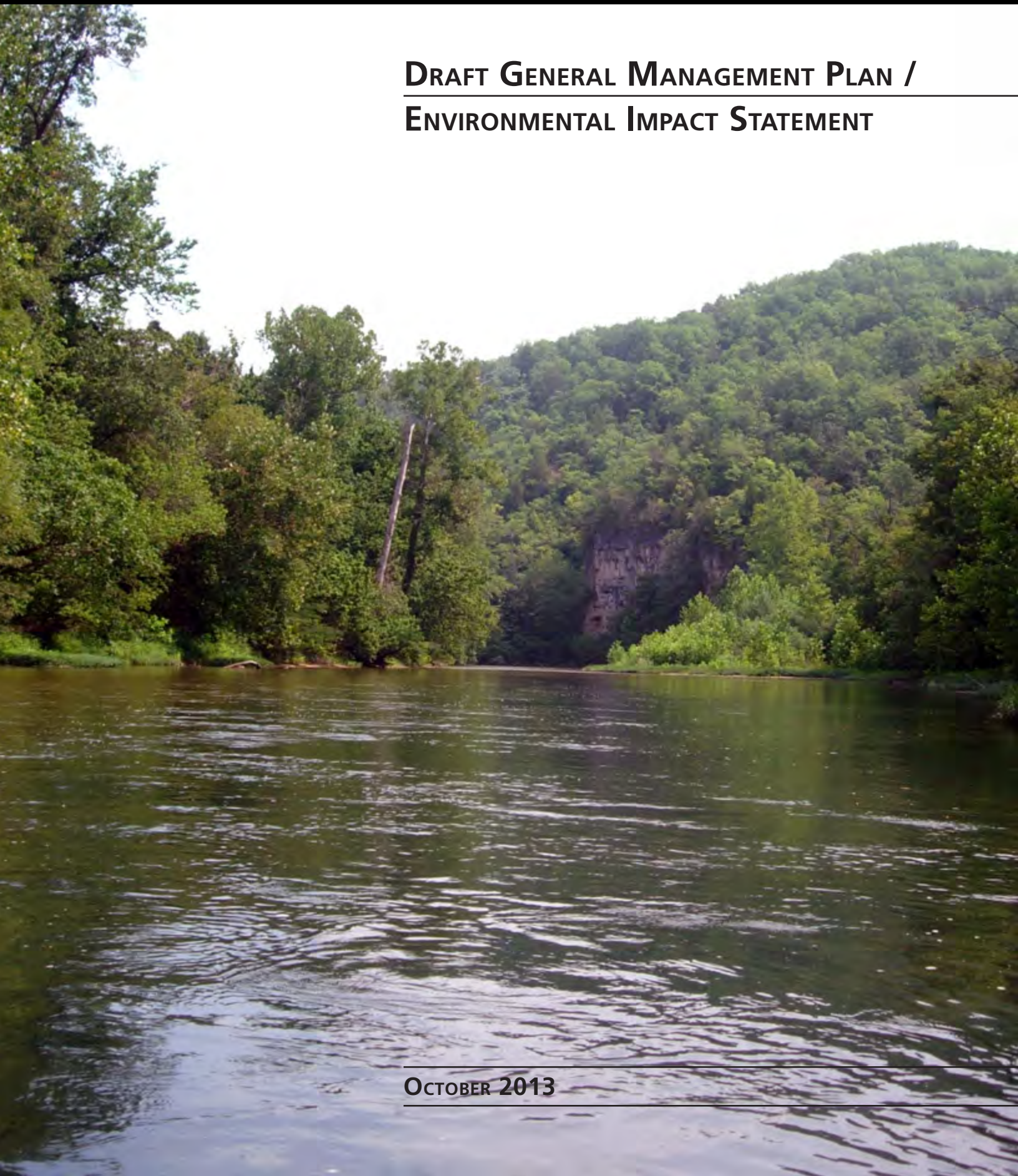
Ozark National Scenic Riverways
Missouri

National Park Service
U.S. Department of the Interior



Draft General Management Plan / Environmental Impact Statement

October 2013

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Draft General Management Plan / Wilderness Study / Environmental Impact Statement

Ozark National Scenic Riverways

Texas, Dent, Shannon, and Carter Counties, Missouri

Ozark National Scenic Riverways was created through congressional legislation on August 24, 1964 (by Public Law 88-492) to conserve and interpret the scenic, natural, scientific, ecological, and historic values and resources within the National Riverways, and to provide for public outdoor recreational use and enjoyment of those resources. The National Riverways include portions of the Current and Jacks Fork rivers, providing 134 miles of clear, free-flowing, spring-fed waterways. The impressive hydrogeologic character of the National Riverways' karst landscape supports an amazing variety of natural features, including a spring system unparalleled in North America. The cave system is equally impressive with one of the highest densities of caves in any national park.

The National Riverways lie within the Ozark Highlands, an important center of biodiversity in North America. The Ozark Highland is home to a rich array of wildlife and plants, including endemic species that exist nowhere else in the world. These two rivers have been designated as Outstanding National Resource Waters in Missouri. The National Riverways also feature archeological and historic structures, landscapes, and objects, reflecting ancient life in the Ozark Highlands. The extraordinary resources of the National Riverways provide outstanding recreational opportunities and experiences on and along free-flowing rivers.

The National Riverways are managed by the National Park Service (NPS). The adjacent state and federal lands are managed by the Missouri Department of Conservation and the U.S. Forest Service. This draft general management plan is needed because the last comprehensive planning effort for the National Riverways was completed in 1984. Much has occurred since then: patterns and types of visitor use have changed, as well as understanding of resources and resource threats within the National Riverways. Each of these changes affects how visitors access and use the park unit and associated facilities, resources are managed, and the National Park Service conducts its operations. The approved general management plan will provide comprehensive guidance for perpetuating natural systems, preserving cultural resources, and providing opportunities for quality visitor experiences at Ozark National Scenic Riverways for the next 15 or 20 years. This document examines the impacts of implementing one no-action and three action alternatives for managing the National Riverways. The no-action alternative would continue current management and provides a basis for determining the impacts of the other alternatives. The three action alternatives (alternative A, alternative B (NPS preferred), and alternative C) present a spectrum of visitor opportunities, visitor facilities, and natural and historic enhancements.

The document also includes a wilderness study for the Big Spring Area of the National Riverways. A study is required by the Wilderness Act of 1964, Secretarial Order 2920, and NPS *Management Policies 2006*. They stipulate that the National Park Service must study roadless and undeveloped areas within the national park system, including new areas or expanded boundaries, to determine whether they should be recommended for designation as wilderness.

This *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* has been distributed to other agencies, interested organizations, and individuals for their review and comment. The public comment period for this document will last for 60 days after the Environmental Protection Agency's notice of availability has been published in the *Federal Register*. Readers are encouraged to submit their comments on this draft plan. Please see "How to Comment" on the next page for further information.

HOW TO COMMENT ON THIS PLAN

Comments on this plan are welcome and will be accepted for 60 days after the Environmental Protection Agency's notice of availability appears in the *Federal Register*. To respond to the material in this plan, written comments may be submitted by any one of several methods, as noted below:

Internet Website:
http://parkplanning.nps.gov/ozar

Mail:
Ozark National Scenic Riverways
404 Watercress Drive
PO Box 490
Van Buren, MO 63965

Personal Delivery:

Written and/or verbal comments may be made at public meetings. The dates, times, and locations of public meetings regarding this general management plan and wilderness study will be announced in the media following release of this document.

Commenters are encouraged to use the Internet. Please submit only one set of comments.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment-including your personal identifying information-may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

EXECUTIVE SUMMARY

PURPOSE OF THE PLAN

Ozark National Scenic Riverways (the NPS Riverways, National Riverways, or the park unit) was established as a unit of the national park system by the U.S. Congress in 1964. The first general management plan for the National Riverways was completed in 1984, and this plan served the park unit well for many years. However, the 1984 plan is outdated and the NPS Riverways is now facing an increasing array of issues that require guidance through an updated, approved general management plan. A new plan is needed for the following reasons:

- Clearly define resource conditions and visitor experiences to be achieved at Ozark National Scenic Riverways.
- Provide a framework for National Park Service (NPS) managers to use when making decisions about how to best protect the NPS Riverways' resources, provide a diverse range of visitor experience opportunities, and manage visitor use, and what kinds of facilities, if any, to develop in the National Riverways.
- Ensure that this framework for decision making has been developed in consultation with interested stakeholders and adopted by NPS leadership after adequate analysis of the benefits, impacts, and economic costs of alternative courses of action.

THE ALTERNATIVES

This *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* (general management plan) presents four alternatives for the future management of Ozark National Scenic Riverways. Based on the purpose and significance of the NPS Riverways, the alternatives provide different ways to manage resources and visitor use and improve facilities and infrastructure.

The four alternatives are the no-action alternative (continuation of current management) and three action alternatives, designated alternative A, alternative B (NPS preferred), and alternative C. The action alternatives include management zones, which only apply to land areas for which the National Park Service has fee title land ownership. Management zones do not apply to private lands within park boundaries, including private lands with overlaying scenic or conservation easements.

Additional actions and alternatives were considered and dismissed from further analysis. Dismissed actions and the supporting rationale are included in "Chapter 2: Alternatives, Including the Preferred Alternative."

No-action Alternative

The no-action alternative describes how Ozark National Scenic Riverways has been and would continue to be managed without the implementation of an action alternative. It reflects current resource conditions and trends, existing recreational opportunities, types of development, and levels of service. The no-action alternative also describes ongoing management issues, such as resource degradation and visitor conflicts. The primary purpose of the no-action alternative is to establish a baseline for determining the impacts of the action alternatives.

The no-action alternative is a description of current management conditions rather than a reiteration of existing planning documents for the National Riverways.

The 1984 general management plan, 1989 river use management plan, and 1992 statement for management all provide a basis for understanding the current management approach.

Under the no-action alternative, the National Park Service would continue to maintain the Big Spring tract's primitive, natural character to maintain its wilderness eligibility.

Alternative A

Under alternative A, management would focus on creating visitor experiences and providing resource conditions that help visitors better understand the riverways of the past, including traditional river recreation activities reminiscent of those that occurred when the National Riverways were established. Management would emphasize greater opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter, less crowded, and slower paced. Management would also focus on protecting natural resources and systems. Under this alternative, most of the Big Spring Wilderness Study Area would be recommended for wilderness designation.

Management would strive to provide more secluded visitor experiences and more awareness of, and opportunities for, historical cultural connections. Emphasis would be placed on restoring natural resources to more natural conditions and limiting development. Visitor services and facilities would be retained only to provide access for specific recreational activities and administrative activities. For example, roads and trails that have been illegally developed would be closed and rehabilitated with native vegetation. Some commercial services may be limited to achieve desired resource and visitor experience conditions.
This alternative would provide a comprehensive NPS Riverways-wide approach to resource and visitor use management. Specific management zones detailing acceptable resource conditions, visitor experience and use levels, and appropriate activities and development would be applied to National Riverways lands consistent with this concept.

Alternative B (NPS Preferred)

Under this alternative, management would enhance opportunities for visitors to discover and learn about the natural wonders and Ozark heritage of the National Riverways, while maintaining a mix of traditional recreational and commercial activities. Emphasis would be placed on increasing opportunities for visitor education and connections to natural resources and cultural landscapes.

This alternative would focus on providing a balance of diverse recreational opportunities and visitor experiences along with increasing visitor education and appreciation of natural and cultural resources of the park unit. For example, a mix of private and guided traditional recreational activities like boating, floating, and horseback riding would occur under this alternative. Additional trails and a small learning center at a rehabilitated Powder Mill would be developed to better orient and inform visitors. Natural resources would be restored to more natural conditions, while maintaining greater opportunities for visitor access than under alternative A. Most of the Big Spring Wilderness Study Area would be recommended for wilderness designation.

This alternative would provide a comprehensive NPS Riverways-wide approach to resource and visitor use management. Specific management zones detailing acceptable resource conditions, visitor experience and use levels, and appropriate activities and development would be applied to NPS Riverways lands consistent with this concept.

Alternative C

Under alternative C, management would primarily seek to provide a diversity of outdoor recreational opportunities and experiences while maintaining the highly scenic natural setting and cultural resources. The National Riverways would be managed to support higher levels and diverse types of recreational opportunities, with a focus on more intensive management to ensure that excessive impacts on resources or public safety would not occur. In addition, land-based recreational opportunities would be increased.

Visitors would experience higher levels of social interaction with other visitors, especially during the peak season, which is defined as March 15 through Labor Day. Additional facilities such as campgrounds and trails would be developed to accommodate increased levels and different types of visitor use.

To support these recreational conditions, there would be a higher tolerance for resource impacts on more heavily used areas. Monitoring efforts would be emphasized to track natural resource conditions so unacceptable impacts from recreational activities did not occur. Interpretive and education programs would focus on expanding visitor connection with natural and cultural resources while improving their knowledge of low-impact recreational uses. The goal of such programs would be to encourage resource stewardship. Under this alternative, approximately half of the Big Spring Wilderness Study Area would be recommended for wilderness designation.

This alternative would provide a comprehensive NPS Riverways-wide approach to resource and visitor use management. Specific management zones detailing acceptable resource conditions, visitor experience and use levels, and appropriate activities and development would be applied to NPS Riverways lands consistent with this concept.

NEXT STEPS

After the distribution of the *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement,* there will be a 60-day public review and comment period. Afterward, the National Park Service planning team will evaluate comments from other federal agencies, tribes, organizations, businesses, and individuals regarding this draft plan. The National Park Service will then incorporate appropriate changes and prepare a final general management plan. The final plan will include letters from governmental agencies, any substantive comments on the draft document, and NPS responses to those comments.

Following distribution of the final general management plan and a 30-day no-action period, a record of decision approving a final plan will be prepared for signature by the NPS regional director. The record of decision documents the NPS selection of an alternative for implementation. The plan will then be implemented, depending on funding and staffing. A record of decision does not guarantee funds and staff for implementing the approved plan.

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GUIDE TO THIS DOCUMENT

This *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* is organized in accordance with the Council on Environmental Quality's implementing regulations for the National Environmental Policy Act, the NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making*, and the NPS *General Management Planning Dynamic Sourcebook*.

Chapter 1: Introduction sets the framework for the document. It describes why the plan is being prepared and what needs it addresses based on the Ozark National Scenic Riverways' legislated mission, its purpose, the significance of its resources, special mandates and administrative commitments, servicewide mandates and policies, and other planning efforts in the area.

The chapter also details the planning opportunities and issues that were raised during public scoping meetings and initial planning team efforts. The alternatives developed and presented in the next chapter address these issues and concerns to varying degrees. This chapter concludes with a statement of the scope of the environmental impact analysis, including what impact topics were retained or dismissed from detailed analysis and why.

Chapter 2: Alternatives, Including the Preferred Alternative begins with an explanation of how the alternatives were formulated and how the preferred alternative was identified. A comparison of costs for implementing the alternatives is included. The four alternatives (including continuation of current management) are then presented. Mitigation measures to minimize or eliminate the impacts of some proposed actions are described just before the discussion of future studies and/or implementation plans that would be needed. The evaluation of the environmentally preferable alternative is followed by summary tables of the environmental consequences of implementing the alternative actions.

Chapter 3: Wilderness Study begins with an explanation of how the study was completed and a description and map of the study area. This section explains the wilderness eligibility process and how this relates to areas of the National Riverways. Public comments regarding wilderness designation are summarized in this chapter. A comparison of alternatives analyzed for the wilderness study is then presented. The wilderness proposal process is explained as well as how managing for wilderness may affect planning and management of services, resources, and uses of the wilderness area.

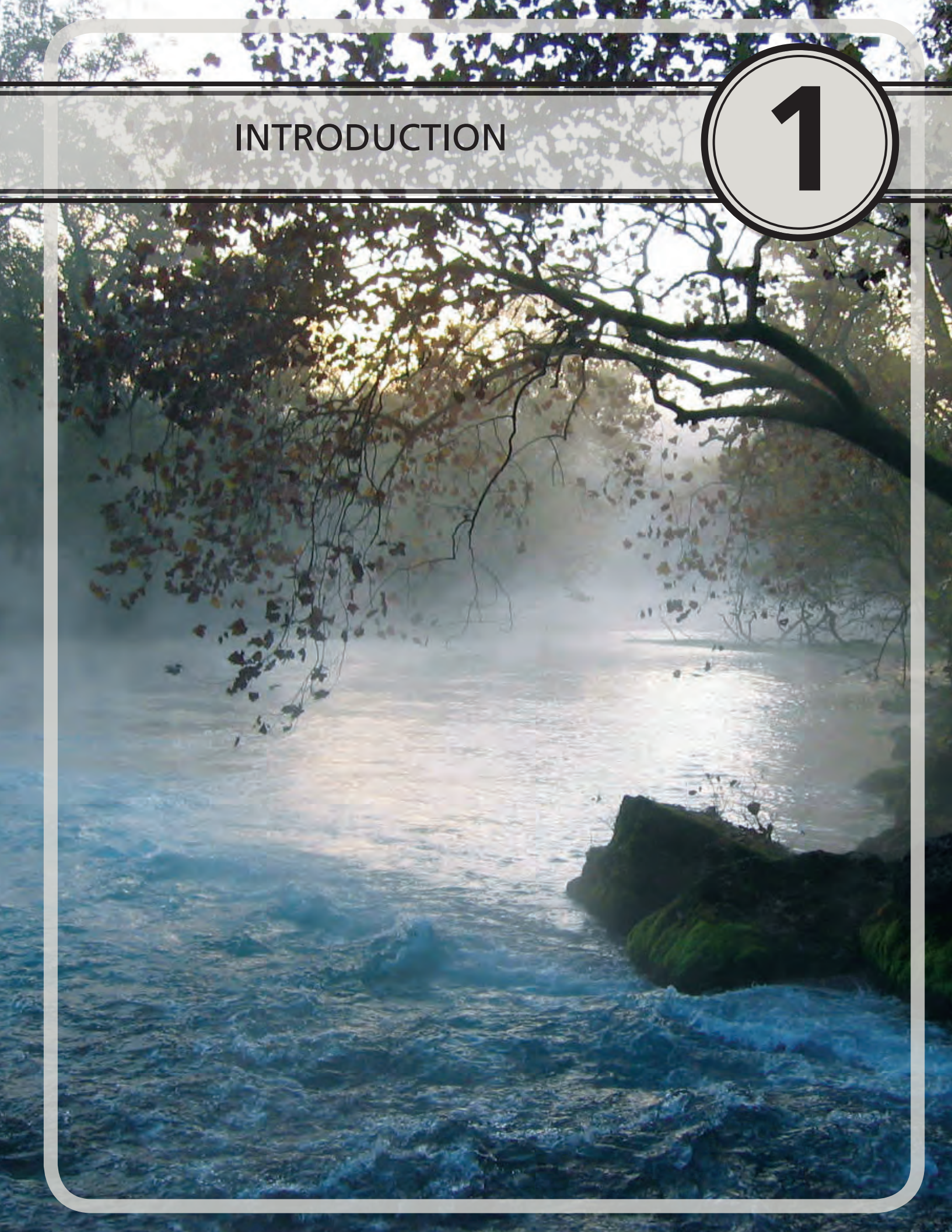
Chapter 4: Affected Environment describes those areas and resources that would be affected by implementing actions in the various alternatives. Included are natural resources, cultural resources, visitor use and experience, soundscapes, park operations, and the socioeconomic environment.

Chapter 5: Environmental Consequences analyzes the impacts of implementing the alternatives on topics described in "Chapter 4: Affected Environment." Methods that were used for assessing the impacts in terms of the locality, intensity, type, and duration of impacts are outlined at the beginning of the chapter.

Chapter 6: Consultation and Coordination describes the history of public and agency coordination during the planning effort and any future compliance requirements. It also lists agencies and organizations that will be receiving copies of the document, and NPS responses to comments received on the draft plan.

Chapter 7: Appendixes, References, Preparers and Consultants presents supporting information for the document.

1 INTRODUCTION



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INTRODUCTION

Planning for Ozark National Scenic Riverways (the Riverways, National Riverways, or the park unit) is a decision-making process, and general management planning is the first and broadest level of decision making for national park system units. General management plans are intended to establish the future management direction of a park. General management planning focuses on why the park unit was established (purpose), why it is special (its significance and its fundamental resources and values), and what resource conditions and visitor experiences should be achieved and maintained (desired future conditions).

General management plans are intended to be long-term documents that look years into the future to establish a management philosophy and framework for decision making and problem solving in units of the national park system. General management plans usually provide guidance for approximately 20 years. The plan does not provide specific, detailed answers to every issue facing the National Riverways, but rather is a framework to assist National Park Service (NPS) managers in making decisions today and in the future.

Actions directed by general management plans or in subsequent implementation plans are accomplished over time. Although a general management plan provides the analysis and justification for future funding, the plan in no way guarantees that money will be forthcoming. Budget restrictions, requirements for additional data or regulatory compliance, and competing national park system priorities prevent immediate implementation of many actions.

This *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* was developed by an interdisciplinary team in consultation with NPS offices; tribes; federal, state, and local agencies; organizations; and other interested parties. Preparation also included substantial input and participation from the general public.

This plan presents and analyzes four alternative future directions for the management and use of Ozark National Scenic Riverways. The potential environmental impacts of the alternatives have been identified and assessed.

BACKGROUND ON PLAN DEVELOPMENT

Developing a vision for the park's future (and identifying the management direction that would help create that future) is the primary role of the general management plan. However, before a particular vision is decided upon, several possible visions and management directions are developed and analyzed. These different possibilities are called alternatives. Each alternative includes a variety of potential strategies that fit together in a unified management direction. The development of alternatives included a wide range of input from the public, NPS staff, and other agencies.

Evaluating alternatives enables planners and the public to compare and contrast the advantages and disadvantages of one course of action over another. Such comparison is a requirement of the National Environmental Policy Act and is at the core of the NPS general management plan process. In order to organize information and formulate alternatives appropriate for the entire area included in the National Riverways, extensive consultation was sought with other agencies, tribes, offices, and the general public.

Management Zones

The development of management zones is an important tool used by planners in the general management planning process. These zones tell how areas of the National Riverways would be managed in the future. Management zones describe desired conditions for the National Riverways' cultural and natural resources and for visitor experiences. The conditions are different in each zone and are intended to represent the widest possible range of conditions that would be appropriate to the National Riverways' purpose and significance.

Seven management zones were developed for the National Riverways, based on ideas from public comments and from the park's staff. For Ozark National Scenic Riverways, zones would only be applied to the Current and Jacks Fork rivers and those land areas for which the National Park Service has fee title ownership. Lands with timber or scenic easements and private lands within the NPS Riverways' boundary are not zoned. There are no proposed management zones for the no-action alternative, since that alternative projects current, on-the-ground management conditions into the future.

Exploration of Alternatives

This general management plan presents a no-action alternative and three action alternatives for future management for Ozark National Scenic Riverways. The no-action alternative describes continuation of current park management practices and provides a baseline for comparison of the three action alternatives.
For each action alternative, which are designated A, B, and C, a set of maps has been prepared showing the application of management zones based on the alternative concepts. For example, the NPS Riverways could be managed under a concept emphasizing high recreational activity and visitor interaction, a concept emphasizing primitive natural resource values, or a concept emphasizing remote recreation and visitor solitude. While these concepts would overlap in some ways, these different emphases would require various areas of the NPS Riverways to be managed differently. These kinds of differences between the concepts of the alternative can be seen on the maps presented in "Chapter 2: Alternatives, Including the Preferred Alternative."

Public comments on the alternatives during the scoping period helped the National Park Service refine the alternatives and management zones. Those alternatives are presented in this *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement*.

BRIEF DESCRIPTION OF THE PARK

Ozark National Scenic Riverways was established by an Act of Congress in 1964 (Public Law 88-492) to protect 134 miles of the Current and Jacks Fork rivers in the Ozark Highlands of southeastern Missouri. As stated in the enabling legislation, the purpose of the National Riverways is:

> . . . conserving and interpreting unique scenic and other natural values and objects of historic interest, including preservation of portions of the Current River and the Jacks Fork River in Missouri as free-flowing streams, preservation of springs and caves, management of wildlife, and provisions for use and enjoyment of the outdoor recreation resource thereof by the people of the United States . . .

Appendix B provides the full text of the enabling legislation for Ozark National Scenic Riverways.

The National Riverways are in southern Missouri, in Shannon, Carter, Dent, and Texas counties (see the Ozark National Scenic Riverways Overview Map). Within its boundaries are approximately 80,785 acres of river, forest, open field, and glade environments. Of that, 61,368 acres are federal and 19,417 acres are in nonfederal ownership.

The National Riverways' headquarters is in Van Buren, Missouri, about 190 driving miles south of St. Louis, Missouri and 148 miles east of Springfield, Missouri. The free-flowing rivers run through the Courtois Hills, among the most rugged areas of the Missouri Ozarks.

The hills rise abruptly from the valley floors and narrow hollows that meander between the steep ridges. The landscape is predominantly rural, with dense deciduous forests and occasional open fields that are often the remnants of former farms. Much of the area is underlain by soluble limestone and dolomite that has given rise to numerous sinkholes, caves, and springs representative of classical karst topography. Up to 90% of the combined flow of the Current River and Jacks Fork comes from the more than 400 springs in the drainage basin (Mugel *et al*. 2009). Big Spring, one of the largest springs in the United States, has an average flow of approximately 287 million gallons of water per day.

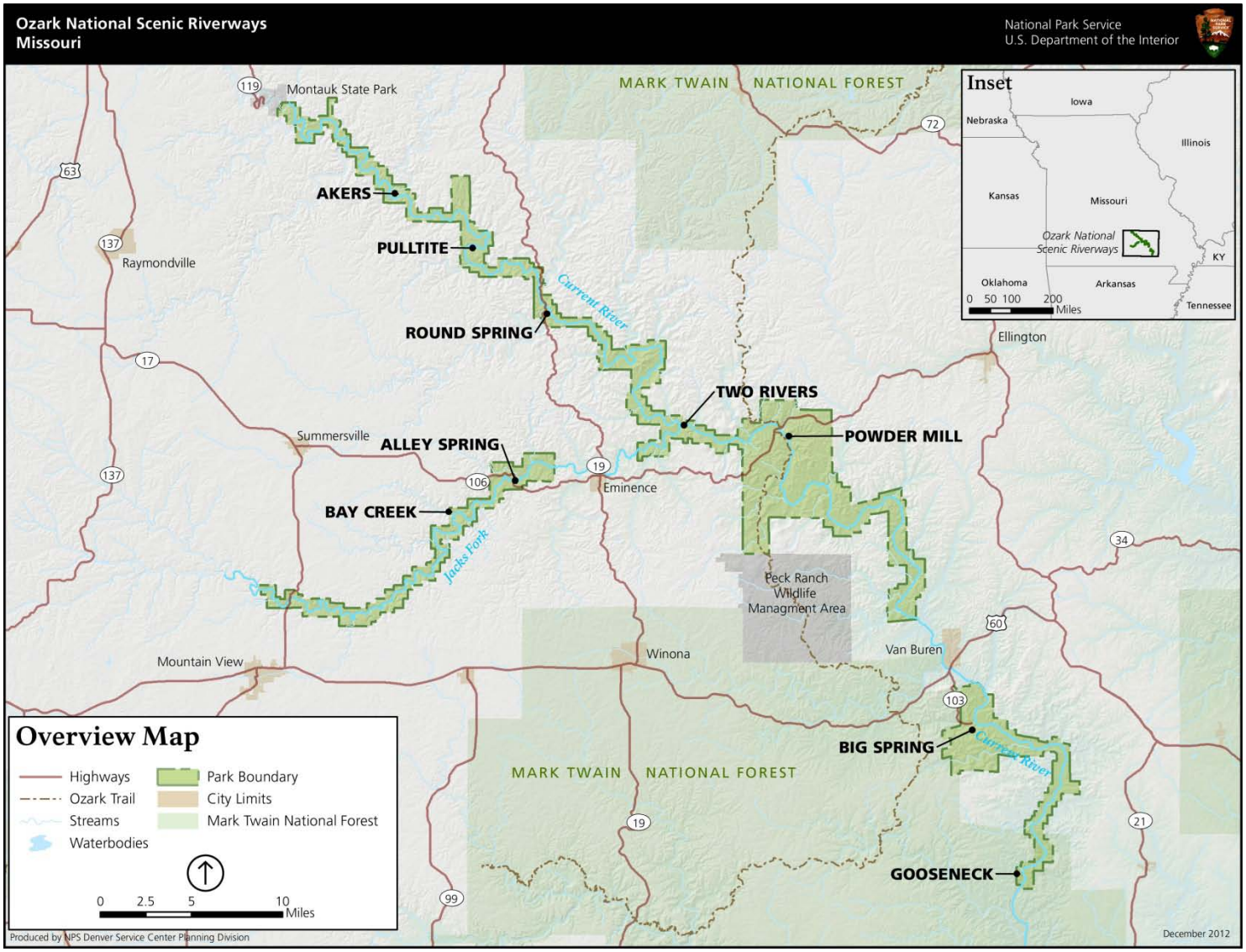
In addition to a wide diversity of fish, bird, and mammal species, the NPS Riverways contains hundreds of plant species ranging from rare wild orchids to abundant goldenrod and coneflowers. Some dry hilltops feature desert-like glades where collared lizards, tarantulas, cacti, and other species more typical of the Southwest may be found. Several areas in the park unit are designated "Missouri Natural Areas," because of their unique scenic beauty or scientific value.

The NPS Riverways also contains a broad range of cultural resources, including prehistoric sites associated with thousands of years of American Indian use and occupation of the area, and later 19th century structures and sites such as mills and farms that reflect the patterns of settlement and the economic activities of early Euro-American pioneers. The NPS Riverways also preserves significant examples of buildings and structures built by the Civilian Conservation Corps during the 1930s. Several of the NPS Riverways' historic properties are listed in the National Register of Historic Places.

The Current and Jacks Fork rivers provide excellent recreational opportunities that include, but are not limited to, boating, canoeing, tubing, swimming, fishing, and sightseeing. Visitors also enjoy hiking, backpacking, hunting, and horseback riding.

BRIEF DESCRIPTION OF WILDERNESS STUDY

The National Park Service is required to study the suitability of lands within the national park system for preservation as wilderness. Lands designated by Congress as wilderness are permanently set aside in a natural condition to provide outstanding opportunities for solitude or primitive and unconfined recreation. A wilderness study evaluates if lands and waters in areas managed by the National Park Service are appropriate for designation as wilderness. The inclusion of a wilderness evaluation in the current planning effort is to fulfill the NPS commitment in the 1984 *Ozark National Scenic Riverways General Management Plan* to initiate a formal wilderness study should "conditions precluding legislative wilderness designation change in the future." The study is supported by documented analysis in compliance with the National Environmental Policy Act and the National Historic Preservation Act.


Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
Montauk State Park
MARK TWAIN NATIONAL FOREST
AKERS
PULLTITE
ROUND SPRING
Current River
Raymondville
Summersville
ALLEY SPRING
BAY CREEK
Jacks Fork
Eminence
TWO RIVERS
POWDER MILL
Ellington
Peck Ranch Wildlife Managment Area
Winona
Van Buren
Mountain View
BIG SPRING
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Overview Map
Highways
Ozark Trail
Streams
Waterbodies
Park Boundary
City Limits
Mark Twain National Forest
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Produced by NPS Denver Service Center Planning Division
December 2012

ESTABLISHMENT OF OZARK NATIONAL SCENIC RIVERWAYS

Efforts to protect the scenic and recreational values of the area now included in Ozark National Scenic Riverways began in the latter 19th century. After the Civil War, large corporate lumber operations cleared much of the pine stands along the Current and Jacks Fork rivers, which resulted in widespread environmental damage. Despite the adverse effects of the lumber operations, the area nevertheless became a popular recreation destination for sportsmen by the turn of the 20th century. Hunting and fishing clubs and cabin retreats provided recreational opportunities for wealthy urban businessmen, and floating the rivers on johnboats became a popular activity. The area's scenic beauty received national attention following a float trip and visit to Alley Spring in 1909 by Missouri Governor Herbert S. Hadley. A private company later purchased the mill hamlet of Alley and promoted it as a "pleasure resort."

By the 1920s, auto-touring became a popular recreational activity, and the demand for better roads in the Current River area prompted highway and bridge construction projects. To complement the road improvements, Missouri State Parks established Big Spring, Alley Spring, and Round Spring State Parks in 1924. The parks became popular destinations for motoring visitors. Site development projects and enhanced visitor facilities were constructed at these parks and other regional locations by the Civilian Conservation Corps (CCC) during the Great Depression of the 1930s. In addition to the state parks, several private recreational resorts, health spas, and river guide/outfitting services emerged along the Current River during the 1920s and 1930s.

Proposals to dam the Current River for commercial hydroelectric power and recreational development became topics of heated political debate after 1930. The U.S. Army Corps of Engineers was authorized by Congress to construct 50 dams in Missouri during the decade. Opposition to damming the Current River emerged among a coalition of conservation groups and local citizens. World War II delayed the construction plans as federal funding priorities were focused on the war effort.

In 1949, Missouri Governor Forrest Smith voiced strong support for maintaining the Current River in its free-flowing natural condition. The U.S. Army Corps of Engineers withdrew its plans to dam the river the following year.

In 1956, a joint state and federal agency report called for the creation of a national recreation area for the Current, Jacks Fork, and Eleven Point rivers. This was followed by a study undertaken in 1960 by the National Park Service that assessed the feasibility of adding the rivers to the national park system. The broad coalition that had earlier formed to preserve the Current River divided between those who favored NPS management to preserve natural values and promote tourism and those who favored the more multiple-use approach of the U.S. Forest Service. The latter approach promoted scenic easements (rather than outright federal acquisition) to regulate private farming and timber lands along the rivers.

A series of bills were introduced in Congress between 1960 and 1964 to preserve the Ozark riverways. However, the factional differences that had emerged between those with different visions for management of the riverways contributed to the bills' defeat. Despite these setbacks, strong backing for federal management came from Secretary of the Interior Stewart L. Udall (who floated the Current River in 1961) and President John F. Kennedy who endorsed the establishment of what was then envisioned as "Ozark National Monument."

In 1963, Missouri's congressional delegation united in drafting a revised bill that retained provisions for scenic easements and allowed hunting and fishing according to state regulations. The Eleven Point River and the lower section of the Current River were dropped from the final legislation.

In 1964, President Lyndon Johnson signed the legislation establishing Ozark National Scenic Riverways, and a formal dedication ceremony was held eight years later, in 1972, at Big Spring. The NPS Riverways became the first federally protected national rivers and provided the impetus for subsequent enactment of the National Wild and Scenic Rivers Act of 1968.

PURPOSE OF THE PLAN

The approved general management plan will be the basic document for managing Ozark National Scenic Riverways for the next 20 years or until a new plan replaces it. The purposes of this general management plan are as follows:

- Clearly define resource conditions and visitor experiences to be achieved in Ozark National Scenic Riverways.
- Provide a framework for National Riverways managers to use when making decisions about such issues as how to best protect National Riverways resources, provide a quality visitor experience, and manage visitor use, and what kinds of facilities, if any, to develop in the National Riverways.
- Ensure that this foundation for decision making has been developed in consultation with interested stakeholders and adopted by the NPS leadership after an adequate analysis of the benefits, impacts, and economic costs of alternative courses of action.

Legislation establishing the National Park Service as an agency and governing its management provides the fundamental direction for the administration of Ozark National Scenic Riverways (and other units and programs of the national park system). As discussed later in this chapter under "Servicewide Mandates and Policies," management of the National Riverways also must comply with many other federal laws. This general management plan will build on this large body of legislation plus the laws that established Ozark National Scenic Riverways to provide a vision for the National Riverways' future. The alternatives in this general management plan address the desired future conditions that are not mandated by law and policy and must be determined through a planning process.

NEED FOR THE PLAN

This new management plan for Ozark National Scenic Riverways is needed because the last comprehensive planning effort for the National Riverways was completed in 1984. Much has occurred since then:

- Patterns and types of visitor use have changed and technology has introduced opportunities for recreational activities and access not envisioned in the past.
- The National Park Service is continually learning more about the riverways' diverse natural and cultural resources and the challenges involved in protecting them.
- Existing uses have changed, providing opportunities to recommend some of the NPS Riverways' lands for designation as potential wilderness.

Each of these changes has major implications for how visitors access and use the National Riverways, the facilities needed to support those uses, how resources are managed, and how the National Park Service manages its operations.

The general management plan represents a commitment by the National Park Service to the public on how the National Riverways will be used and managed. As such, it is intended to

- confirm the purpose and significance of the National Riverways
- determine the best mix of resource protection and visitor experiences beyond what is prescribe by law and policy, based on the purpose and significance statements for the National Riverways; the range of public expectations and concerns; the natural and cultural resources in the National Riverways; the impacts of the alternatives on natural, cultural, and socioeconomic conditions; impacts on visitor use and experience; and long-term economic considerations and costs
- define management zones that implement the goals of the National Park Service and the public with regard to natural and cultural resource management and protection and visitor use and experience—facilities that are appropriate within each management zone are also identified
- assist NPS staff in determining whether actions proposed by the National Park Service or others are consistent with the goals embodied in the approved general management plan
- serve as the basis for more detailed management documents, such as five-year strategic plans and implementation plans such as resource stewardship plans and visitor use plans

Implementation funding is not automatically forthcoming once the general management plan is approved. The National Riverways must compete with other units in the national park system for funding.

The general management plan does not describe how particular programs or projects should be prioritized or implemented. Those decisions will be addressed during the more detailed planning in strategic and implementation plans. All of those plans depend on subsequent funding and will be based on the goals, future conditions, and appropriate types of activities established in the approved general management plan.

The general management plan is also needed to meet the requirements of the National Parks and Recreation Act of 1978 and NPS policy. These mandate development of a general management plan for each unit in the national park system.

PURPOSE OF AND NEED FOR THE WILDERNESS STUDY

The National Park Service is required to study the suitability of lands within the national park system for preservation as wilderness. Lands designated by Congress as wilderness are permanently set aside in a natural condition to provide outstanding opportunities for solitude or primitive and unconfined recreation. A wilderness study evaluates if lands and waters in areas managed by the National Park Service are appropriate for designation as wilderness. The inclusion of a wilderness evaluation in the current planning effort is to fulfill the NPS commitment in the 1984 *Ozark National Scenic Riverways General*

Management Plan to initiate a formal wilderness study should "conditions precluding legislative wilderness designation change in the future." The study is supported by documented analysis in compliance with the National Environmental Policy Act and the National Historic Preservation Act.

The 1984 planning effort evaluated the entire Ozark National Scenic Riverways for wilderness suitability. Three potential wilderness areas were identified: the Upper Jacks Fork, Big Spring, and Cardareva. Due to land ownership and uses in those areas which did not conform to wilderness, the plan correctly noted that a legislative wilderness designation would be precluded at that time. The plan did, however, recognize the wilderness qualities of these areas and stated the agency's commitment to take another look at the same areas in the future when circumstances surrounding land ownership and use changed.

The Upper Jacks Fork and Cardareva areas still do not meet the congressional wilderness requirement for federal land ownership, and the Upper Jacks Fork area still has nonconforming uses that prevent the National Park Service from proposing the area for wilderness. However, the Big Spring area now does warrant further study. The nonconforming conditions at Big Spring have been resolved, and there has been ongoing public interest in seeing the Big Spring tract (3,434 acres) managed for wilderness qualities. This public interest is also focused on the contiguous U.S. Forest Service Big Spring tract (3,518 acres).

This wilderness study evaluates the Big Spring area within Ozark National Scenic Riverways for possible recommendation to Congress for inclusion in the national wilderness preservation system. All three action alternatives of the general management plan explore a wilderness option for the Big Spring area. The outcome of this planning process may result in a wilderness recommendation to Congress.

THE NEXT STEPS IN THE PLANNING PROCESS

After distribution of this *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement*, there will be a 60-day public review and comment period. After this, the NPS planning team will evaluate comments from other federal and state agencies, tribes, organizations, businesses, and individuals regarding the draft plan and will incorporate appropriate changes into a final *Ozark National Scenic Riverways General Management Plan / Wilderness Study / Environmental Impact Statement*. The final plan will include letters from governmental agencies, any substantive comments on the draft document, and NPS responses to those comments.

Following distribution of the *Ozark National Scenic Riverways Final General Plan / Wilderness Study / Environmental Impact Statement* and a 30-day no-action period, a record of decision approving the final plan will be prepared for signature by the NPS regional director. The record of decision will document the NPS selection of an alternative for implementation. With the signing of the record of decision, implementation of the plan can begin.

IMPLEMENTATION OF THE PLAN

Implementation of the approved plan will depend on future funding. The approval of a plan does not guarantee that the funding and staffing needed to implement the plan would be forthcoming. Full implementation of the approved plan could be many years in the future. The implementation of the approved plan could also be affected by other factors such

as changes in NPS funding, visitor use patterns, requirements for additional data or regulatory compliance, competing national park system priorities, and uncontrollable environmental changes.

Once the general management plan has been approved, additional feasibility studies and more detailed planning and environmental documentation would be completed, as appropriate, before any proposed actions can be carried out, as in the following examples:

- Appropriate permits would be obtained before implementing actions that would impact wetlands.
- Appropriate federal and state agencies would be consulted concerning actions that could affect threatened and endangered species.
- American Indian tribes, the state historic preservation officer, local governments, and the public would be consulted.

The general management plan does not prescribe how particular programs or projects should be implemented. Those decisions would be addressed during more detailed planning efforts associated with the development of future strategic and implementation plans. All future plans would tier from the approved general management plan and would be based on the goals, future conditions, and appropriate types of activities that it established.

FOUNDATION FOR PLANNING AND MANAGEMENT

PARK PURPOSE

Purpose statements convey the reasons for which the national park unit was set aside as part of the national park system. Grounded in an analysis of park legislation and legislative history, purpose statements also provide primary criteria against which the appropriateness of plan recommendations, operational decisions, and actions are tested. A park unit's purpose statement focuses the NPS' management role at a particular park unit but does not supersede the NPS Organic Act (see "Servicewide Laws and Policies" section later in this chapter).

The purpose of Ozark National Scenic Riverways is to

- preserve and protect in an unimpaired condition the unique scenic and natural values, processes, and unspoiled setting derived from the clean, free-flowing Current and Jacks Fork rivers, springs, caves, and their karst origins
- provide for and promote opportunities for the scientific and public understanding of the natural and cultural resources
- offer opportunities for understanding and appreciating the human experience associated with the Ozark Highlands landscape
- provide for uses and enjoyment of the outdoor recreation opportunities consistent with the preservation of the park unit's resources.

PARK SIGNIFICANCE

Significance statements capture the essence of the Ozark National Scenic Riverways' importance to our country's natural, cultural, and recreational heritage. Significance statements do not inventory resources; rather they describe the NPS Riverways' distinctiveness and help to place the park unit within its regional, national, and international contexts. Significance statements answer questions such as why the Ozark National Scenic Riverways' resources are distinctive and what they contribute to our natural, cultural, and recreational heritage. Defining the National Riverways' significance helps managers make decisions that preserve the resources and values necessary to accomplish the park unit's purpose.

The significance statements are as follows:

- The impressive hydrogeologic character of the Ozark National Scenic Riverways' karst landscape supports an amazing variety of natural features, including a spring system that is world-class and unparalleled in North America. The park unit features the largest spring in the national park system, six first-magnitude (discharge rate of 100 cubic feet of water per second) springs and spring complexes, and over 350 springs parkwide. The cave system is equally impressive, with 402 documented caves within the park unit boundary—one of the highest densities of any national park system unit.
- Ozark National Scenic Riverways contains 134 miles of clear, free-flowing, spring-fed rivers. These include the Jacks Fork and Current Rivers, which are two of only three

Outstanding National Resource Waters in Missouri.

- The ancient Ozark Highlands is an important center of biodiversity in North America, including numerous endemic species that are found nowhere else in the world. The large variety of species found within Ozark National Scenic Riverways is due to the rich array of aquatic, terrestrial, and subterranean habitats concentrated within its river corridors.
- Ozark National Scenic Riverways features archeological sites, historic structures, objects, and landscapes that reflect more than 12,000 years of people living along, adapting to, and interacting with these Ozark Highland rivers.
- The complex and dynamic natural resources and systems of the Ozark National Scenic Riverways provide for outstanding, high-quality recreational experiences on and along free-flowing rivers.

FUNDAMENTAL RESOURCES AND VALUES

Fundamental resources and values are systems, processes, features, visitor experiences, stories, and scenes that deserve primary consideration in planning and management because they are critical to maintaining the park unit's purpose and significance. Fundamental resources and values are subject to periodic review and updates based on new information or changing conditions.

The planning team, with assistance from other resource experts and the public, has identified the following fundamental resources and values for Ozark National Scenic Riverways. The fundamental resources and values listed below are only a portion of the National Riverways' total resources and values; all resources and values were considered in this planning effort.

Natural Resources

Karst-based Hydrogeological System. The Ozark National Scenic Riverways is situated in a geologically and hydrologically complex area along the Current and Jacks Fork rivers. The geology of these two watersheds is composed primarily of rock formations of soluble limestone and dolomite, which produced an intricate karst landscape of disappearing streams, underground rivers, sinkholes, caves, and springs. The hydrogeologic processes of this karst landscape have also created an unusually high density of extraordinary caves and springs. Big Spring is the largest freshwater spring in the national park system. At least 90% of the combined flow of the Current and Jacks Fork rivers is from springs, which account for their year-round, sustained flows.

Free-flowing River Water Quality. Exceptionally high water quality and clarity of the free-flowing Current and Jacks Fork rivers has led to designation of these rivers as two of only three Outstanding National Resource Waters in Missouri. This designation has national, recreational, and ecological significance. Ozark National Scenic Riverways contains 134 miles of exceptionally clear, free-flowing rivers. This remarkable water clarity is primarily because most of the water that flows into the Jacks Fork and Current Rivers is spring fed.

High-quality Ecosystems. The Ozark National Scenic Riverways has a diversity of rare, high-quality ecosystems that support an assemblage of unique plants and animals. This rich biological diversity has evolved in response to the hydrogeologic processes of the area's

ancient karst landscape. Simultaneously, the lack of glaciation or inundation of the Ozark physiographic province allowed the region to serve as lasting refuge for species colonization and adaptation. This combination of factors fostered an interconnected system of terrestrial, aquatic, and subterranean microhabitats that contributes to the park unit's high biological diversity and has made the Ozarks an important North American region of endemism where many species exclusively occur.

Cultural Resources

Human Occupation of and Enduring Connection to the Ozark Highlands. The rich cultural history of the Current and Jacks Fork Rivers is manifested in several ways including the archeological record that documents thousands of years of human presence, surviving historic structures, museum collection items, and the customs and stories that have been passed on from generation to generation. Throughout this long, interconnected history, the rivers have remained a primary focus of a landscape that has sustained prehistoric and historic populations, and helped shape their cultural identities. Archeological and ethnographic resources, historic structures, cultural landscapes, and museum collections combine to help tell the story of humans' occupation of and enduring connection to the Ozark Highlands. A relatively complete record of prehistoric American Indian occupation is represented in a variety of archeological habitation sites, ranging from simple campsites to more elaborate base camps and villages. These sites reflect changes in the human adaptation, settlement, and subsistence strategies practiced through time. The National Riverways also contain outstanding examples of traditional Ozark domestic and industrial architecture as well as Civilian Conservation Corps-constructed timbered stone structures.

Visitor Experience Values

Outstanding, High-quality Recreational Experiences on and along Free-flowing Rivers. The essence of an Ozark National Scenic Riverways visitor experience includes enjoying clear, free-flowing water in a tree-covered valley with a chance to observe native wildlife, explore a cave, or ponder the size of a spring flow. It is nationally recognized as one of the most scenic float trips in America, offering an experience that can be both invigorating and reflective. There are few opportunities for such high-quality recreation experiences in a natural river environment.

PRIMARY INTERPRETIVE THEMES

Primary interpretive themes are the most important ideas and concepts communicated to the public about the park unit. They are the core of all interpretive programs and media provided to park unit visitors. The following primary interpretive themes are the most important ideas or concepts to be communicated to the public about the NPS Riverways:

Karst

The Current and Jacks Fork rivers arise from an extensive karst geomorphology consisting of massive water conduits that remain tantalizingly hidden from view on the surface. Discovery, exploration, and scientific understanding of this complex natural system continue to take place.

Natural Resource

Ozark National Scenic Riverways preserves ecological processes and systems that sustain a high-quality example of an Ozark riparian landscape and its natural communities. This oldest continuously exposed land mass in North America features a subtle, fragile collection of

diverse and relict species and special environments that stimulate wonder, curiosity, and a zeal for discovery in all who experience its meaning.

Water Quality

The relatively undeveloped nature of the watershed directly contributes to the outstanding water quality and clarity in the riverways. However, the rivers and springs remain highly susceptible to pollution far beyond the boundaries of the National Riverways because of the nature of the karst environment. Karst factors that influence water quality include high porosity of aquifers and rapid rates of groundwater movement and recharge. These features of a karst system can create direct pathways for surface contaminants to quickly enter the groundwater system where remediation is difficult. Since local communities depend on groundwater for their survival, scientists strive to expand their limited knowledge and understanding of the natural consequences of potential developments within the watershed.

Archeology

During the past 12,000 years, prehistoric peoples have benefited from the diverse natural resources available on the eastern slope of the Ozark Highland. The Ozark riverine environment offered abundant foodstuffs exploited by a subsistence strategy based on movement of prehistoric groups from place to place throughout the seasons. Locations of primary camps were along the major streams in the same locations where people like to camp today. Archeological materials from these prehistoric peoples are well represented in the NPS Riverways and provide significant insights into their adaptations to the Ozark environment.

Historical archeological resources have also been identified and recorded associated primarily with 19th and early 20th century farmsteads, town and mill sites, extractive industries, and other settlement activities.

Ozark Culture

The Ozark region features a currently viable culture, making conscious choices in its way of life. This pragmatic lifestyle respects loyalty to clan and kin, values personal independence, and ensures survival through interaction with local resources. Local residents have traditionally been fiercely independent and self-sufficient. They continue to engage in traditional forms of practical recreation such as hunting, fishing, picnicking, and family reunions while seeking personal renewal and rejuvenation within the river corridor.

History

An Ozark culture evolved from the early 19th century settlement of the Current and Jacks Fork rivers by mostly Scots-Irish families from the highlands of Kentucky and Tennessee. The Ozarkers relied on close family ties along the streams and lived off small patches of corn, hogs raised on the open range, the abundant springs, and plants and animals found in the forest. They often gathered and hunted the latter for trade goods.

After the Civil War, major corporations entered the region and engaged in the large-scale extraction of the timber. The highland culture experienced significant change but characteristically adapted and continued. This included the introduction of a recreational float-fishing and hunting industry on and along the rivers.

State and federal governments addressed the damage to natural resources with the restoration of the forest and establishment of state parks and a national forest. Later,

the rivers became an early example of a shift in public interest to protecting the value of free-flowing rivers, resulting in the first federally protected river system.

Recreation

The resources of the NPS Riverways provide a wide variety of appropriate and relatively safe recreational opportunities and experiences. The compelling sensory experience of traveling on clear, flowing water through a tree-covered valley, with the chance to observe native wildlife, explore a cave, or ponder the size of a spring flow, serves as the essence of a National Riverways experience. Personal rejuvenation may result from following a recreational ethic of respect for resources and visitors, engaging in sustainable practices of hunting and fishing, or fulfilling a desire to have fun.

SPECIAL MANDATES AND ADMINISTRATIVE COMMITMENTS

Special mandates are legislative or judicial requirements that are specific to a particular unit of the national park system. They are typically mandated by Congress or by the courts. Administrative commitments are agreements that have been reached through formal, documented processes. These requirements are not open for reevaluation as part of the general management plan; instead, they serve as guidelines with which planning proposals must be consistent. Mandates and administrative commitments that influence the general management plan are listed here.

Scenic Easements in Perpetuity

The establishment of the Ozark National Scenic Riverways (Public Law 88-492, section 2) authorized the Secretary of the Interior to acquire interests, including scenic easements, on lands within the boundary of the NPS Riverways (see the Ozark National Scenic Riverways Scenic Easements Map). Scenic easements account for 9,257 acres, which are managed to maintain the natural environment and scenery for the benefit of the visiting public. Easements are designed to ensure that developments do not degrade the scenic and natural quality of private lands within the boundary of the NPS Riverways. Scenic easements retain a 300 foot wide strip along the riverbanks which remains open to public use. Use is typically limited to boat landings, sightseeing, and resting. Any additional use of the 300-foot strip is regulated by the landowner.

A number of scenic easements are also covered by timber management agreements and mineral reservations. Any request to modify existing easement restrictions that would affect either the land or structures must be evaluated by the National Park Service before approval. Please refer to the scenic easements map for the location of easements within the boundaries of the NPS Riverways.

Private Ownership

Establishing legislation for the Ozark National Scenic Riverways states that the federal government can acquire no more than 65,000 acres of private land. In addition to the private land with scenic easements, there are approximately 5,400 acres of other private land with timber plans that are within the congressional boundary. Only a limited number of the regulations in 36 *Code of Federal Regulation*s (CFR) apply to these lands.

Free-roaming Horses

By legislation, H.R. 238, S. 796–Ozark Wild Horse Protection Act, and under agreement with the National Park Service,

the Wild Horse League has authority and responsibility to manage free-roaming horses within the National Riverways.

Hunting and Trapping

Hunting and trapping within the Ozark National Scenic Riverways is authorized in accordance with federal and state laws through its establishing legislation. Public Law 88-492, section 5a states that "the Secretary may designate zones where, and establish periods when, no hunting shall be permitted, for reasons of public safety, administration, or public use and enjoyment and shall issue regulations after consultation with the Conservation Commission of the State of Missouri." A 1987 district court decision stated that the framers of the establishing legislation meant to include trapping as a part of hunting.

Restrictions on Motorized Vessels

Title 36 CFR 7.83 states that "On waters situated within the boundaries of Ozark National Scenic Riverways, the use of a motorized vessel is limited to a vessel equipped with an outboard motor only."

Scuba Diving

Scuba diving is prohibited within all springs and spring branches on federally owned land within the boundaries of Ozark National Scenic Riverways without a written permit from the superintendent, in accordance with 36 CFR 7.83.

Working with Missouri Department of Conservation

Legislation authorizes the National Park Service to consult with the Missouri Department of Conservation on hunting and related issues within the Ozark National Scenic Riverways. The legislation also authorizes the National Park Service to work with other federal and state agencies on the preservation and enhancement of the area's natural beauty and other resources.

Van Buren and Eminence Gaps

The gaps are defined by the National Riverways' enabling legislation, Public Law 88-492 section 1, as "no lands shall be designated within two miles of the present boundaries of the municipalities of Eminence and Van Buren, Missouri." The NPS Riverways has no authority in the gaps for managing resources, visitor use, visitor activities, or free-flowing values unless activities within the gaps cause a direct adverse impact on National Riverways resources. There is potential that activities in the gaps may impact resources downstream or within the National Riverways.

Wilderness Study Requirements

The 1984 *Ozark National Scenic Riverways General Management Plan* states that three potential wilderness areas (Big Spring, Cardareva, and Upper Jacks Fork) were evaluated for wilderness qualities, but factors such as land ownership patterns and existing uses, many of which are beyond NPS control, precluded legislative wilderness designation. The 1984 *Ozark National Scenic Riverways General Management Plan* further states that, should these conditions change in the future, a formal wilderness study would be initiated. Upper Jacks Fork and Cardareva still do not meet wilderness suitability requirements due to existing ownership and nonconforming uses. However, nonconforming uses were removed from the Big Spring tract in the early 1990s, making it eligible for wilderness study.

SERVICEWIDE LAWS AND POLICIES

This section identifies what must be done at Ozark National Scenic Riverways to comply with federal laws and NPS policies. Many park management directives are specified in laws and policies guiding the National Park Service and, therefore, are not subject to alternative approaches. For example, there are laws and policies about managing environmental quality (such as the Clean Air Act, the Endangered Species Act, and Executive Order 11990 "Protection of Wetlands"), laws governing the preservation of cultural resources (such as the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act), and laws about providing public services (such as the American with Disabilities Act). A general management plan is not needed to decide, for instance, that it is appropriate to protect endangered species, control nonnative species, protect archeological sites, conserve artifacts, or provide for universal access. Laws and policies have already decided those and many other things for us. The National Park Service will continue to strive to implement these requirements with or without a new general management plan.

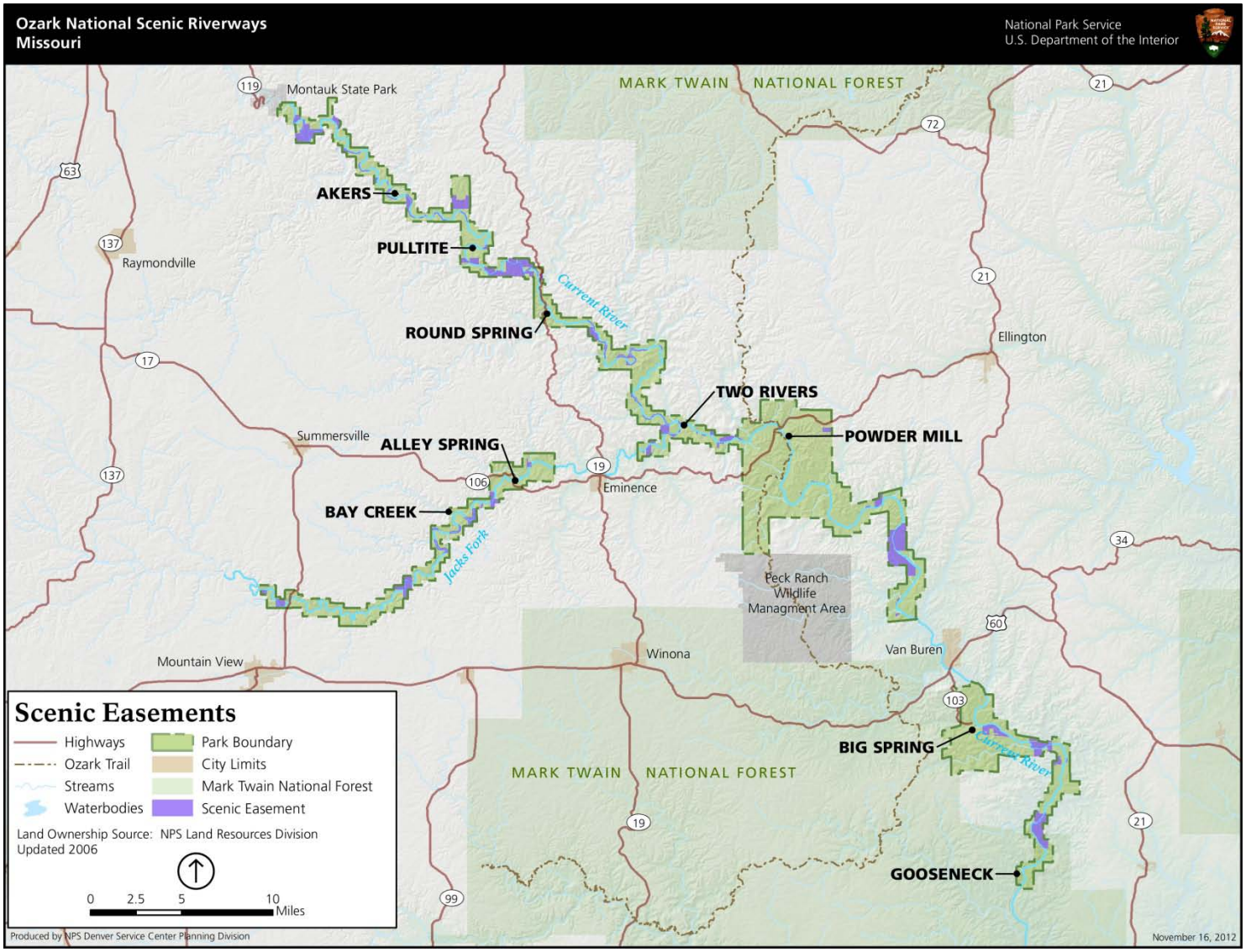
Some of these laws and executive orders are applicable solely or primarily to units of the national park system. Laws and policies applicable to Ozark National Scenic Riverways include the following.

National Park Service Organic Act

The National Park Service and its mandates are authorized under its Organic Act (16 *United States Code* [USC] 1, 2–4) and the General Authorities Act (16 USC 1a-8). These acts direct the agency to conserve the scenery, the natural and historic objects, and the wild life, and to provide for the enjoyment of those resources in such a manner as to leave them unimpaired for future generations. Amending the Organic Act, the Redwood Act (March 27, 1978, 16 USC 1a-1) further defines that the National Park Service may not allow degradation of the values and purposes for which the various areas were established unless authorized by Congress. This act also affirms that if a conflict occurs between visitor use and protection of resources, the intent of Congress is to favor resource protection.

National Historic Preservation Act

The National Historic Preservation Act of 1966, as amended (16 USC 470 *et sequens*), establishes as federal policy that the historical and cultural foundations of the nation's heritage be preserved. Section 106 of the National Historic Preservation Act requires that federal agencies that have direct or indirect jurisdiction over actions take into account the effect of those actions on cultural resources eligible for or included in the National Register of Historic Places. This section also provides the opportunity for the Advisory Council on Historic Preservation, state historic preservation officer, American Indian tribes traditionally associated with park lands, other interested agencies or organizations, and the general public to comment on the action.


Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
Montauk State Park
MARK TWAIN NATIONAL FOREST
AKERS
PULLTITE
ROUND SPRING
Current River
Raymondville
Ellington
TWO RIVERS
POWDER MILL
Summersville
ALLEY SPRING
Eminence
BAY CREEK
Jacks Fork
Peck Ranch Wildlife Managment Area
Mountain View
Winona
Van Buren
BIG SPRING
Current River
MARK TWAIN NATIONAL FOREST
GOOSENECK
Scenic Easements
Highways
Ozark Trail
Streams
Waterbodies
Park Boundary
City Limits
Mark Twain National Forest
Scenic Easement
Land Ownership Source: NPS Land Resources Division
Updated 2006
0 2.5 5 10 Miles
Produced by NPS Denver Service Center Planning Division
November 16, 2012

National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

National Parks Omnibus Management Act of 1998

This act outlines a strategy to improve the ability of the National Park Service to provide high-quality resource management, protection, interpretation, and research in the national park system.

Safe Drinking Water Act

Safe Drinking Water Act (42 USC 3001 *et seq*.) applies to developed public drinking water supplies. It sets national minimum water quality standards and requires testing of drinking water.

Clean Water Act

The 1972 Clean Water Act strives to restore and maintain the integrity of U.S. waters. The Clean Water Act grants authority to the states to implement water quality protection through best management practices and water quality standards. The concepts of Outstanding National Resource Waters and anti-degradation are established in the discussion of water quality standards.

Federal Cave Resources Protection Act of 1988

Federal Cave Resources Protection Act of 1988 requires protection of "significant caves" on federal lands and fosters increased cooperation and exchange of information between governmental authorities and those who use caves on federal lands for scientific, education, or recreational purposes. Significant caves possess one or more of the following features, characteristics, or values: 1) biota, 2) cultural, 3) geologic/mineralogic/paleontologic, 4) hydrologic, 5) recreational, and 6) educational or scientific. However, all caves on NPS-administered lands are deemed to fall within the definition of "significant caves."

Clean Air Act

The Clean Air Act of 1970 (as amended in 1990) regulates airborne emissions of a variety of pollutants from area, stationary, and mobile sources. The amendments to the act were added primarily to fill gaps in earlier regulations pertaining to acid rain, ground level ozone, stratospheric ozone depletion, and air toxics. Also, it identified 189 hazardous air pollutants. The act directs the U.S. Environmental Protection Agency to study these pollutants, identify their sources, determine the need for emissions standards, and develop and enforce appropriate regulations.

Endangered Species Act

The Endangered Species Act of 1973 requires the National Park Service to identify all federally listed endangered, threatened, and candidate species that occur within each park unit and promote their conservation and recovery. The act requires that any activity funded by federal monies that has the potential to impact endangered biota must involve consultation through the secretary of interior. It requires agencies to protect designated critical habitats upon which endangered and threatened species depend. Although not required by law, it also is NPS policy to identify, preserve, and restore state and locally listed species of concern and their habitats.

Archeological Resources Protection Act

Archaeological Resources Protection Act of 1979, as amended, defines archeological resources as any material remains of past human life that are at least 100 years old and are of scientific interest. With penalties for violators, it requires federal permits for the excavation and removal of artifacts on federal lands. It provides for the custody and preservation of excavated artifacts and materials and related data having to do with archeological survey and excavation records. It provides for the confidentiality within the federal agency of archeological site locations, so that information is not shared with the public. It encourages cooperation with other parties to improve and increase the protection of archeological resources. Amended in 1988, it requires the development of plans for surveying public lands and for recording and reporting incidents of suspected violations.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act assigns ownership or control of American Indian human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal or tribal lands to lineal descendants, affiliated Indian tribes, or Native Hawaiian organizations. Among its provisions, the act establishes criminal penalties for trafficking in human remains or cultural objects and requires federal agencies and museums receiving federal funding to inventory American Indian human remains and associated funerary objects in their possession or control and to identify their cultural and geographical affiliations.

The Wilderness Act

The Wilderness Act of 1964 requires that all federal lands be evaluated for their eligibility for inclusion within the national wilderness preservation system. For those lands that possess wilderness characteristics, no action that would diminish their wilderness eligibility will be taken until after Congress and the president have taken final action.

Executive Order 11990: Wetlands Protection

This executive order requires the National Park Service to (1) exhibit leadership and act to minimize the destruction, loss, or degradation of wetlands; (2) protect and improve wetlands and their natural and beneficial values; and (3) refrain from direct or indirect assistance of new construction projects in wetlands unless there are no feasible alternative to such construction and the proposed action includes all feasible measures to minimize damage to wetlands.

Executive Order 11988: Floodplain Management

This executive order has a primary objective "to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative." For nonrecurring actions, the order requires that all proposed facilities must be located outside the boundary of the 100-year floodplain. Barring any feasible alternatives to construction within the floodplain, adverse impacts are to be minimized during the design phase of project planning. NPS guidance for this executive order can be found in Director's Order 77-2.

Executive Order 13112: Invasive Species

This executive order enhances and furthers the existing authority of the federal government to assist in preventing and controlling the spread of invasive species.

IMPLEMENTATION OF LAW AND POLICY GUIDANCE

Please refer to appendix A for a description of some of the most pertinent servicewide mandates and policy topics related to planning and managing Ozark National Scenic Riverways. The table includes a statement of desired conditions along with management strategies that may be implemented to achieve these conditions and to meet requirements. Although desired conditions are written in present tense, these are not necessarily conditions that exist currently. The strategies in the table are examples and are not intended to be all-inclusive. Specific strategies, management actions, and prioritization of these actions may be addressed in future implementation plans. Funding and staffing constraints may also affect the implementation of strategies.

RELATIONSHIP OF THE GENERAL MANAGEMENT PLAN TO OTHER PLANNING EFFORTS

Ozark National Scenic Riverways is part of larger environmental and political settings. Planning efforts for areas within or near the NPS Riverways could influence or be influenced by actions presented in this *Ozark National Scenic Riverways General Management Plan / Wilderness Study / Environmental Impact Statement* and must be considered. These relevant plans and studies are listed below. This section is limited to the current or recent plans of the National Riverways and its neighbors that are directly relevant to general management planning topics. In addition, the National Riverways has numerous implementation-level plans in all divisional areas that govern day-to-day park management.

MANAGEMENT PLANS AND STUDIES OF THE NATIONAL PARK SERVICE

The National Park Service will ensure that all existing and future plans are consistent with the general management plan. In cases where the implementation of an existing plan would conflict with the general management plan, then the particular plan would be revisited to determine ways to assure compatibility.

Chilton Creek Area Boat Ramp and Parking (2009)

This study analyzed a proposal to construct a stabilized boat ramp and accompanying parking area to accommodate approximately 10 vehicles with boat trailers upstream from the Van Buren gap in the general area of Chilton Creek. This project was completed.

Flying W Environmental Assessment (2007)

This action would modify the site to protect resources from degradation while providing for recreational opportunities. The environmental assessment was completed but the project has not been implemented.

Broadfoot/Shawnee Horse Staging Area Environmental Assessment (2006)

The proposed action would involve construction, maintenance, and ongoing use of the staging areas. The environmental assessment identified modifications for protection and mitigation of potential impacts to natural and cultural resources.

Big Spring Divisional Storage Building (ongoing)

There is a need in the NPS Riverways to have a storage facility to house supplies and materials. Planning currently is in the preliminary stages for how to best address these issues.

Alley Spring and Powder Mill Bank Stabilization (ongoing)

The park unit is currently in the preliminary planning stages for a vegetative bank stabilization project for this area.

Cedargrove and Rhymer Ridge Repeater Sites (2011)

A repeater site at Rhymer Ridge was recently completed. A new repeater site at Cedargrove is needed and would be developed within park unit boundaries as part of the proposed upgrade of the NPS Riverways' radio system. The Cedargrove tower and equipment enclosure would be within the clearing where the former ranger station was located. The site would be surrounded by a 6-foot-high, chain-link security fence with a vehicle gate at the entrance. The surface in the enclosure and extending a few feet beyond the fence would have aggregate rock installed over a weed barrier mat.

COUNTY AND REGIONAL PLANS

Elk Reintroduction

The Missouri Department of Conservation has developed a plan for and has begun to reintroduce elk in an area near the National Riverways. The plan calls for releasing up to 150 elk into a 346-square-mile "restoration zone" in and around the Peck Ranch Conservation Area in Shannon, Carter, and Reynolds counties (MDC 2011e).

Completion of the Old Tram Road Trail

Efforts are underway to complete the Old Tram Road Trail, which would run from Van Buren to Big Spring. Several miles of the trail would be in the National Riverways. If completed, the trail would become part of the larger Ozark Trail.

Van Buren Economic Development Plan

The Town of Van Buren is developing an economic development plan for the town that, in part, may focus on increasing tourism in and around the town.

Bridge Replacements

Bridge replacements over the Current River, Sinking Creek, and Spring Valley are anticipated to occur during the 20-year life of this general management plan. A bridge to replace the Cedar Grove low-water crossing may also be considered. Any future bridge work would include NPS involvement and require environmental compliance and a public involvement process.

PLANNING ISSUES AND OPPORTUNITIES

During the scoping period (early information gathering) for this general management plan, issues and concerns were identified by the general public; NPS staff; county, state, and other federal agency representatives; NPS Riverways' partners; resource experts; and representatives from organizations. An issue is defined as an opportunity, conflict, or problem regarding the use or management of public lands. Comments were solicited at public meetings, workshops, and open houses; through planning newsletters; and on the NPS Riverways' website (see "Chapter 6: Consultation and Coordination").

Comments received during the scoping process demonstrated there is much the public values about the National Riverways, especially their protection of scenery and water quality, interpretation of local history and heritage, and access to trails. Issues and concerns expressed during scoping generally focused on balancing appropriate visitor use, types and levels of facilities, services, and activities with desired resource conditions. The general management plan alternatives provide strategies for addressing the issues

in the context of the National Riverways' purpose, significance, and special mandates.

The following text presents the issues and concerns identified during scoping for the general management plan, as well as how the plan seeks to address these issues.

Kinds and Amounts of Recreational Use

A wide range of recreational activities and experiences were identified during scoping as important to visitors of the Ozark National Scenic Riverways. Some of these include river sports (canoeing, floating, tubing, boating, rafting, and fishing), hiking and walking, horseback riding, driving all-terrain vehicles (ATVs) and off-road vehicles, wildlife viewing and bird watching, and camping. Of these recreational activities and experiences, public comments mainly centered on river sports, horseback riding, and the use of all-terrain vehicles and off-road vehicles.

There was no consensus as to how recreation on the river should be managed. Although most commenters on river sports felt the rivers were too crowded, they did not agree on how to reduce river user numbers. Some people encouraged further use of the existing permit system or creating management zones to reduce the number of parties on the National Riverways. Other commenters suggested reducing vehicle access along the rivers. Increased visitor education on the use of and operation of both motorized and nonmotorized watercraft was also suggested to address this issue. Similar strategies for restricting the use of all-terrain vehicles and off-road vehicles were also discussed.

Respondents were divided on horseback riding in the National Riverways. There were differences on what constitutes appropriate camping in the National Riverways and what types of facilities should accompany the different styles of camping. Other National Riverways users wanted more hiking trails, and several requested improved signs along trails.

This plan explores different options for providing a range of recreational use opportunities on and along the riverways, including the preservation of traditional uses, exploring additional uses, reducing or increasing uses, and modifying existing recreational use opportunities and/or use limitations. This plan also determines the kinds and amounts of recreational use for NPS Riverways' areas consistent with the protection and enhancement of the NPS Riverways' values. All options would ensure the protection and enhancement of the National Riverways' values while minimizing conflicts and crowding among visitors.

Boating Regulations

During the development of alternatives for this general management plan, questions arose regarding the NPS' authority to allow 60/40 horsepower motors based on the park unit's existing regulation (36 CFR 7.83(a)(2)), which is included in appendix C. This regulation prohibits the use of motors that are rated higher than 40 horsepower by the manufacturer. Through research and consultation with the Department of Interior Regional Solicitor's Office, the National Park Service has learned that allowing retrofitted 60/40 horsepower jet motors is in violation of the regulation, because the National Park Service is bound by the manufacturer's rating of the horsepower.

The National Park Service is committed to comply with the newly clarified limitations on its authority to allow 60/40 horsepower motors under the existing regulation, while considering the impact of reversing the park unit's longstanding interpretation of the regulation. The National Park Service

has developed the following course of action to address this issue as part of this general management plan:

The no-action alternative describes the continuation of NPS current management to allow 60/40 horsepower motorboats on certain portions of the Current and Jacks Fork rivers. As noted above, continuation of this approach is in violation with the existing regulation. The no-action alternative is characterized this way to provide a baseline for comparison in evaluating the changes and impacts of the other alternatives. The action alternatives (A, B, and C) explore different options for compliance, including (1) enforce the existing regulation, and (2) pursue rule-making to change the existing regulation to allow 60/40 horsepower motors.

Analysis within the general management plan is based upon the assumption that such a rule-making change could or would be achieved.

Visitor Behavior

By far the most commonly expressed concerns in public scoping were related to visitor behavior. The National Riverways were designated to create a special experience for visitors, so people may observe native wildlife, explore a cave, or ponder the size of a spring flow. This invigorating and reflective scenic experience serves as the essence of an Ozark National Scenic Riverways experience. A recurring complaint by commenters was the growing amount of disrespectful and vulgar visitor behavior. Most commenters stated concerns about drug and alcohol use, and trash and litter along the rivers and surrounding lands. Many families stated they will no longer visit the National Riverways due to growth of inappropriate visitor behavior. Currently, visitors recreating in the National Riverways may consume alcohol. Three general types of sentiments were expressed over visitor behavior. One sentiment suggested completely banning alcohol on the riverways. Other commenters stated having alcohol on the riverways was fine. Opinions which fell into the middle advocated that alcohol should be allowed, but abusers should be dealt with sternly and existing laws should be more consistently and forcefully enforced. Education, interpretation, partnerships with special interest groups and concessioners, and increased law enforcement were suggested as ways to reduce conflicts and increase respectful behavior.

This plan determines different options and strategies for addressing inappropriate visitor behavior and ways to strengthen ongoing management and law enforcement efforts. All options would ensure visitor safety while avoiding conflicts among visitors.

Natural Resources

Under the provisions of the National Riverways' establishing legislation, the National Park Service is responsible for conserving, interpreting, and exhibiting the unique natural and cultural resources of the Current and Jacks Fork rivers and surrounding areas. NPS Riverways' lands contain a rich array of wildlife and plants, including endemic species that exist nowhere else in the world. The Ozark Plateau is one of the oldest continuously exposed land masses in the world and, as a result, is home to a unique ecosystem.

Ozark National Scenic Riverways contains 134 miles of exceptionally clear, free-flowing rivers, which is unprecedented anywhere else in the United States. This remarkable water clarity is primarily because most of the water that flows into the Jacks Fork and Current Rivers is filtered through the karst groundwater system. The hydrogeologic processes of

this karst landscape have also created an unusually high density of extraordinary caves and springs.

Natural resources-related comments that were received during scoping most often mentioned the effects of recreation equipment and animals on water quality, wildlife habitat fragmentation, invasive nonnative species, declining fish populations, and management of songbird populations.

This plan determines appropriate management strategies to protect and enhance natural resources within the National Riverways, particularly the maintenance and restoration of native species and their habitats and the ecological processes that sustain them. This plan explores ways to mitigate human-caused impacts to river-related natural resources.

Cultural Resources and Interpretation

Comments emphasized the importance of Ozark cultural heritage. Many people were adamant that the interpretive program should continue to focus on the area's prehistory, history, and heritage demonstrations. Others expressed the need to provide more interpretive displays, kiosks. Commenters also expressed concern for vandalism and disturbance to historic structures and archeological sites, and illegal removal of artifacts from these areas.

This plan explores options for the development of and ways to improve education and interpretation of cultural resources and to protect these resources within the NPS Riverways.

Park Management and Operations

Commenters held varying views on park management and operations topics, including whether park management was doing enough to protect resources in accordance with the National Riverways' mission, the effectiveness of law enforcement, the enforcement of scenic easements, and community relations. This plan explores different staffing levels and operational costs to provide an appropriate standard for managing the park unit.

Types and Levels of Development

Several comments emphasized that the types and levels of development within the National Riverways should be *appropriate*. That is, the commenters felt that appropriate facilities should be located at appropriate locations, consistent with the needs of users and the setting in which the facilities were located. In some cases, upgrading or enhancing existing campgrounds and landings were recommended to handle the volume of current use. Other commenters felt development of facilities should be kept to a minimum so the National Riverways would maintain a more "primitive" feel.

Some respondents advocated for wilderness designation of the Big Spring tract. Other people felt wilderness designation would be too restrictive, and many were unclear of the implications of wilderness designation.

This plan determines what types of facilities are needed and where they should be located within the NPS Riverways, including access. It also determines which areas should be free of developments. It evaluates the compatibility of existing and/or new developments to protect and enhance the National Riverways' values and determines appropriate management strategies to achieve park unit goals.

IDENTIFICATION OF IMPACT TOPICS

An important part of planning is seeking to understand the consequences of making one decision over another. To this end, this general management plan is accompanied by an environmental impact statement, which identifies the anticipated impacts of possible actions on the NPS Riverways' resources and on visitors and neighbors. Impacts are organized by topic, such as "impacts on the visitor experience" or "impacts on vegetation." Impact topics focus the environmental analysis and ensure the relevance of impact evaluation.

Impact topics for this document were identified based on federal laws and other legal requirements, Council on Environmental Quality regulations for implementing the National Environmental Policy Act, NPS management policies, staff subject-matter expertise, and issues and concerns expressed by the public and other agencies early in the planning process.

The interdisciplinary planning team conducted a preliminary analysis to determine the anticipated context, duration, and intensity of effects on resources from implementing the alternatives. As a result, some impact topics have been eliminated from further analysis because these resources do not occur within the designated river corridors or because the anticipated impacts would have no effect, negligible effect, or possibly a minor effect on resources.

The impact topics are described in "Chapter 4: Affected Environment." These descriptions of the NPS Riverways' environment establish the basis for the impact analysis in "Chapter 5: Environmental Consequences." Table 1 provides a summary of the impact topics analyzed in detail or dismissed from detailed analysis.

IMPACT TOPICS CONSIDERED, BUT NOT ANALYZED IN DETAIL

Some impact topics that commonly are considered during the planning process were not relevant to the development of this general management plan because either the management alternatives would have no effect, a negligible effect, or a minor effect on the resource, or because the resource does not occur within the boundaries of Ozark National Scenic Riverways. The following explains why these impact topics were dismissed from detailed analysis.

Indian Trust Resources

The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by U.S. Department of the Interior agencies must explicitly be addressed in environmental documents.

There are no Indian trust resources within the NPS Riverways. The lands in the park unit are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian Trust resources were dismissed as an impact topic.

TABLE 1. IMPACT TOPICS

Impact topics analyzed in this plan	Impact topics eliminated from detailed analysis in this plan
Alternatives in this plan have potential to affect these resources or topics.	These resources or topics are important, but alternatives in this plan would have only positive impacts on them, and/or any adverse impacts would be negligible or minor.
Natural resources	Indian trust resources
• Geologic resources and soils	Visual resources
• Water resources	Air quality
• Vegetation	Water quantity
• Fish and wildlife	Prime or unique farmland
• Federally and state-listed species	Natural or depletable resource requirements and conservation potential
Cultural resources	Energy requirements and conservation Potential
• Archeological resources	Carbon footprint
• Historic buildings, structures, and cultural landscapes	Environmental justice
• Ethnographic resources	
Museum collections	
Visitor use and experience	
Soundscapes	
Park operations	
Socioeconomic environment	

Visual Resources

Visual resources of the NPS Riverways are primarily protected through scenic easements and special mandates. No changes to scenic easements are being proposed in this plan. Scenic easements are discussed in more detail in the Special Mandates and Administrative Commitments section of chapter 1.

Crowding and congestion are perceived by visitors visually and through noise. Therefore, these visual aspects of park management are analyzed in detail in the visitor use and experience section of this document.

Due to reasons presented above, and because none of the alternatives in this plan propose any new substantial development that would alter the National Riverways' visual character, this topic was dismissed from detailed analysis.

Air Quality

The Clean Air Act of 1970, (42 USC 7401 *et seq*.) was established to promote the public health and welfare by protecting and enhancing the nation's air quality. The act established specific programs that provide special protection for air resources and air quality-related values associated with NPS units. Section 118 of the Clean Air Act requires park units to meet all state, federal, and local air pollution standards. NPS *Management Policies 2006* addresses the need to analyze potential impacts on air quality during park planning.

The Clean Air Act and pursuant regulations classified areas of the country by existing and desired air quality

conditions. Ozark National Scenic Riverways is listed as a Class II area by Congress. Class II areas of the country are protected under the act, but less stringently than Class I areas, which include a limited number of specially designated wilderness areas and national parks (such as the Grand Canyon) where outstanding visibility is critical.

Although the National Park Service does not have air quality monitoring stations within Ozark National Scenic Riverways, monitoring data are available for Buffalo National River. Because this park unit is located approximately 175 miles southwest of Ozark National Scenic Riverways, their monitoring results are useful in understanding air quality conditions and trends for the National Riverways and the region as a whole.

The National Park Service strives to perpetuate the best possible air quality, because air pollution, even at relatively low levels, affects ecological and human health, scenic views, and visitor enjoyment. Progress toward this goal is measured by examining current conditions and trends for key air quality indicators, including ozone, visibility, and atmospheric deposition. These indicators for Buffalo River and the area in the vicinity of Ozark National Scenic Riverways show stable trends, with slight improvement in atmospheric deposition (NPS 2009b).

Air quality would be largely unaffected by the management alternatives considered in this general management plan. None of the actions considered would violate any air quality standard or result in a cumulative net increase of any criteria pollutant under federal or state ambient air quality standards. Implementation of any of the alternatives described in this general management plan would have negligible effects on air quality, and the NPS Riverways' Class II air quality would be unaffected. Therefore, air quality was dismissed as an impact topic.

Water Quantity

Because no water withdrawals, diversions, or other activities are proposed in the alternatives that would affect water quantity in the NPS Riverways, this topic was dismissed from detailed analysis.

In addition, consumptive uses, such as park facilities, would be coordinated with Missouri State based in-stream water rights requirements.

Prime or Unique Farmland

In 1980, the Council on Environmental Quality directed that federal agencies must assess the effects of their actions on farmland soils classified by the Natural Resources Conservation Service as prime or unique. Prime farmland is defined as soil that produces general crops such as common foods, forage, fiber, and oil seed. Unique farmland produces specialty crops such as fruits, vegetables, and nuts.

Some prime and unique farmlands exist in the National Riverways, but since the establishment of the park unit these are no longer managed for the purpose of agricultural production. The National Park Service does manage open fields throughout the park unit using agricultural leases, but does so to maintain the cultural significance of these areas, not for agricultural production. The alternative management strategies presented in this plan would not affect the management of open fields that may contain prime or unique farmlands; therefore this topic was dismissed from detailed analysis.

Natural and Depletable Resource Requirements and Conservation Potential

None of the alternatives being considered in this plan would result in the extraction of natural or depletable resources from the

National Riverways. The use and consumption of fuel and other nonrenewable resources for NPS operations, activities, and development associated with the alternatives is very small in comparison to that of the region.

The National Park Service strives to use sustainable practices and technology and reduce its impact on natural or depletable resources. In all of the alternatives, ecological principles would be applied to ensure that the NPS Riverways' natural resources were maintained and protected. Also, agricultural leases would continue to include annual harvesting of hay, mowing, and grazing on various small agricultural tracts to maintain the cultural landscapes of the National Riverways. These areas would continue to be managed sustainably to ensure the long-term viability of these resources and would result in only negligible effects on this topic.

As a result of the above, this impact topic has been dismissed from further consideration.

Energy Requirements and Conservation Potential

The implementing regulations of the National Environmental Policy Act require that energy requirements, natural or depletable resource requirements, and conservation potential be analyzed. Any differences between the alternatives in terms of these factors would be localized and negligible. Therefore, this topic was dismissed from detailed analysis.

Carbon Footprint

For the purpose of this planning effort, "carbon footprint" is defined as the sum of all emissions of carbon dioxide and other greenhouse gases (for example, methane and ozone) that would result from implementation of any of the management alternatives. Understanding the carbon footprint of each alternative is important to determine its potential to contribute to climate change.

The action alternatives described in this document would result in a negligible change in the amount of greenhouse gases that contribute to climate change. Therefore, this impact topic has been dismissed from detailed analysis in this plan. The reasons for dismissing this impact topic are that (1) no notable road construction is proposed under the action alternatives, (2) modest reductions in motorized vehicle and motorboat use could occur under the action alternatives due to proposed closures of unofficial roads and traces and the proposed nonmotorized boating areas, and (3) changes to facilities are largely in-kind and should have overall small benefit due to newer sustainable building practices. Because of the negligible amount of change in greenhouse gas emissions that would result from each action alternative, a quantitative measurement of their carbon footprint was determined by the planning team not to be practical.

Environmental Justice

Presidential Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

According to the Environmental Protection Agency (1998), environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with

respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

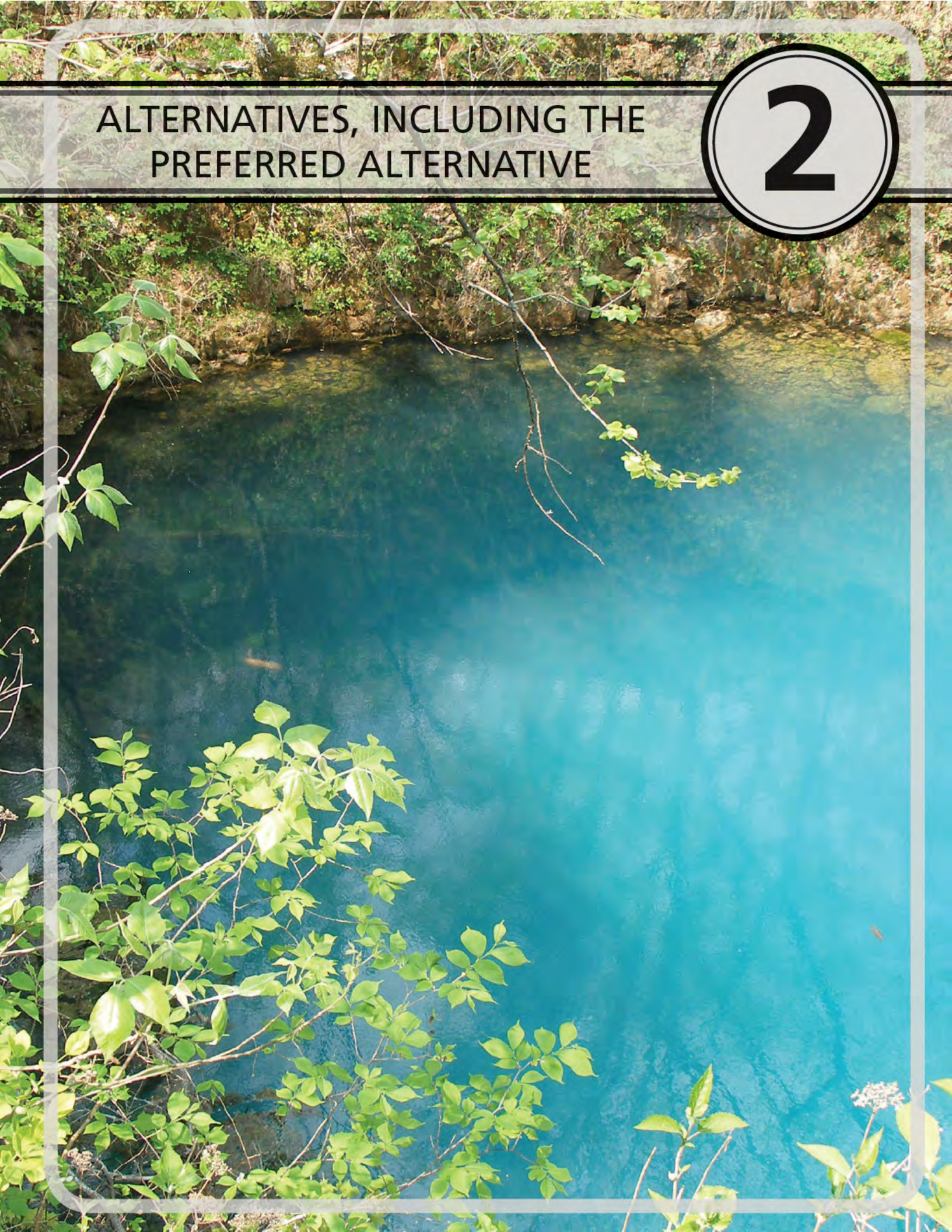
Carter and Shannon counties contain a relatively low percentage of the population considered minority compared to the population throughout the state. However, these counties do contain a high percentage of individuals that are living below the poverty threshold as defined by the U.S. Census. During the consideration of this impact topic, of most concern were possible changes in horse power regulations that may limit the size of boat motors and areas where certain motors may be used within the riverways. Analysis of this topic illustrated no evidence that this would cause disproportional impact on minorities and low-income populations and communities. For further information on the economic effects of horsepower regulations, please refer to the socioeconomics section of chapter 5.

Therefore, environmental justice is dismissed as an impact topic for the following reasons:

- The NPS staff and planning team actively solicited public participation as part of the planning process and gave equal consideration to input from all persons regardless of age, race, income status, or other socioeconomic or demographic factors.
- Implementation of any of the alternatives would not result in any disproportionate human health or environmental effects on minorities or low-income populations and communities.
- The impacts associated with implementation of the alternatives would not result in any effects that would be specific to any minority or low-income community. Any anticipated impacts, such as traffic, would not disproportionately affect minority or low-income populations.
- Impacts would not occur all at one time but would be spread over a number of years.

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

2



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INTRODUCTION

The purpose of developing alternatives is to provide a clear basis for choice among a diverse set of options for the future management of the NPS Riverways.

Many aspects of the desired future condition of the National Riverways are defined in the establishing legislation, the NPS Riverways' purpose and significance statements, and the servicewide mandates and policies described earlier. Within these parameters, the National Park Service solicited input from the public, NPS staff, government agencies, tribal officials, and other organizations regarding issues and desired conditions for the National Riverways. The planning team also gathered information about existing visitor use and conditions of the NPS Riverways' facilities and resources. The team then considered which areas of the NPS Riverways attract visitors and the locations of highly sensitive resources.

Using this information, the planning team developed seven designated management zones (four land-based and three river-based), and four sets of alternative future management strategies to reflect the range of ideas proposed by National Riverways staff, other agencies, and the public. The alternatives were developed through a lengthy, collaborative process that is described in more detail later. The management zones are graphically shown on the maps for alternatives A, B, and C to reflect the management concept proposed for each alternative.

This chapter describes the alternatives for managing the Ozark National Scenic Riverways for the next 20 years or more. The chapter includes tables summarizing the key differences in management strategies among the alternatives, management zones, and expected impacts from implementing the alternatives (based on the analysis in "Chapter 5: Environmental Consequences"). This chapter also describes identification of the NPS preferred alternative, potential boundary adjustments, and mitigation measures that would lessen or avoid impacts; defines strategies to address visitor use management and climate change; identifies future studies and implementation plans needed; provides staffing and cost estimates; and establishes the environmentally preferable alternative.

RELATIONSHIP OF MANAGEMENT ZONES AND ALTERNATIVES

The primary building blocks for reaching an approved management plan for a national park system unit are the management zones and the alternatives. All are developed within the scope of the park unit's purpose, significance, mandates, and legislation.

The NPS planning process requires that planning alternatives propose management zones for areas within the National Riverways boundary. Zones would be applied only to the Current and Jacks Fork rivers and those land areas for which the National Park Service has fee title ownership within the park unit's authorized boundary. Lands with timber or scenic easements are managed by the legal requirements of the easement and are not zoned. Private lands within the boundary are not zoned.

Management zones tell how areas of the National Riverways would be managed in the future. Management zones prescribe a range of desired resource conditions and visitor experiences and include statements about the appropriate kinds and levels of management, use, and facilities in each zone. The management zones provide primary guidance for subsequent decision making at the National Riverways and are the core of the general management plan. Management zones are combined in different ways to reflect the concept proposed for each alternative.

Each of the alternatives in this general management plan presents an overall management concept and proposals about how different NPS Riverways programs and areas could be managed through the application of the management zones and other strategies. The concept for each alternative gives planners and park unit staff the idea for what the alternative would look like. For example, perhaps one management zone is called natural and another zone is called recreation. An alternative whose concept is to keep most of a park unit area in an undeveloped condition would have more of the natural zone applied than the recreation zone. Both zones would also be larger or smaller or in different locations, depending on the overall concept for each alternative.

This *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* presents four alternatives for the future management of the NPS Riverways. The no-action alternative would continue current management; the development and discussion of a no-action alternative is required by law. The current management direction for the NPS Riverways is not based on management zones. Thus, it serves most importantly as a baseline for comparing the action alternatives, which are designated A, B, and C.

The action alternatives present alternative approaches to the park unit's current management direction, including different ways to manage natural and cultural resources, visitor use, operations, and the facilities and other infrastructure of the NPS Riverways. Many aspects of current management may have merit; in those cases, the action alternatives may embrace or build on that current direction.

The four alternatives embody the range of what the public and National Park Service desire to see accomplished with regard to natural and cultural resource conditions, scenery conservation, land protection, water resource protection, visitor opportunities and experience, transportation, concessions, and other services. All of the alternatives considered in this general management plan would allow the National Park Service to continue to follow existing agreements and servicewide mandates, laws, and policies that were presented in chapter 1.

DEVELOPMENT OF THE ALTERNATIVES

The alternatives focus on what resource conditions, visitor uses, experiences, and opportunities should be provided at the NPS Riverways rather than on details of how these conditions and uses or experiences should be achieved. Thus, the alternatives do not include many details on the implementation of resource and visitor use management objectives. More detailed implementation plans would be developed following approval of the general management plan.

Alternative visions for managing the NPS Riverways were developed by identifying different ways to address the planning issues identified in chapter 1, in context with the NPS Riverways' purpose and significance. In developing this range of alternatives, the National Park Service adhered to the requirements of the National Environmental Policy Act, while giving careful consideration to the National Riverways' enabling legislation.

In addition, two specific topics with legal requirements (motorboat horsepower limits and potential wilderness recommendation) were incorporated to align with the range of management concepts, strategies, and zones during the development of the alternatives. The alternative approaches to address these topics are summarized below.

Public scoping meetings were held in 2006 and a second set of public meetings were held during the summer of 2009. In addition, the National Park Service prepared and mailed three newsletters between 2006 and 2009 to

update the public on planning progress. A preliminary version of the alternatives was presented to the public in *Newsletter 3: Preliminary Alternatives* in May of 2009. A major stakeholder meeting was held in February 2010. Public comments received from meetings and newsletters have been instrumental in the formulation of alternatives within this plan.

Motorboat Horsepower Limits

During public scoping meetings it became apparent a major topic of public interest was in the size of motors currently allowed on the rivers. Existing park regulations (36 CFR 7.83(a) (2), see appendix C) prohibits the use of motors rated higher than 40 horsepower (hp) by the manufacturer from Big Springs upriver to Alley Springs and Round Springs. However, for many years the National Riverways has interpreted the regulations as allowing, and the public has been using motors rated up to 60 hp if they were equipped with a jet powered prop that effectively lowered the usable horsepower to 40 hp. The National Park Service has recently been advised that this interpretation of the regulations is in variance with the CFR. This issue has been included in this comprehensive planning process because the discussion of motor size could logically include a range of alternatives for how the public recreates on and uses the rivers. Any alternative that proposed the continued use of 60/40 hp motors would require rule-making to change the existing regulation.

Alternative B, which is the preferred alternative, would continue to allow the use of these 60/40 hp jet motors (or 40 hp without the jet) on the waters where they are currently allowed as shown in the no-action alternative. Alternative A would limit the use of motors to no more than 40 hp with or without jet attachments. Alternative C would allow the use of 60/40 motors.

Potential Wilderness Recommendation

In 1984, the National Park Service evaluated Ozark National Scenic Riverways for wilderness suitability. One of the areas recognized for its wilderness qualities was the Big Spring tract near the lower Current River and adjacent to Mark Twain National Forest. At that time there were nonconforming uses occurring there that prevented wilderness designation. In the final 1984 *Ozark National Scenic Riverways General Management Plan*, the National Park Service committed to do a formal wilderness study should those conditions or uses change. In the early 1990s, the nonconforming uses at Big Spring were resolved. As a result, the National Park Service included a wilderness study as part of this general management plan (see chapter 3).

A formal wilderness study is undertaken by policy to develop the recommendation to Congress for wilderness designation. The recommendation pathway flows through the NPS director, and Secretary of the Interior to the president. The president then formally transmits this recommendation to both houses of Congress for action. Regardless of what the Study recommends, ultimately it is up to Congress to enact the legislation necessary to designate an area as wilderness. A wilderness study may propose that all or some of the suitable lands be recommended as wilderness. In extraordinary circumstances, a wilderness study may result in a proposal that none of the suitable areas be recommended as wilderness.

The no-action alternative describes the continuation of NPS current management, such that the National Park Service would continue to maintain the Big Spring tract's primitive, natural character in order to maintain its wilderness eligibility. The action alternatives explore different options for wilderness recommendations, based on the results of the wilderness study:

- Alternative A recommends 3,424 acres of the Big Spring Wilderness Study

Area for wilderness designation (99% of the total wilderness study area).

- Alternative B recommends 3,430 acres of the Big Spring Wilderness Study Area for wilderness designation.
- Alternative C recommends 1,779 acres of the Big Spring Wilderness Study Area, south of Chilton Creek, for wilderness designation (52% of the total wilderness study area).

IDENTIFICATION OF THE NATIONAL PARK SERVICE PREFERRED ALTERNATIVE

Identification of the NPS' preferred alternative involved evaluating the alternatives using an objective analysis process called "Choosing By Advantages." This process included a 3-day workshop held in 2011, during which staff members representing all divisions of the Ozark National Scenic Riverways worked together to develop the preferred alternative. Through this process, the planning team identified and compared the relative advantages of each alternative according to a set of factors that were based on the benefits or advantages of each alternative to fulfill the purpose of the plan, while addressing the planning issues identified in chapter 1. These factors include the following:

Factor 1: Protect and improve cultural resources (historic structures, cultural landscapes, ethnography, and archeology).

Factor 2: Protect and improve natural resources (land management zoning, river zoning, soundscapes, free-flow protection, water quality, wildlife, and habitat fragmentation).

Factor 3: Provide desirable visitor experiences and services (river-based recreation zones / social interaction, land-based recreation / social interaction, user conflicts / visitor safety, scenic experience, interpretation/education, designated access and circulation, and visitor facilities).

Factor 4: Provide necessary and appropriate commercial services (commercial recreation–boat and shuttle, new commercial opportunities–river, and other commercial opportunities–land).

Factor 5: Improve park operations (staffing, operational facilities, wilderness, partnerships, agricultural leases, scenic easements, and housing).

Recommendations made during the "Choosing by Advantages" process were based on the importance of advantages between the alternatives. This involved the identification of the attributes or characteristics of each alternative relative to the factors, a determination of the advantages for each alternative for each factor, and then weighing the importance of each advantage. The relationship between the advantages and costs of each alternative were also established. This information was used to identify the alternative that provides the National Park Service and the public the greatest advantage for the most reasonable cost.

The results of the Choosing by Advantages process identified alternative B as the agency's preferred alternative. This alternative provides the best combination of strategies to protect the park unit's unique natural and cultural resources and visitor experience, while improving the park unit's operational effectiveness and sustainability. It also provides other advantages to the NPS Riverways, regional communities, partners, and stakeholders. A brief description of the key differences among the alternatives as they relate to each factor is provided below, along with a rationale as to why alternative B would provide the greatest advantage.

Factor 1: Protect and Improve Cultural Resources

All three action alternatives would include the following:

- Restore additional historic structures and make them available/accessible to the public as interpretive exhibits.
- Introduce management zoning.
- Implement visitor use management strategies.

Alternative C would include two actions not shared by the other action alternatives:

- Provide more intensive management for some historic structures and sites to protect resources to accommodate more visitors.
- Monitor resource conditions so that unacceptable impacts do not occur.

Alternative A and alternative B would both include reestablishment of select pastoral landscapes.

Alternative B would include several actions, beyond those shared with the other action alternatives:

- Restart oral history program.
- Enhance archive and museum collections program.
- Expand curatorial facility to provide additional archeological storage space for smaller national park units in the region.
- Develop the NPS Riverways as a regional curatorial hub.
- Include monitoring, research, and preservation projects that would actively support and strengthen management capabilities and ensure accurate visitor information.

As a result of these additional actions, alternative B was determined to provide the greatest advantages with respect to protecting and improving cultural resources.

Factor 2: Protect and Improve Natural Resources

All three action alternatives would involve the following actions:

- Introduce management zoning.
- Implement visitor use management strategies.
- Implement ecological restoration projects, such as closing, stabilizing, and revegetating undesignated roads, traces, trails, river crossings, and access points.
- Partner with the state to enhance healthy native game fish populations.

Alternative C would include two actions not shared by the other action alternatives:

- Manage natural resources to provide high-quality scenery and have a higher tolerance for resource impacts in heavily used areas.
- Monitor resource conditions so that unacceptable impacts do not occur.

Alternative B would include several actions beyond those shared with the other action alternatives:

- Research effects of visitor use on river and karst habitats.
- Partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge.
- Improve park unit waste systems and partner with the community about waste systems adjacent to the riverways.

As a result of these additional actions, alternative B was determined to provide the greatest advantages with respect to protecting and improving natural resources.

Factor 3: Provide Desirable Visitor Experiences and Services

All three action alternatives would share the following actions:

- Introduce management zoning.
- Implement visitor use management strategies.
- Close and restore some undesignated roads, traces, trails, river crossings, and access points.
- Redistribute concession nonmotorized watercraft dropoff and pickup locations to reduce peak-season crowding effects, with the peak season occurring from March 15 through Labor Day.
- Improve and lengthen the designated horse trail system.
- Possibly establish a permitting system to manage horse use.
- Allow mountain biking as a new trail use, but only on designated trails.
- Restrict gravel bar camping to designated campsites only—except for primitive camping).
- Open an additional mile of trail for people with disabilities.

Alternative C would include four actions not shared by the other action alternatives.

- Establish a 25-campsite horse campground.
- Allow vehicle access to gravel bars.
- Maintain current motorboat horsepower limits.
- Coordinate with local caving clubs to provide caving safety training and cave visits.

Alternative A and alternative B would increase the percentage of the river zoned for nonmotorized recreation.

Alternative B and alternative C would share three actions:

- Increase law enforcement.
- Provide two additional developed campgrounds.
- Pursue a rule-making to change the existing regulation to allow 60/40 horsepower motors on certain portions of the Current and Jacks Fork rivers.

Alternative B would include several actions not shared by other action alternatives:

- Establish a learning center at Powder Mill and develop a school curriculum.
- Reduce the number of gravel bars accessible to vehicles.
- Provide guided tours to additional discovery sites.
- Allow visitors to access designated remote sites.
- Establish Junior Rangers and Discovery Rangers programs.

As a result of these additional actions, alternative B was determined to provide the greatest advantages with respect to providing desirable visitor experiences and services.

Factor 4: Provide Necessary and Appropriate Commercial Services

All three action alternatives would include potential opportunities for new concessions for overnight river activities such as guided float trips and guided (hike-in) backcountry trips in the natural and primitive zones.

Alternative B and alternative C would include potential opportunities for new concessions for new campgrounds and shuttle services for

river users utilizing nonmotorized watercraft. These and higher concentrations of visitors in developed zones may create the need for an additional camp store.

As a result of the similarity between alternative B and alternative C, they were both determined to provide equal advantages with respect to providing necessary and appropriate commercial services, and had advantages greater than alternative A.

Factor 5: Improve Park Operations

All three action alternatives would include these actions:

- Organize a park advocacy group.
- Establish a partnership with the counties regarding road management, including closures.
- Continue to share office space at the Van Buren headquarters with other federal and state agencies.
- Continue to have Eastern National Association provide bookstore services at park unit visitor contact facilities, such as the Van Buren headquarters, Round Spring, and Alley Mill. The Ozark National Scenic Riverways would continue to participate as part of a national cooperative agreement with Eastern National Association. When the Big Spring contact facility is opened, the Park may have Eastern National Association provide services.
- Provide four new housing duplex units to support additional need for seasonal or term staff.
- Construct three multioperational facilities, one for each management district in alternatives A and C. Under the preferred alternative one multioperational facility would be constructed.

The primary difference among the alternatives is that alternative C would increase staffing levels the most (primarily in law enforcement). Alternative A would have minimal staffing increases.

With the largest staffing increases and cost increase, alternative C was determined to provide the greatest advantages with respect to improving park operations. Alternative B also has significant staffing increases and as such, significant advantages.

POTENTIAL BOUNDARY ADJUSTMENTS

The National Park and Recreation Act of 1978 requires general management plans to address whether boundary modifications should be made to park units. Boundary adjustments may be recommended for the following reasons:

- Protect significant resources and values or enhance opportunities for public enjoyment related to park unit purposes.
- Address operational and management issues, such as the need for access or the need for boundaries to correspond to logical boundary delineations such as topographic or other natural features or roads.
- Otherwise protect park unit resources critical to fulfilling park unit purposes.

No specific boundary adjustments were identified as needed for the Ozark National Scenic Riverways. Thus, none of the alternatives in this general management plan propose changes to the park unit boundary. This plan does not preclude future consideration of boundary adjustments should needs or conditions change. The boundary may be adjusted in the future where opportunities arise. The park unit would continue to consider these opportunities on a case-by-case basis.

MANAGEMENT ZONES

Management zones define specific resource conditions, visitor experiences, appropriate recreational activities, and levels and types of development to be achieved and maintained in different areas of the NPS Riverways for each action alternative. In formulating the three action alternatives, the management zones were placed in different locations in the NPS Riverways according to the concept of each alternative.

There are no proposed management zone maps for the no-action alternative. Although some management zones were developed for the 1984 *Ozark National Scenic Riverways General Management Plan*, these are not presented because the NPS approach to zoning has changed significantly and an updated management zoning approach is required. Also different from the 1984 plan, this planning effort will not apply any management zones to easements or private lands.

Proposed management zones for the NPS Riverways were presented to the public in Newsletter 3: Preliminary Alternatives (spring/summer 2009). They were then modified in response to public comments.

DESCRIPTIONS OF MANAGEMENT ZONES

There are seven designated management zones, including four land-based zones and three river-based zones, for the Ozark National Scenic Riverways. River-based zones include the area up to the ordinary high-water mark.

Developed

The developed zone represents areas that would support moderate to high levels of development and visitor services to accommodate concentrated visitor use and diverse recreational, educational, and interpretive opportunities. Most of the administrative facilities for operations and maintenance would be in this zone.

Resource-based Recreation

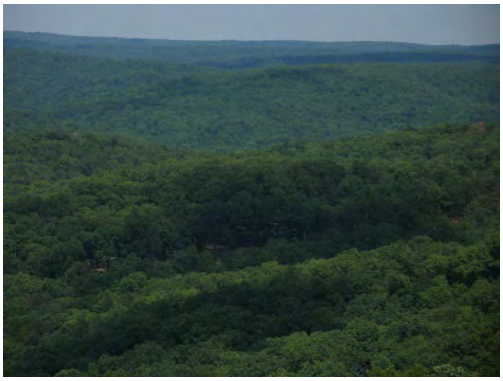
The resource-based recreation zone represents areas that would support moderate levels of visitor use to

accommodate a wide range of recreational, educational, and interpretive opportunities. Although some resource modifications could occur, natural and cultural resources would remain largely intact.

Natural

The natural zone represents areas that would support the broader ecological integrity of the National Riverways. Natural processes would dominate and only low-impact recreational activities would be allowed. Visitors would be immersed in nature with opportunities to enjoy solitude and natural sights and sounds.

Primitive



The primitive zone represents areas that would retain their wild, natural character. Natural resources and processes would be preserved to maintain their natural conditions and ecological integrity. Opportunities would be provided for visitors to experience backcountry challenges and solitude.

Mixed-use River

The mixed-use river zone represents sections of the rivers that would support a mix of motorized and nonmotorized boating opportunities. Visitor encounters would typically be moderate to high, especially during peak use. The natural setting would predominate, but the sights and sounds of human activity would be prevalent.

Seasonal Mixed-use River

The seasonal mixed-use zone represents sections of the rivers that would support a

mix of nonmotorized and lower-horsepower motorized boating opportunities during the off-peak season. The rest of the year, only nonmotorized boating would be allowed. The natural setting would predominate, but the social setting would vary seasonally with the types of allowable activities and levels of use.

Nonmotorized River

The nonmotorized river zone represents sections of the rivers that accommodate year-round, nonmotorized boating opportunities. Visitors would experience an unaltered river system where natural sights and sounds would predominate, except during peak use when recreational activity would be more apparent.

MANAGEMENT ZONE COMPARISON

Tables 2 and 3 give an overview of each management zone and describe the desired conditions for resources within each zone. Table 2 provides information about the four land-based management zones. Table 3 provides information about the three river-based management zones. The tables allow comparison of the differences between zones—some slight, some major—in the tolerance for resource impacts, appropriate management activities, visitor use levels, and appropriate recreational activities. For a more detailed overview of the management zones see appendix D.

Table 2. Ozark National Scenic Riverways Land-based Management Zones

	Developed	Resource-based recreation	Natural	Primitive
Zone concept	Areas support moderate to high levels of development and visitor services to accommodate concentrated visitor use and diverse recreational, educational, and interpretive opportunities. Most of the administrative facilities for operations and maintenance would be in this zone.	Areas support moderate levels of visitor use to accommodate a wide range of recreational, educational, and interpretive opportunities. Although some resource modifications could occur, natural and cultural resources would remain largely intact.	Areas support the broader ecological integrity of the national riverways. Natural processes would dominate and only low-impact recreational activities would be allowed. Visitors would be immersed in nature with opportunities to enjoy solitude and natural sights and sounds.	Areas retain their wild, natural character. Natural resources and processes would be preserved to maintain their pristine conditions and ecological integrity. Opportunities would be provided for visitors to experience backcountry challenges and solitude.
Levels of development	Moderate to high levels of development to meet visitor use and park administrative needs.	Moderate levels of development for the purpose of directing visitor use, enhancing recreational opportunities, and protecting resources.	Developments would be limited to those essential for resource protection, research, monitoring, and basic visitor services.	Minimal development would be allowed for the protection of natural resources and to allow for dispersed, low-impact visitor use.
Visitor experience	Visitors would have opportunities to better understand the riverways' significant resources and values through a wide range of interpretive facilities and services, interact with other visitors and park staff, and recreate in an environment that is supported by a variety of visitor services. Visitors would experience a modified natural environment with developed visitor facilities for orientation; day and overnight use would concentrate most of the park's visitors in these areas. They also would have a high expectation for quality services and facilities.	Visitors would have opportunities to participate in a range of recreational, interpretive, and educational opportunities. Visitors would experience a mostly natural setting where some visitor services are available.	Visitors would encounter intact natural resources, features, and systems for personal inspiration, education, and recreation. Experiences could include opportunities for solitude, contemplation, and self-reliance. Evidence of human use would be limited.	Visitors would be immersed in a primitive, wild setting with opportunities to experience backcountry challenges, solitude, and self-reliance. Visitors would have a sense of remoteness, isolated from the sights and sounds of other people.
Visitor services	Moderate to high level of visitor services could include one or more of the following: orientation and interpretive programs, signs, wayside exhibits, campgrounds, contact stations, commercial operations, convenience stores, dining, and shuttle services.	Moderate levels of visitor services would be provided, such as orientation and interpretive programs, signs and wayside exhibits, and commercial services if compatible with the desired resource conditions and visitor experiences.	Low levels of visitor services would be provided, such as informational signs and wayside exhibits.	Directional signs would be provided at trailheads. Limited interpretive materials might be available to promote safe and responsible recreation.
Natural resource condition	Natural resources would be managed to accommodate facilities for NPS operations and concentrated visitor use. The effects of developments and visitor use on the natural surroundings would be minimized through planning and design efforts.	Resources would be maintained in their natural condition, yet modified where necessary to provide distinct visitor opportunities and experiences. Modifications would be aesthetically blended with the environment as much as possible.	Ecological integrity would be maintained by preserving and restoring natural resources and processes through an integrated natural resource management approach. Emphasis would be placed on protecting and restoring outstanding natural features and habitats for rare and endangered species.	Natural systems and processes would function independent of human intervention. Natural conditions would be restored when disturbed by human activity, but only if degraded sites are not expected to recover in a timely manner without human intervention. No development would occur.
Cultural resource condition	Cultural resources eligible for or listed in the National Register of Historic Places would be protected and managed consistent with NPS policies and the standards published by the secretary of the interior. All other cultural resources would be evaluated to determine if they should be preserved, stabilized, restored, or left unmaintained.	Same as Developed	Same as Developed	Same as Developed

TABLE 3. OZARK NATIONAL SCENIC RIVERWAYS RIVER-BASED MANAGEMENT ZONES (INCLUDES RIVERS UP TO THE ORDINARY HIGH-WATER MARK)

	Mixed-use	Seasonal mixed-use	Nonmotorized
Zone concept	The river supports a mix of motorized and nonmotorized boating opportunities. The natural setting would predominate, but the sights and sounds of human activity would be prevalent.	The river supports a mix of nonmotorized and lower-horsepower motorized boating during the off-peak season, which occurs from after Labor Day through March 14. The rest of the year, only nonmotorized boating would be allowed. The natural setting would predominate, but the social setting would vary seasonally with the types of allowable activities and levels of use.	The river supports year-round, nonmotorized boating opportunities. Visitors would experience an unaltered river system where natural sights and sounds would predominate, except during peak use when recreational activity would be more apparent.
Levels of development	Low to moderate levels of development would be provided to accommodate launching and retrieving motorized and nonmotorized watercraft on the river. Locating new developments or improvements in the floodplain would be avoided where possible.	Same as Mixed-Use	Low levels of development could be provided to accommodate launching and retrieving only nonmotorized watercraft on the river. Locating new development or improvements in the floodplain would be avoided.
Visitor experience	Visitors would have opportunities to engage in a diverse mix of motorized and nonmotorized boating experiences.	Visitors would have the opportunity to float the river without the presence of motorized boats during the peak season, which is defined as March 15 through Labor Day. During the off-season, visitors would have opportunities to engage in a mix of lower-horsepower motorized and nonmotorized boating experiences.	Visitors would have the opportunity to float the river without the presence of motorized boats year-round.
Natural resource condition	The natural resource conditions in the river corridor would be managed to ensure that the free-flowing clear, clean water of the river was not degraded.	Same as Mixed-Use	Same as Mixed-Use
Cultural resource condition	Cultural resources eligible for or listed in the National Register of Historic Places would be protected and managed consistent with NPS policies and the standards published by the secretary of the interior. All other cultural resources would be evaluated to determine if they should be preserved, stabilized, restored, or left unmaintained. Cultural resources that are subject to bank erosion, slumping, subsidence, or other natural deterioration would be stabilized using best management practices.	Same as Mixed-Use	Same as Mixed-Use

HORSEPOWER LIMITS

Table 4 describes the horsepower limits under each alternative. The color codes correspond to the river-based management zones described in table 3.

During public scoping meetings it became apparent a major topic of public interest was in the size of motors currently allowed on the rivers. Existing park regulations (36 CFR 7.83(a) (2), see appendix C) prohibits the use of motors rated higher than 40 hp by the manufacturer from Big Springs upriver to Alley Springs and Round Springs. However, for many years the National Riverways has interpreted the regulations as allowing (and the public has been using) motors rated up to 60 hp if they were equipped with a jet powered prop that effectively lowered the usable horsepower to 40 hp. The National Park Service has recently been advised that this interpretation of the regulations is in variance with the *Code of Federal Regulations*. This issue has been included in this comprehensive planning process because the discussion of motor size could logically include a range of alternatives for how the public recreates on and uses the rivers.

Alternative B, which is the preferred alternative, would continue to allow the use of these 60/40 hp jet motors (or 40 hp without the jet) on the waters where they are currently allowed as shown in the no-action alternative. Alternative A would limit the use of motors to no more than 40 hp with or without jet attachments. Alternative C would allow the use of 60/40 motors. Any alternative that proposed the continued use of 60/40 hp motors would require rule-making to change the existing regulation.

RECREATION OPPORTUNITIES

Table 5 summarizes recreation activities that are allowed in each management zone. Collectively, the management zones provide the full suite of recreation opportunities that will be allowed in Ozark National Scenic Riverways.

Participation in some activities, including picnicking, scenic viewing, nature observation, and interpretive talks and demonstrations, will be allowed in all management zones in Ozark National Scenic Riverways. Activities such as hiking or fishing, which respectively can occur only on land or in water, are restricted to land-based or river-based management zones. In some cases, zoning is used to manage for desired conditions. For example, bicycling is not included in the primitive zone because it is not consistent with this zone's wild, natural character.

TABLE 4. MOTORBOAT HORSEPOWER (HP) LIMITS BY ALTERNATIVE

		No-action alternative		Alternative A		Alternative B (NPS preferred)		Alternative C	
		Peak season	Off-peak season	Peak season	Off-peak season	Peak season	Off-peak season	Peak season	Off-peak season
Current River	Northern boundary to Akers	10 hp	25 hp	No motorboats		No motorboats		No motorboats	
	Akers to Pulltite	10 hp	25 hp					No motorboats	25 hp
	Pulltite to Round Spring					No motorboats	25 hp		
	Round Spring to Two Rivers	60/40 hp		No motorboats	25 hp	60/40 hp		60/40 hp	
	Two Rivers to Van Buren			40 hp					
	Van Buren to Big Spring							No hp limits	
	Big Spring to southern boundary	No hp limits							
Jacks Fork	Western boundary to Rymers	10 hp	25 hp	No motorboats		No motorboats		No motorboats	
	Rymers to Bay Creek							No motorboats	25 hp
	Bay Creek to Alley Spring	25 hp				No motorboats	25 hp	25 hp	
	Alley Spring to West Eminence	25 hp							
	East Eminence to Two Rivers	60/40 hp				60/40 hp		60/40 hp	

General notes:
Peak season is defined as March 15 through Labor Day.
The designation of 60/40 assumes a regulation change. The color codes correspond to the river-based management zones described in table 3:

Mixed-use	Seasonal mixed-use	Nonmotorized

Table 5. Recreation Activities by Management Zone

Activity	Land-based management zones				River-based management zones		
	Developed	Resource-based recreation	Natural	Primitive	Mixed-use river	Seasonal mixed-use river	Nonmotorized river
Picnicking	●	●	●	●	●	●	●
Camping, amenities provided	●	●					
Camping, no amenities			●	●			
Camping on gravel bars[1]					●	●	●
Lodging/dining	●						
Hiking	●	●	●	●			
Horseback riding		On designated trails			At designated fords		
Bicycling on roads	●	●	●				
Bicycling on trails	●	●	●				
Scenic viewing / nature observation	●	●	●	●	●	●	●
Interpretive talks, demonstrations	●	●	●	●	●	●	●
Hunting and trapping		●	●	●	●	●	●
Fishing (not in springs)	●	●	●	●	●	●	●
Caving	Guided	Guided	Guided	Guided			
All terrain vehicle[2]	●						
Swimming[3]					●	●	●
Canoeing, kayaking, rafting, tubing					●	●	●
Motorized boating					Motorboats year-round. See table 4 for motorboat horsepower limits by alternative.	Peak season: No motorboats. Off-peak season 25 horsepower maximum.	No motorboats.

1 Camping on gravel bars would only be allowed in designated areas.

2 All-terrain vehicle and utility terrain vehicles would only be allowed on designated county roads, in accordance with state law.

3 Swimming is not allowed in springs or spring branches.

LAND ACREAGE AND RIVER MILE COMPARISONS BY ALTERNATIVES

The no-action alternative is the continuation of current management practices. There are no proposed management zone maps for the no-action alternative. Some management zones were developed for the 1984 *Ozark National Scenic Riverways General Management Plan*, but these are not presented because the NPS approach to zoning has changed significantly and an updated management zoning approach is required.

Mapping of the management zones for alternatives A, B, and C, was respectively provided in each alternative map. For each alternative, the number of federally owned acres that would be within each land-based management zone is shown in table 6. Visual representations of the same data, as percentages of the NPS Riverways' land area, are provided in figures 1, 3, and 5 for alternatives A, B, and C, respectively.

Table 7 presents the river miles within each river-based management zone for each action alternatives. Visual representations of the same data, as percentages of the NPS Riverways' river miles, are provided in figures 2, 4, and 6 for alternatives A, B, and C, respectively.

Inspection of the tables and graphs demonstrate that there are substantial differences in the acreages and river miles assigned to the various land- and water-based management zones among the action alternatives. This demonstrates that the process for developing alternatives was successful in meeting the requirement to consider the full range of reasonable alternatives that is included in guidance from the Council on Environmental Quality and NPS Director's Order 12.

TABLE 6. FEDERALLY OWNED ACRES WITHIN EACH LAND-BASED MANAGEMENT ZONE FOR EACH ACTION ALTERNATIVE

Zone	Alternative A	Alternative B (NPS preferred)	Alternative C
Developed	739	1,436	2,958
Resource-based recreation	1,671	4,534	30,822
Natural	35,411	37,204	14,542
Primitive	13,833	8,480	3,332
Total	51,654	51,654	51,654

TABLE 7. RIVER MILES WITHIN EACH RIVER-BASED MANAGEMENT ZONE FOR EACH ACTION ALTERNATIVE

Zone	Alternative A	Alternative B (NPS preferred)	Alternative C
Mixed-use river	48	70	79
Seasonal mixed-use river	18	18	27
Nonmotorized river	68	46	28

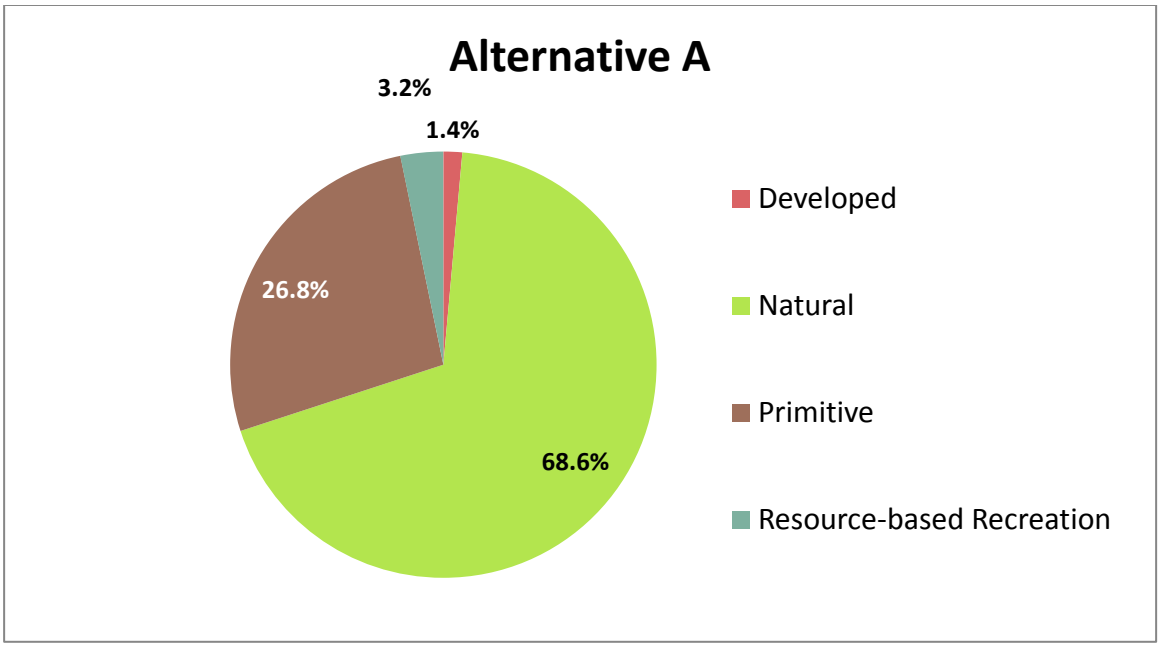


FIGURE 1. PROPORTION OF MANAGEMENT ZONES FOR ALL FEDERALLY OWNED NATIONAL RIVERWAYS LANDS UNDER ALTERNATIVE A

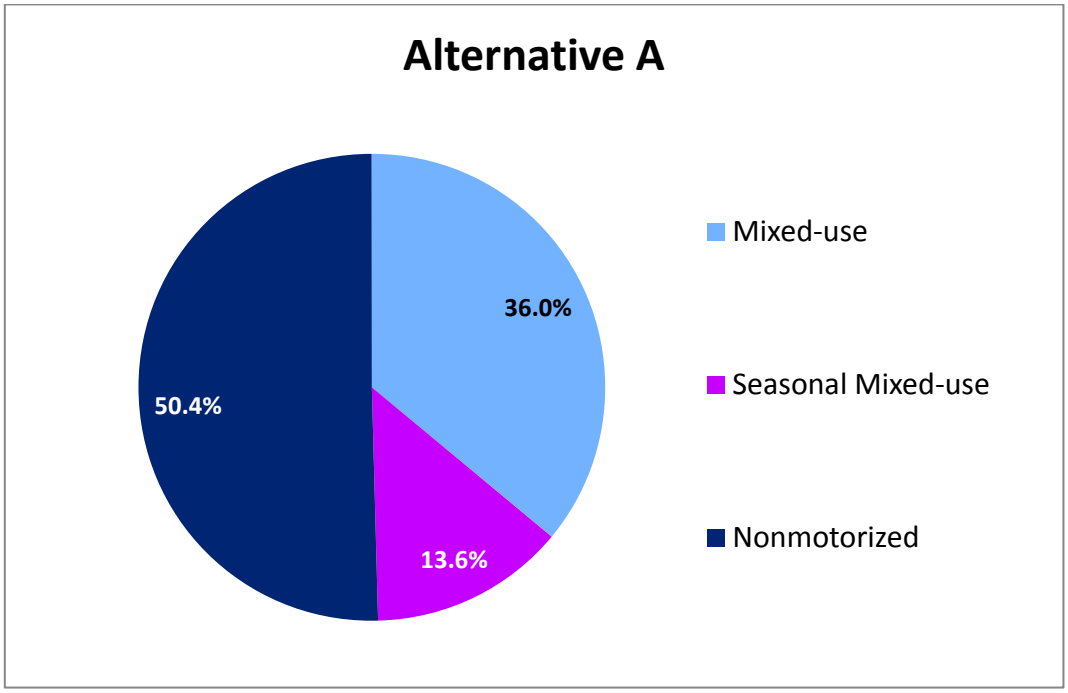


FIGURE 2. PROPORTION OF MANAGEMENT ZONES FOR ALL NATIONAL RIVERWAYS WATERS UNDER ALTERNATIVE A

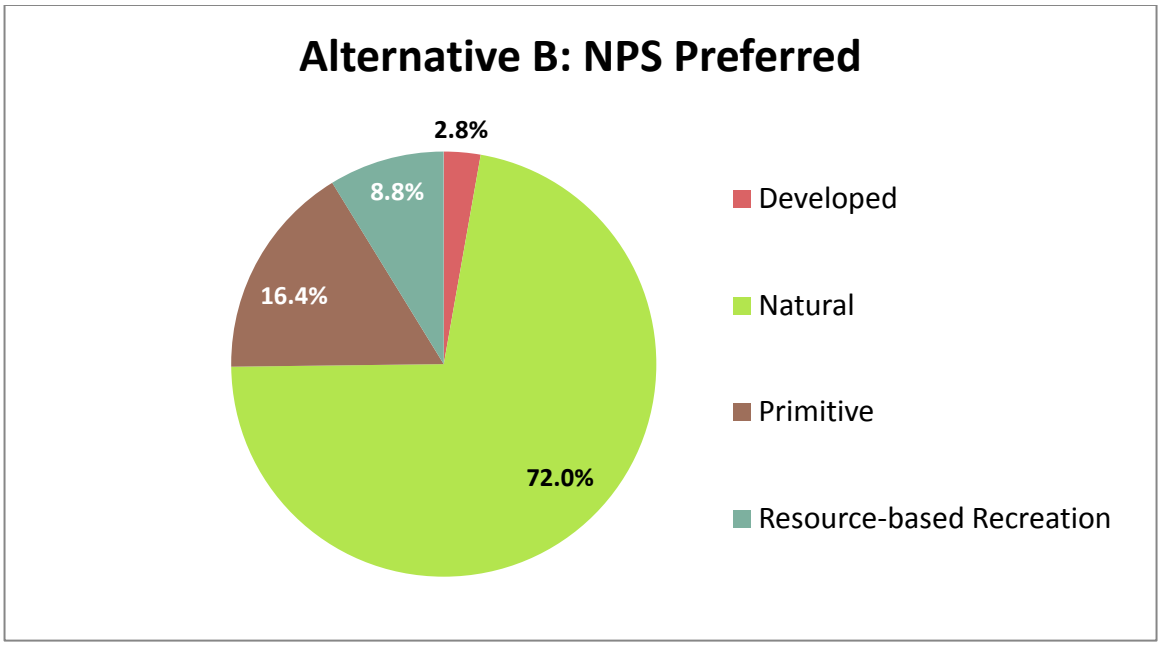


FIGURE 3. PROPORTION OF MANAGEMENT ZONES FOR ALL FEDERALLY OWNED NATIONAL RIVERWAYS LANDS UNDER ALTERNATIVE B

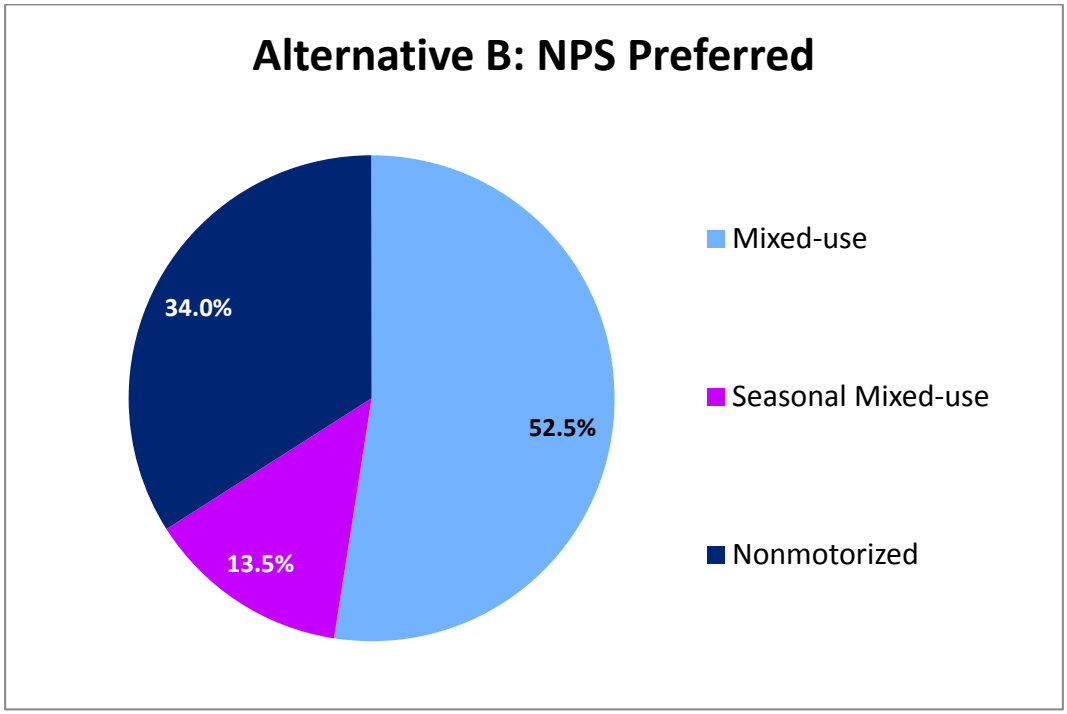


FIGURE 4. PROPORTION OF MANAGEMENT ZONES FOR ALL NATIONAL RIVERWAYS WATERS UNDER ALTERNATIVE B

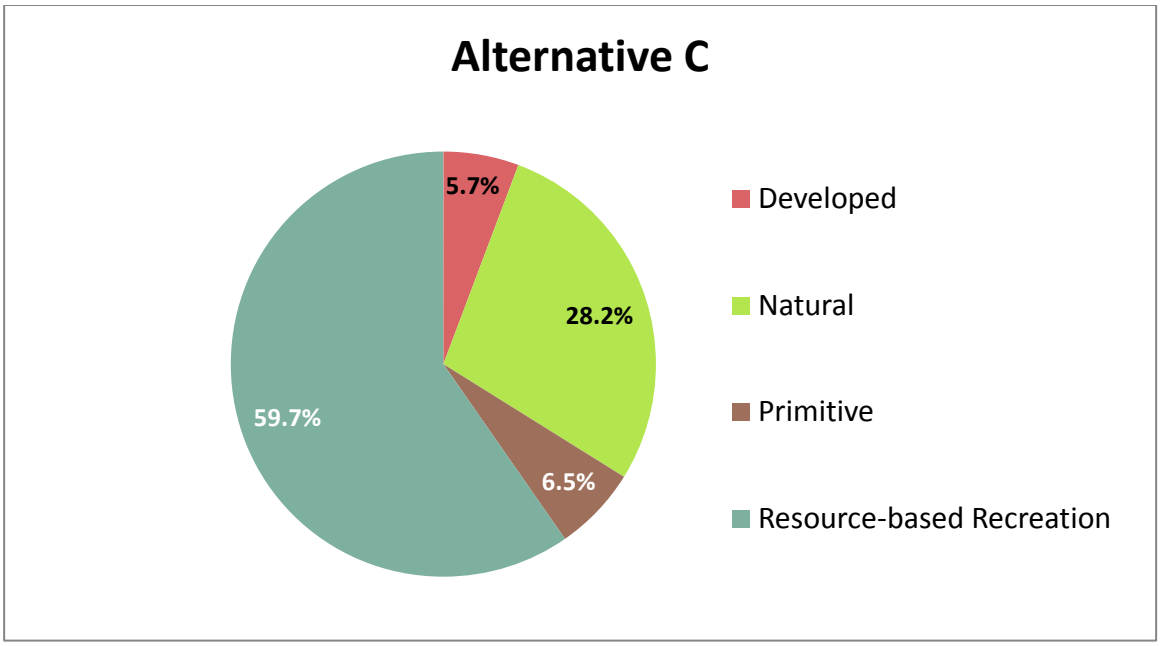


FIGURE 5. PROPORTION OF MANAGEMENT ZONES FOR ALL FEDERALLY OWNED NATIONAL RIVERWAYS LANDS UNDER ALTERNATIVE C

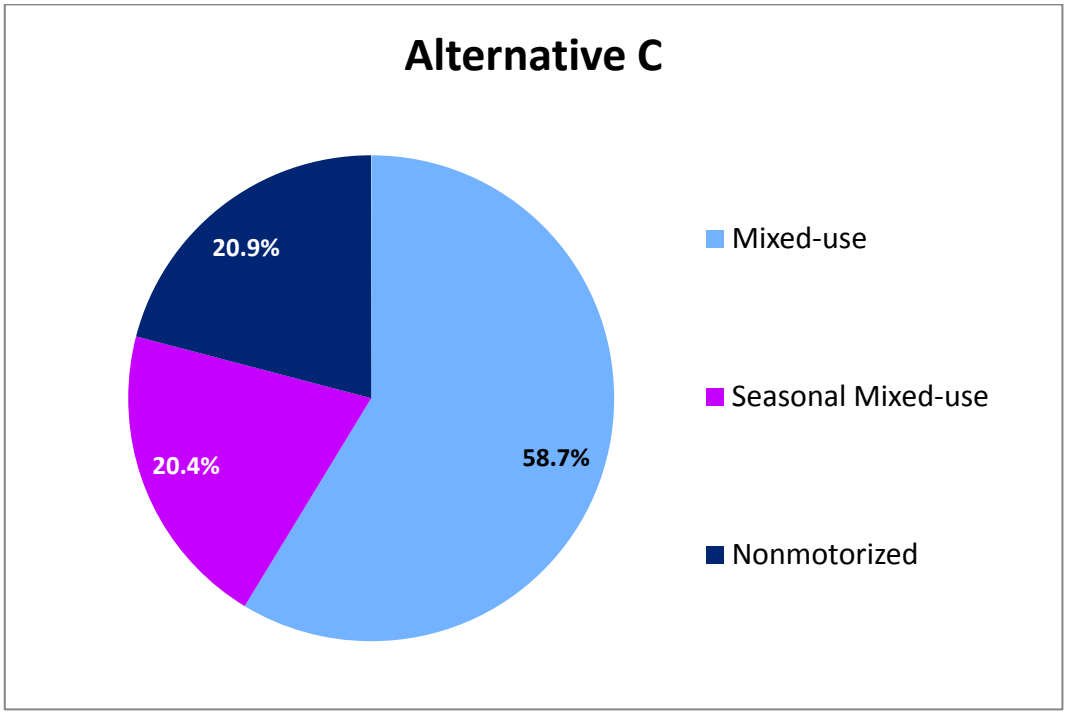


FIGURE 6. PROPORTION OF MANAGEMENT ZONES FOR ALL NATIONAL RIVERWAYS WATERS UNDER ALTERNATIVE C

THE ALTERNATIVES

ORGANIZATION OF ALTERNATIVES

The overall concepts for each alternative are presented followed by management strategies that would guide NPS Riverways' programs, activities, or resources. These strategies are organized by the following nine management categories:

- zoning
- visitor experiences and activities
- visitor services and facilities
- interpretation and education
- natural resource management
- cultural resource management
- wilderness
- park operations
- partnerships

For the no-action alternative, information is presented that helps identify current NPS Riverways activities and programs, as well as some of the ongoing issues and concerns that the proposals for alternatives A, B, and C may address.

ALTERNATIVE CONCEPTS

No-action Alternative: Continuation of Current Management Practices

The no-action alternative is depicted on the No Action map following the alternative description. This alternative describes how Ozark National Scenic Riverways has been and would continue to be managed. It reflects current resource conditions and trends, existing recreational opportunities, types of development, and levels of service. The primary purpose of describing the no-action alternative is to provide a baseline for comparing the other management alternatives.

The no-action alternative is a description of on-the-ground management conditions rather than a reiteration of existing planning documents for the National Riverways. The 1984 general management plan, 1989 river use management plan, and 1992 statement for management all provide a basis for understanding the current management approach. However, these documents are not always an accurate reflection of adaptive management approaches taken by NPS staff to address unforeseen or emerging issues.

Alternative A

Alternative A is depicted on the alternative A map following the alternative description. Management would focus on creating visitor experiences and providing resource conditions that help visitors better understand the riverways of the past, including the traditional river recreation activities reminiscent of those that occurred when the National Riverways were established. Alternative A would emphasize greater opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter, less crowded, and slower paced.

Alternative B (NPS Preferred)

Alternative B is depicted on the alternative B map following the alternative description. Management would provide a high level of protection of natural and cultural resources while expanding ways for visitors to experience and learn about these resources in interesting and enjoyable ways. This alternative strives to improve visitors' connection to the natural, cultural, and scenic elements of the National Riverways with the major goal of helping improve visitor appreciation of its resources. Visitors would have enhanced opportunities to discover and learn about

the National Riverways' natural wonders and Ozark heritage.

Alternative C

Alternative C is depicted on the alternative C map following the alternative description. Management would primarily seek to provide a diversity of outdoor recreational opportunities and experiences while maintaining the highly scenic natural setting and cultural resources. This alternative's diverse river recreational opportunities and experiences would be similar to what is included in the no-action alternative. Alternative C also would offer additional land-based recreational opportunities. This is reflected in the increased amount of acreage in the resource-based recreation zone and the developed zone.

THE NO-ACTION ALTERNATIVE
CONTINUATION OF CURRENT MANAGEMENT PRACTICES

ZONING

The no-action alternative management zoning is limited to river use management zones set forth in the 1989 river use management plan.

VISITOR EXPERIENCES AND ACTIVITIES

The current, wide variety of visitor experiences and recreational activities would continue to occur. These include river-based recreational opportunities such as canoeing, kayaking, tubing, rafting, johnboating, and fishing. Different stretches of the river would continue to be managed for different boating experiences. The current variety of land-based recreational opportunities would also continue to be offered to visitors, including hiking, horseback riding, hunting, picnicking, camping, and caving.

River-based Recreation

All sections of the NPS Riverways would continue to be open to nonmotorized watercraft year-round.

Management would continue to provide for visitor opportunities and experiences that result in high-density canoe use in the upper Current River. The frequency of river access points along this stretch would continue to allow for float trips of one day or less. Tube use has grown in popularity in many sections of the NPS riverways, especially along the lower Current River. These high-density river sections would likely continue to increase in use.

Management would continue to allow boats to use 60/40 horsepower motors on certain portions of the Current and Jacks Fork Rivers. As noted previously, this approach is in violation with the existing regulation. Nonetheless, this situation cannot continue indefinitely, the no-action alternative is characterized this way to provide a baseline for comparison in evaluating the changes and impacts of the other alternatives. The no-action alternative is characterized this way to provide a baseline for comparison in evaluating the changes and impacts of the other alternatives. River use management zones from 1989 that set horsepower limits on motorboats and maximum numbers for canoes within the National Riverways would continue. See specific motorboat horsepower limits by alternative. Concessioners would continue to be required to limit canoe rentals to adhere to the 1989 river management plan.

The no-action alternative reflects current management practices. The Park staff is tasked with protecting the resource and may exercise adaptive management approaches on an as needed basis to address unforeseen or emerging issues in accordance with law and policy.

The riverways would continue to be available for fishing and gigging activities, consistent with applicable restrictions set forth by the park unit or state. For example, fishing by motorized boat would be allowable in areas zoned by the park unit for motorized boating. The National Park Service would continue to partner with the state to enhance healthy native game fish populations.

Land-based Recreation

Forty nine miles of designated hiking trails, ranging in length from less than a mile to more than thirteen miles, would continue to be provided. Some developed-area paved trails would continue to be

accessible and two campgrounds would continue to provide accessible campsites. Trails would continue to be off-limits to mountain bikes.

The current, designated horse trail system of 23 miles of designated horse trails would continue to be provided, with seven designated stream crossings for horse riders. At least 90 miles of undesignated horse trails, with 24 undesignated stream crossings used by horse riders and 38 undesignated access points could continue to be utilized. Horse camping would continue to not be allowed.

Developed fee campgrounds with recreational vehicle hookups at Big Spring, Alley Spring, and Round Spring, would continue to provide a total of 450 sites.

Vehicular access to designated sites on gravel bars for day use and overnight camping would continue to be allowed. Campers would continue to be allowed to locate their own campsites on gravel bars.

Backcountry campsites would continue to be provided in designated areas throughout the NPS Riverways and would require a fee. Some backcountry sites would continue to have basic amenities, such as restrooms, tables, fire rings, and/or lantern posts.

Primitive campsites would continue to be provided throughout the NPS Riverways and would not require a fee. Primitive sites would have no amenities. Some primitive sites are accessible by vehicles.

Currently all caves in the National Riverways, other than Round Spring cave, are closed in attempt to limit the spread of white-nose syndrome amongst gray bats. However, guided cave tours at Round Spring would continue to be provided.

VISITOR SERVICES AND FACILITIES

Visitor orientation and information services would continue to be available at NPS headquarters in Van Buren, at the multiagency visitor center in Salem, and at a few contact points and ranger stations throughout the National Riverways.

Major recreation sites would continue to be found at Akers, Pulltite, Round Spring, Alley Spring, Two Rivers, Powder Mill, and Big Spring. These areas would include visitor facilities for day use and overnight camping. Existing visitor services would also continue, which include equipment rentals, restrooms, and concession stores and food services. Rental cabins would continue to be available at Big Spring. Smaller recreation sites with facilities for day and overnight use would continue to include Cedargrove, Jerktail, Blue Spring, Log Yard, and Gooseneck. River access, primitive camping, restrooms, and parking would continue to be provided at various sites along the rivers.

There are currently 23 concession contracts that provide services to visitors. These businesses would continue to operate under their existing contracts to provide visitor support and river recreational services (canoe, tube, and raft rentals and shuttle services), cabin rentals and a restaurant at Big Spring, and five camp stores near the campgrounds.

There are approximately 350 miles of roads in the National Riverways. Included in this figure are more than 50 miles of paved roads, more than 120 miles of graded roads, and more than 150 miles of two-track dirt roads.

There are 72 miles of trails designated for hiking and/or horseback riding. Different segments of the road and trail networks would continue to be managed by the National Park Service or state or county agencies.

The following visitor entry services and information conditions would continue:

- no entrance station or entrance fees
- no traditional NPS year-round visitor center
- primary use of the website and printed materials to provide visitor information
- use of seasonal visitor contact locations
- use of the offsite, multiagency information facility in Salem, Missouri, to provide visitor information

Existing NPS roads and river access points that are currently open and accessible would continue to be managed and patrolled. Management would continue to strive for closure of roads, traces, crossings, and river access points that are not part of the NPS-designated system. Law enforcement would be increased for compliance.

INTERPRETATION AND EDUCATION

The current variety of interpretive and educational programs would continue to be provided for visitors. The goal of these programs is to ensure that visitors have all of the information they need to fully enjoy and experience the National Riverways by

- promoting awareness about the facilities, features, and activities available
- interpreting the cultural and natural features of the area
- educating visitors on the safe and proper use of National Riverways resources

NATURAL RESOURCE MANAGEMENT

Natural resource management would continue to preserve and protect the natural resources, processes, systems, and values of the National Riverways in accordance with NPS policies. In particular, programs would emphasize protection of outstanding natural features, including sites that encompass geological, scientific, and ecological characteristics that warrant special protection. Examples include caves, springs, and other rare habitats that support threatened and endangered species. Ongoing programs also would include the administration of scenic easements on privately owned tracts, collaborative management efforts on state-owned lands, and management of agricultural leases to preserve certain pastoral landscapes within the National Riverways' boundary.

CULTURAL RESOURCE MANAGEMENT

Cultural resource management would continue to include efforts to preserve historic structures, archeological resources, and cultural landscapes in accordance with NPS policies. Cultural resource programs would also include adaptive reuse of some historic structures; management of some historic cemeteries (that is, to provide appropriate access); the study of Ozark folklife; and the preservation and cataloging of historic objects, documents, and other collections.

While there are currently 249 structures on the List of Classified Structures, the number will change as cultural landscapes are reevaluated and individual federal properties pass the 50-year historic benchmark, or when structures that do not receive adequate maintenance deteriorate to a point that they are removed from the list. Some of these structures have been restored and are available as interpretive

exhibits. Others would continue to be adaptively used for other park operations and maintenance purposes. Cemeteries would continue to be maintained. More than 400 archeological sites would continue to be monitored.

In addition, the use of prescribed fire may be considered for managing vegetation associated with historic sites and cultural landscapes in a fashion that preserves the character of historic settings and landscapes.

A cultural affiliation landscape plan for pastoral areas would be completed and implemented. This would increase areas managed as meadows and agricultural sites that were once part of Ozark farms and settlement areas.

The park unit's certified curatorial facility would continue to be managed for park resource collections only.

WILDERNESS

Under the no-action alternative, the National Park Service would continue to maintain the Big Spring tract's primitive, natural character in order to maintain its wilderness eligibility. See chapter 3 for details about the wilderness study and proposed zoning, management of structures, roads, and utilities within the Big Spring tract.

PARK OPERATIONS

Park maintenance operations would continue to be managed out of current facilities, including several structures built by the Civilian Conservation Corps that do not meet health or safety requirements.

Staff housing units would continue to be provided at current operating levels throughout the waterways.

Water systems and waste water systems would continue to be provided at current levels within the waterways.

PARTNERSHIPS

Currently, there are few partnerships. Unlike most national park units, the NPS Riverways do not have a friends group. Management is currently working to develop a friends group.

The park unit would continue to share office space at the Van Buren headquarters with other federal and state agencies.

Eastern National Association would continue to provide bookstore services at park visitor contact facilities such as the Van Buren headquarters, Round Spring, and Alley Mill.

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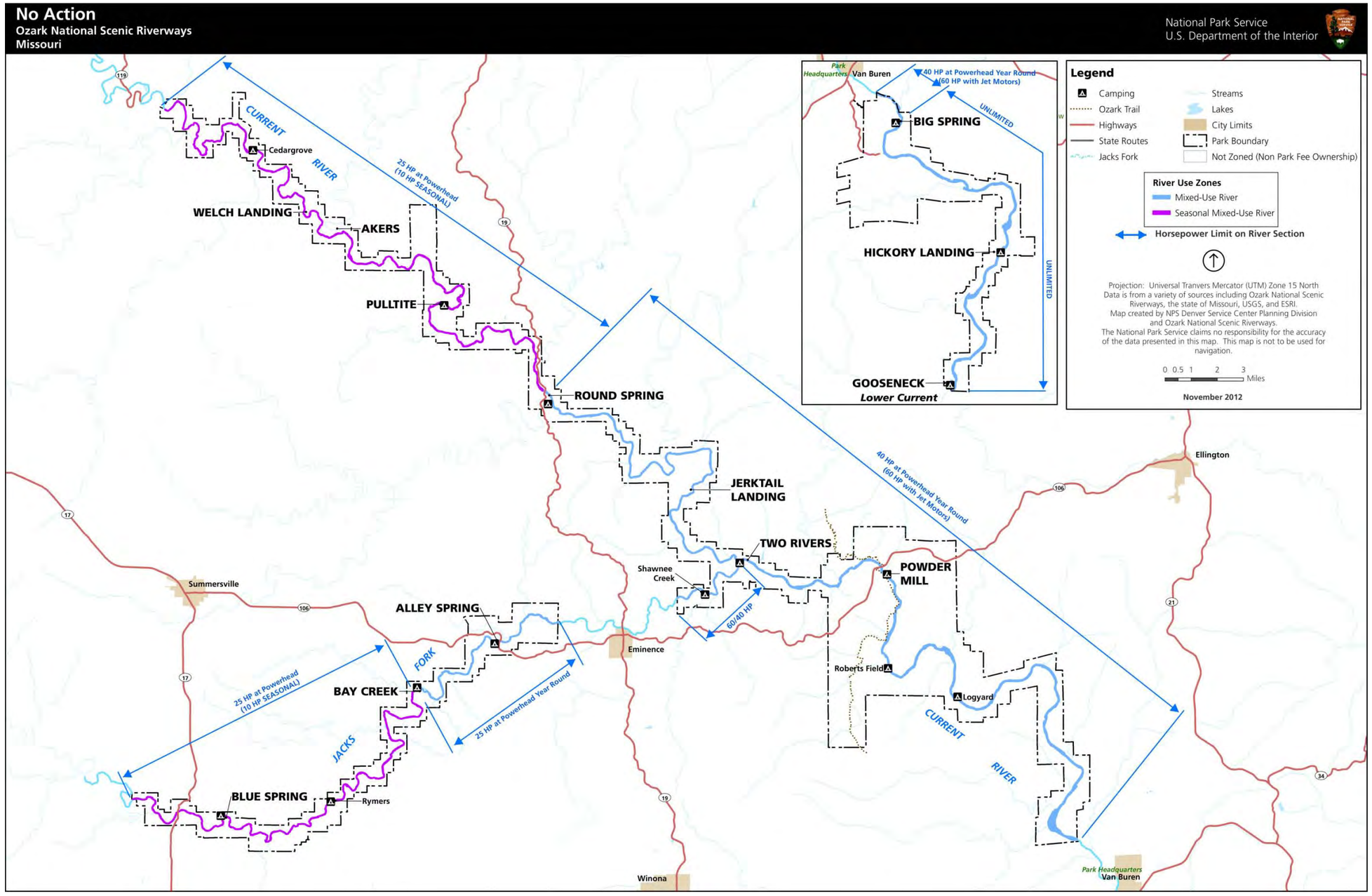
No Action
Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
Legend
Camping
Ozark Trail
Highways
State Routes
Jacks Fork
Streams
Lakes
City Limits
Park Boundary
Not Zoned (Non Park Fee Ownership)
River Use Zones
Mixed-Use River
Seasonal Mixed-Use River
Horsepower Limit on River Section
Projection: Universal Tranvers Mercator (UTM) Zone 15 North
Data is from a variety of sources including Ozark National Scenic Riverways, the state of Missouri, USGS, and ESRI.
Map created by NPS Denver Service Center Planning Division and Ozark National Scenic Riverways.
The National Park Service claims no responsibility for the accuracy of the data presented in this map. This map is not to be used for navigation.
0 0.5 1 2 3 Miles
November 2012
Park Headquarters
Van Buren
40 HP at Powerhead Year Round (60 HP with Jet Motors)
UNLIMITED
BIG SPRING
HICKORY LANDING
GOOSENECK
Lower Current
CURRENT RIVER
Cedargrove
25 HP at Powerhead (10 HP SEASONAL)
WELCH LANDING
AKERS
PULLTITE
ROUND SPRING
JERKTAIL LANDING
TWO RIVERS
POWDER MILL
Shawnee Creek
60/40 HP
Eminence
ALLEY SPRING
BAY CREEK
JACKS FORK
25 HP at Powerhead Year Round
BLUE SPRING
Rymers
Summersville
Winona
Ellington
Roberts Field
Logyard
Park Headquarters
Van Buren

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ALTERNATIVE A

ZONING

See the alternative A map for a depiction of management zones within the NPS Riverways under this alternative. See table 6 for numbers of acres in each land-based management zone and figure 1 for the percentages of the NPS Riverways' land in each land-based management zone. See table 7 for numbers of river miles in each river-based management zone and figure 2 for the percentages of the NPS Riverways' river miles in each river-based management zone.

VISITOR EXPERIENCES AND ACTIVITIES

Visitors would have opportunities to float secluded stretches of the river where they would not experience the sights and sounds of motorized boats or vehicles. Along other stretches of the river, visitors would encounter low to moderate densities of lower-horsepower motorboats that evoke the traditional johnboat river experience. Traditional, family-oriented recreation would also be emphasized, including activities such as guided float trips, gravel bar camping, and fishing. Motorized forms of recreation would be deemphasized.

River-based Recreation

All sections of the riverways would continue to be open to nonmotorized watercraft year-round. The percentage of the rivers zoned for nonmotorized recreation would increase, including specific areas for low-density nonmotorized use, even during the peak-use season, which is defined as March 15 through Labor Day. Concession dropoff and pickup locations for nonmotorized watercraft users would be redistributed to reduce peak-season crowding effects and to protect river resources in response to potential changes in river flow conditions. This would require closure and restoration of about 20 access points. Some new access may be needed; however, total designated access points would decrease.

Existing regulation that prohibits the use of motors that are rated higher than 40 horsepower by the manufacturer on certain portions of the Current and Jacks Fork rivers would be enforced and 60/40 horsepower motors would not be allowed. See table 4 for motorboat horsepower limits by alternative.

The riverways would continue to be available for fishing and gigging activities, consistent with applicable restrictions set forth by the park unit or state. For example, fishing by motorized boat would be allowable in areas zoned by alternative A for motorized boating. The National Park Service would continue to partner with the state to sustain healthy native fish populations.

Land-based Recreation

The location of primitive and natural zoning would increase the amount of hiking trail access compared to current conditions. About 15 miles of roads in primitive zones would be removed and replaced with hiking trails. One additional mile of accessible trails would be opened. Mountain biking may become a new, allowable trail use, but only on designated trails if determined to be appropriate. Mountain biking would not be allowed in primitive zones. This proposed new use would only occur following an appropriate use determination as outlined in 36 CFR 4.30 and NPS *Management Policies 2006* (section 9.2.2.4). This written determination would be published in the *Federal Register*. After a review of public comments, the regional director would

then need to approve the superintendent's written determination before bicycle use could be allowed on designated trails in the park unit.

A recreational horse use and trail management plan would be prepared. Approximately 25 miles of additional designated horse trails would be provided, but there would be no new stream crossings. Approximately 65 miles of undesignated horse trails would be closed and restored. Design of the designated, approximately 23-mile-long horse trail system would be improved to discourage creation of social trails; decrease impacts of horses on sensitive areas, including streams and riparian areas; reduce conflicts with other users; and reduce trail damage, erosion, and manure pollution. A permitting system would be established, as necessary, to manage impacts of horse use. Horse camping may be allowed in designated sites. Law enforcement would be increased for compliance.

Vehicular access to all gravel bars would be eliminated. Gravel bar access would be by boat or walk-in only. Camping on gravel bars would be allowed in designated campsites only.

Backcountry campsites would continue to be provided in designated areas throughout the NPS Riverways and would require a fee. Backcountry campsites would be removed from primitive zones. Backcountry sites may have some basic amenities, such as restrooms, tables, fire rings, and/or lantern posts.

Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. Roads to primitive sites would be removed. Primitive sites would have no amenities and can be accessed by foot or watercraft only.

Currently all caves in the National Riverways, other than Round Spring cave, are closed in attempt to limit the spread of white-nose syndrome amongst gray bats. However, guided cave tours at Round Spring would continue to be provided. The caves are home to a wide variety of unique and important natural resource species. Depending upon the notable effects on the natural resource species, the park unit may continue to keep other caves closed or determine certain caves may be reopened in the future depending upon impact to the natural resources.

VISITOR SERVICES AND FACILITIES

Only a network of designated roads, trails, and river crossings would be retained to provide access for specific recreational activities and administrative purposes. Roads and trails that have been illegally developed would be closed. Native vegetation impacted by these unauthorized routes may be rehabilitated. Commercial services may be limited or modified along different portions of the rivers to achieve desired visitor experiences and resource conditions.

The visitor entry services and information conditions that were described for the no-action alternative would continue. No additional contact locations would be provided.

NPS roads and river access points would be managed by zoning prescriptions. Management would seek to establish a partnership with the counties regarding road management, including closures. Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 50 miles of roads. Law enforcement would be increased for compliance.

There would be potential opportunities for new concessions for overnight river activities such as guided float trips and guided (hike-in) backcountry trips in the natural and primitive zones. New

concessions would require a feasibility study.

INTERPRETATION AND EDUCATION

The focus would be on enhancing visitor awareness of the continuum of people's cultural connections to the area that spans thousands of years. Living history programs would be emphasized to provide visitors with a better understanding of traditional, subsistence ways of life in the Ozarks. For example, an interpretive "float camp" would be developed to let visitors experience what river recreation was like in the past.

NATURAL RESOURCE MANAGEMENT

Natural resources would be maintained or restored to more natural conditions that lack signs of substantial development or use. The emphasis would be on restoring degraded biological communities and improving the natural setting.

Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 50 miles of roads.

The National Park Service would work closely with the U.S. Fish and Wildlife Service to conduct a programmatic consultation under Section 7 of the Endangered Species Act for the general management plan. The National Park Service would also work with the U.S. Fish and Wildlife Service to develop and implement conservation plans and strategies to protect all federal listed species in the NPS Riverways to fulfill the intent of Section 7(a)(1) of the Endangered Species Act.

The National Park Service would seek to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge. It also would seek to partner with communities about waste systems to improve water quality.

CULTURAL RESOURCE MANAGEMENT

Alternative A would emphasize the protection and preservation of archeological resources, historic structures, and cultural landscapes, including the restoration of select open fields to preserve pastoral scenes. Management would seek to partner with volunteers and others to accomplish cultural resource stewardship projects.

Additional historic structures would be restored and made available to the public as interpretive exhibits. These additional structures and associated landscapes would complete the historic representation of the continuum of Ozark cultural history in this region. Approximately five additional cemeteries would be maintained. (i.e. remove undergrowth, tree trimming, repair fences, etc) The more than 400 known archeological sites would continue to be monitored. Appropriate protection measures, such as riverbank stabilization or trail rerouting, would be taken where archeological sites are threatened by erosion, visitor use, or other impacts.

A cultural affiliation landscape plan for pastoral areas would be completed and implemented according to the management zones. This would increase areas managed as meadows and agricultural sites that were once part of Ozark farms and settlement areas.

The park unit's certified curatorial facility would continue to be managed for park resource collections only.

WILDERNESS

Under this alternative, 3,424 out of 3,434 acres within the Big Spring Wilderness Study Area would be recommended for wilderness designation. This amount is 99% of the total wilderness study area. Ten acres in a small developed area and its narrow access corridor would be excluded from the proposed wilderness designation to allow for continued administrative use of the access roads, barn, NPS training range, and utility corridor.

Most of the wilderness study area would be zoned primitive with the exception of the access road, barn, NPS training range, and utility corridor. These areas would be zoned natural.

The fire tower, incinerator, barn, NPS training range, and camp from the Civilian Conservation Corps era would be retained. The barn and NPS training range would be excluded (approximately 6 acres) from the recommended wilderness designation and would continue to be maintained for administrative use. The access road to these facilities would not be open to visitors.

Motorized vehicle use of the access road to the fire tower would be prohibited. This road may be restored to a Civilian Conservation Corps era condition.

The corridor for the buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be excluded from the proposed wilderness designation (approximately 4 acres) and maintained.

PARK OPERATIONS

Three multioperational facilities, one for each management district, would be constructed. Each facility would be 4,500 square feet. Maintenance and field staff offices would be consolidated into these facilities and removed from Civilian Conservation Corps structures. Approximately ten nonhistoric obsolete structures that are part of the deferred maintenance backlog and pose health and safety concerns would be removed and their sites would be restored.

Approximately four new housing duplex units to support additional need for seasonal or term staff would be provided.

No additional wastewater management systems are proposed.

PARTNERSHIPS

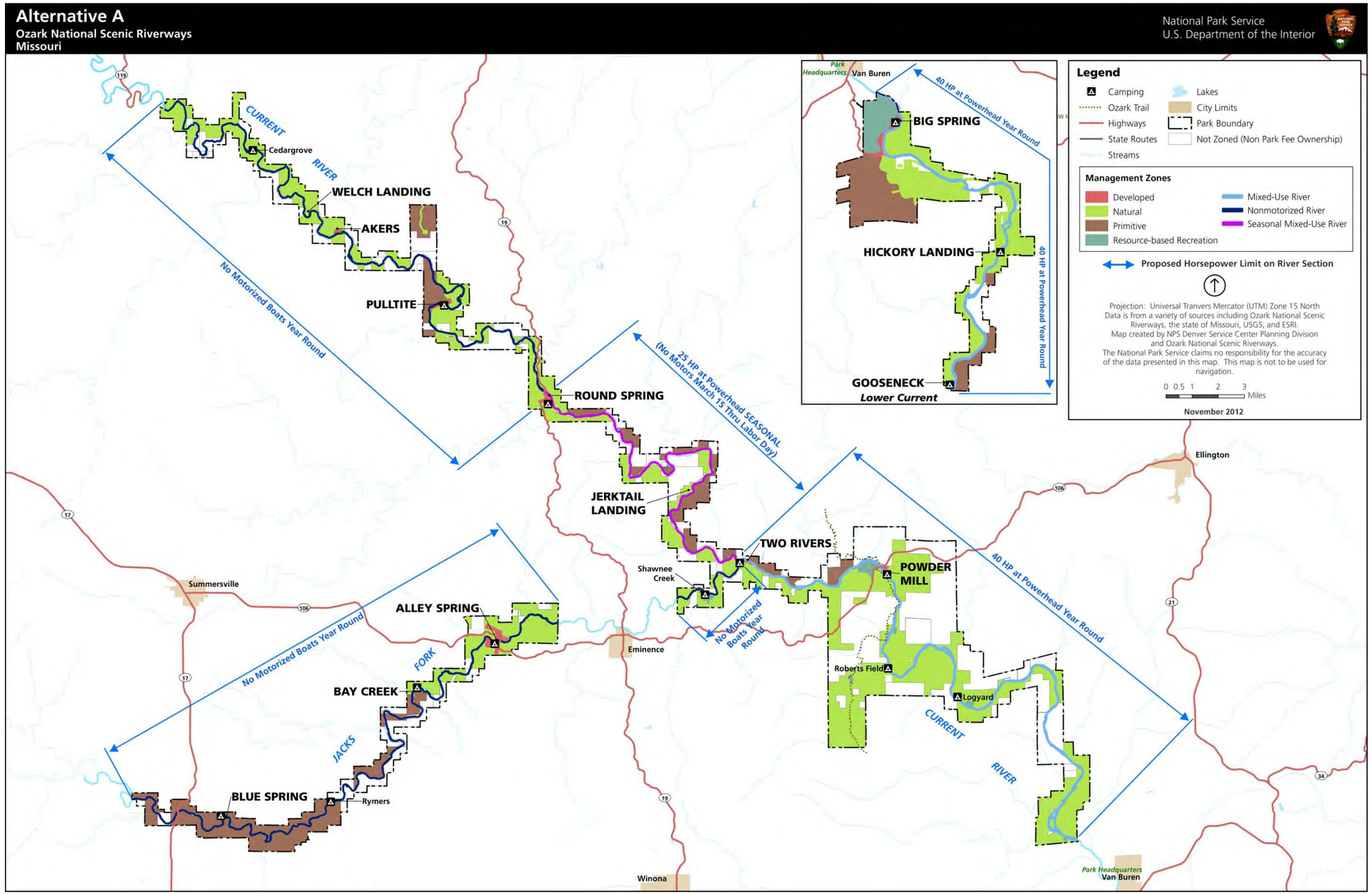
The National Park Service would seek to develop a friends group.

The park unit would continue to share office space at the Van Buren headquarters with other federal and state agencies.

Eastern National Association would continue to provide bookstore services at park unit visitor contact facilities, including the Van Buren headquarters, Round Spring, and Alley Mill.

The National Park Service would seek to partner with volunteers and others to accomplish cultural resource stewardship projects.

Alternative A would include establishing a partnership with the counties regarding road management, including closures. This would include partnering with county and state to replace Cedar Grove low-water bridge with a high-water bridge. Partnering also would be sought with communities about waste systems to improve water quality. Partnering with the state to enhance healthy native game fish populations would continue.


Alternative A
Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
Legend
Camping
Ozark Trail
Highways
State Routes
Streams
Lakes
City Limits
Park Boundary
Not Zoned (Non Park Fee Ownership)
Management Zones
Developed
Natural
Primitive
Resource-based Recreation
Mixed-Use River
Nonmotorized River
Seasonal Mixed-Use River
Proposed Horsepower Limit on River Section
Projection: Universal Tranvers Mercator (UTM) Zone 15 North
Data is from a variety of sources including Ozark National Scenic Riverways, the state of Missouri, USGS, and ESRI.
Map created by NPS Denver Service Center Planning Division and Ozark National Scenic Riverways.
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0 0.5 1 2 3 Miles
November 2012
Park Headquarters
Van Buren
40 HP at Powerhead Year Round
BIG SPRING
HICKORY LANDING
GOOSENECK
Lower Current
CURRENT RIVER
Cedargrove
WELCH LANDING
AKERS
PULLTITE
ROUND SPRING
JERKTAIL LANDING
TWO RIVERS
POWDER MILL
Shawnee Creek
ALLEY SPRING
BAY CREEK
BLUE SPRING
JACKS FORK
Rymers
Summersville
Eminence
Winona
Ellington
Roberts Field
Logyard
No Motorized Boats Year Round
25 HP at Powerhead SEASONAL (No Motors March 15 Thru Labor Day)
40 HP at Powerhead Year Round
No Motorized Boats Year Round

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ALTERNATIVE B (NPS PREFERRED)

ZONING

See the alternative B map for a depiction of management zones within the NPS Riverways under this alternative. See table 6 for numbers of acres in each land-based management zone and figure 3 for the percentages of the NPS Riverways' land in each land-based management zone. See table 7 for numbers of river miles in each river-based management zone and figure 4 for the percentages of the NPS Riverways' river miles in each river-based management zone.

VISITOR EXPERIENCES AND ACTIVITIES

Traditional recreational activities, such as floating, boating, and horseback riding, would still be provided. Also, a variety of guided and self-guided activities would be offered to help visitors discover the array of natural and cultural resource-based opportunities available and increase visitor awareness of the many special resources and values.

River-based Recreation

All sections of the riverways would continue to be open to nonmotorized watercraft year-round. The percentage of the rivers zoned for nonmotorized recreation would increase, including specific areas for low-density nonmotorized use, even during the peak-use season, which is defined as March 15 through Labor Day.

Concession dropoff and pickup locations for river users utilizing nonmotorized watercraft would be redistributed to reduce peak-season crowding effects and to protect river resources in response to potential changes in river flow conditions. This would require closure and restoration of about 20 access points and the careful design and opening of 20 new designated access points. Total designated access points would remain constant or decrease.

The National Park Service would pursue a rule-making to change the existing regulation to allow 60/40 horsepower motors. See table 4 for motorboat horsepower limits by alternative.

The riverways would continue to be available for fishing and gigging activities, consistent with applicable restrictions set forth by the park unit or state. For example, fishing by motorized boat would be allowable in areas zoned by alternative B for motorized boating. The National Park Service would continue to partner with the state to sustain healthy native fish populations.

Land-based Recreation

The location of primitive and natural zoning would increase the amount of hiking trail access compared to current conditions. About 10 miles of roads in primitive zones would be removed and replaced with hiking trails. When needed, trails would be developed to access some discovery sites. Some of these trails may link to the Ozark Trail. One additional mile of accessible trails would be opened. Mountain biking would be a new, allowable trail use, but only on designated trails. Mountain biking would not be allowed in primitive zones.

A recreational horse use and trail management plan would be prepared. Approximately 25 miles of additional designated horse trails would be provided, including some new stream crossings. Approximately 65 miles of undesignated horse trails and unauthorized crossings would be closed and restored. Design of designated, approximately 23-mile-long

horse trail system would be improved to discourage creation of social trails; decrease impact of horses on sensitive areas, including streams and riparian areas; reduce conflicts with other users; and reduce trail damage, erosion, and manure pollution. Horse camping may be allowed in designated sites. A permitting system would be established, as necessary, to manage impacts of horse use. Law enforcement would be increased for compliance.

Two additional developed campgrounds would be provided at existing day use areas: Upper Current River (Akers), Upper Jacks Fork (Blue Spring) and Logyard. Upper Jacks Fork may also be expanded and improved.

The number of gravel bars accessible to vehicles would be designated and reduced. Camping on gravel bars such as Logyard would be allowed in designated campsites only. Backcountry campsites would continue to be provided in designated areas throughout the NPS Riverways and would require a fee. Backcountry campsites would be removed from primitive zones. Some backcountry sites would continue to have some basic amenities, such as restrooms, tables, fire rings, and/or lantern posts.

Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. Some roads to primitive sites would be closed. Primitive sites would have no amenities.

Currently all caves in the National Riverways, other than Round Spring cave, are closed in attempt to limit the spread of white-nose syndrome amongst gray bats. However, guided cave tours at Round Spring would continue to be provided. The caves are home to a wide variety of unique and important natural resource species. Depending upon the notable effects on the natural resource species the Park may continue to keep other caves closed or determine certain caves may be reopened in the future depending upon impact to the natural resources.

VISITOR SERVICES AND FACILITIES

Additional trails (some with universal accessibility) would be developed for visitors to access a network of "discovery sites." A small learning center with educational and interpretive programs and exhibits would be developed to better orient and inform visitors. This facility would include classrooms and might provide some limited quarters for visiting experts.

The visitor entry services and information conditions that were described for the no-action alternative would continue. In addition, one additional visitor contact location may be provided as part of the learning center at Powder Mill.

NPS roads and river access points would be managed by zoning prescriptions. Management would seek to establish a partnership with the counties regarding road management, including closures. For some discovery sites, old access roads would be reopened to enable vehicular access. Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 45 miles of roads, including 10 miles of roads to primitive zone campsites. Law enforcement would be increased for compliance.

There would be potential opportunities for new concessions for shuttle services for river users with nonmotorized watercraft and overnight river activities such as guided float trips and guided (hike-in) backcountry trips in the natural and primitive zones. New concessions would require a feasibility study. New campgrounds and higher concentrations of

visitors in developed zones may create the need for an additional camp store.

INTERPRETATION AND EDUCATION

Self-guided interpretive opportunities would provide visitors with a sense of being the first to discover remote, hard-to-find places, such as an old cabin or a secluded spring. Guided opportunities would include ranger-led tours of special features, such as old settlements, caves and springs, and river environments. This would help reach visitors who are looking for different or additional activities to the traditional float trip. Resource management staff would develop opportunities for visitors and volunteers to engage in hands-on resource management projects. Learning center programs could provide more structured environmental education opportunities, especially for school groups.

A learning center would be established at Powder Mill and a school curriculum would be developed. Learning center programs could provide more structured environmental education opportunities, especially for school groups.

NATURAL RESOURCE MANAGEMENT

Natural resources would be maintained or restored to more natural conditions that lack signs of substantial development or use. Restoring degraded biological communities and improving the natural setting would be emphasized. A focused program of resource monitoring, research, and preservation projects would actively support and strengthen management capabilities and ensure accurate visitor information.

Natural conditions would be restored to approximately 45 miles of roads, including 10 miles of roads to primitive zone campsites. Effects of visitor use on river/karst habitats would be investigated.

The National Park Service would work closely with the U.S. Fish and Wildlife Service to conduct a programmatic consultation under Section 7 of the Endangered Species Act for the general management plan. The National Park Service would also work with the U.S. Fish and Wildlife Service to develop and implement conservation plans and strategies to protect all federal listed species in the NPS Riverways to fulfill the intent of Section 7(a)(1) of the Endangered Species Act.

The National Park Service would seek to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge. It also would attempt to partner with communities about waste systems to improve water quality.

CULTURAL RESOURCE MANAGEMENT

Alternative B would continue to protect and preserve archeological resources, historic structures, and cultural landscapes. Selected structures and sites may receive special attention to support Ozark heritage educational programs. A focused program of resource monitoring, research, and preservation projects would actively support and strengthen management capabilities and ensure accurate visitor information.

An oral history program would be restarted and the archive/collections program would be enhanced. Efforts to coordinate cultural resource education, interpretation, and protection activities across management divisions would be enhanced. This would include ensuring that cultural resource information was accurately conveyed to the public. The National Park Service would seek to partner with volunteers and

others to accomplish cultural resource stewardship projects.

Additional historic structures would be restored and made available to the public as interpretive exhibits. These additional structures and associated landscapes would complete the historic representation of the continuum of Ozark cultural history in this region. Approximately five additional cemeteries would be maintained. The more than 400 known archeological sites would continue to be monitored. Appropriate protection measures such as riverbank stabilization or trail rerouting would be taken where archeological sites are threatened by erosion, visitor use, or other impacts.

A cultural affiliation landscape plan for pastoral areas would be completed and implemented according to the management zones. This would increase areas managed as meadows and agricultural sites that were once part of Ozark farms and settlement areas.

The park unit's curatorial facility would be expanded to provide additional archeological storage space for smaller national park units in the region. The park unit would become a regional curatorial hub.

WILDERNESS

This alternative would recommend wilderness designation for 3,430 out of 3,434 acres within the Big Spring Wilderness Study Area. The entire Big Spring Wilderness Study Area would be zoned primitive.

The fire tower, incinerator, barn, and Civilian Conservation Corps era camp would be retained. The NPS training range would be removed and the area would be restored.

Alternative B would eliminate motorized vehicle use of the access roads to the fire tower, NPS training range, and barn. The roads could be evaluated to determine the feasibility of restoring them to a Civilian Conservation Corps era condition for possible use as hiking trails.
The area above the buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be proposed as potential wilderness addition and would be maintained for its current use until the cable failed or until another utility route outside the wilderness was designated. Once the cable was decommissioned (it could be removed or left in place), the area would be evaluated to determine the feasibility of administratively converting it to wilderness.

PARK OPERATIONS

One multioperational facility would be constructed. The maintenance and field staff offices would be consolidated into this facility and removed from Civilian Conservation Corps structures. Approximately ten nonhistoric obsolete structures that are part of the deferred maintenance backlog and pose health and safety concerns would be removed and their sites would be restored.

Two sustainable (current technology) sanitary systems would be installed at Akers and Pulltite to improve water quality.

PARTNERSHIPS

The National Park Service would seek to develop a friends group.

The park unit would continue to share office space at the Van Buren headquarters with other federal and state agencies.

Eastern National Association would continue to provide bookstore services at park visitor contact facilities, such as the Van Buren headquarters, Round Spring, and Alley Mill.

Under alternative B, the National Park Service would

- seek to partner with volunteers and others to accomplish cultural resource stewardship projects
- seek to establish a partnership with the counties regarding road management, including closures
- seek to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge
- seek to partner with communities about waste systems to improve water quality
- continue to partner with the state to enhance healthy native game fish populations

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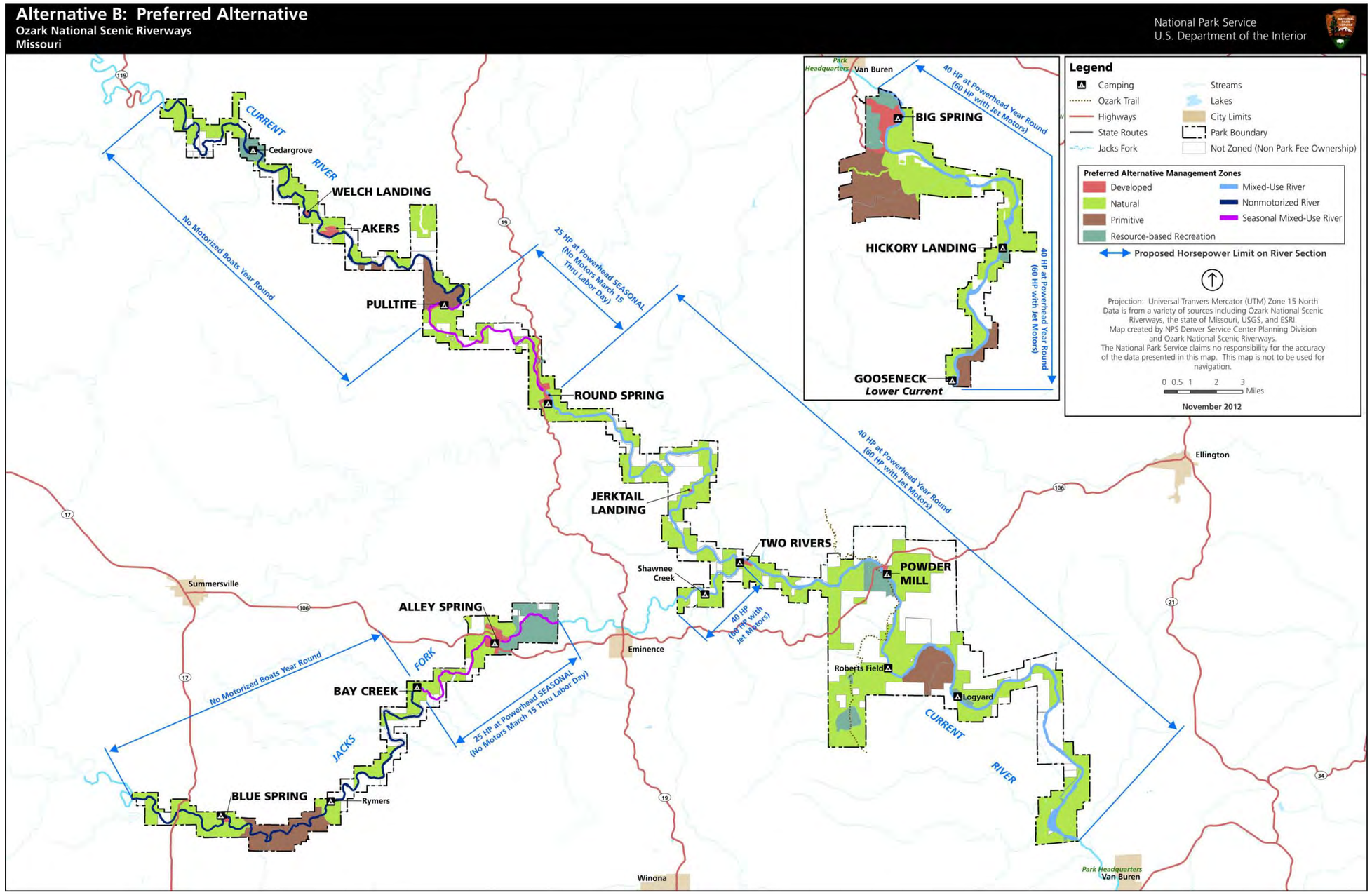
Alternative B: Preferred Alternative
Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
Legend
Camping
Ozark Trail
Highways
State Routes
Jacks Fork
Streams
Lakes
City Limits
Park Boundary
Not Zoned (Non Park Fee Ownership)
Preferred Alternative Management Zones
Developed
Natural
Primitive
Resource-based Recreation
Mixed-Use River
Nonmotorized River
Seasonal Mixed-Use River
Proposed Horsepower Limit on River Section
Projection: Universal Tranvers Mercator (UTM) Zone 15 North
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Map created by NPS Denver Service Center Planning Division and Ozark National Scenic Riverways.
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0 0.5 1 2 3 Miles
November 2012
CURRENT RIVER
Cedargrove
WELCH LANDING
AKERS
PULLTITE
ROUND SPRING
JERKTAIL LANDING
TWO RIVERS
POWDER MILL
Shawnee Creek
ALLEY SPRING
BAY CREEK
JACKS FORK
BLUE SPRING
Rymers
Summersville
Eminence
Winona
Ellington
Roberts Field
Logyard
Park Headquarters
Van Buren
BIG SPRING
HICKORY LANDING
GOOSENECK
Lower Current
No Motorized Boats Year Round
25 HP at Powerhead SEASONAL (No Motors March 15 Thru Labor Day)
40 HP at Powerhead Year Round (60 HP with Jet Motors)
40 HP (60 HP with Jet Motors)

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ALTERNATIVE C

ZONING

See the alternative C map for a depiction of management zones within the NPS Riverways under this alternative. See table 6 for numbers of acres in each land-based management zone and figure 5 for the percentage of the NPS Riverways' land in each land-based management zone. See table 7 for numbers of river miles in each river-based management zone and figure 6 for the percentages of the NPS Riverways' river miles in each river-based management zone.

VISITOR EXPERIENCES AND ACTIVITIES

Visitors could experience a diverse range of motorized and nonmotorized recreational activities in a variety of outdoor settings. Visitors would encounter more intensive management to ensure that the greater levels and types of visitor use do not cause excessive impacts on National Riverways resources or diminish public safety. Visitors would experience higher levels of social interaction, especially during the peak season, which is defined as March 15 through Labor Day. Opportunities for community and family gatherings would be emphasized.

River-based Recreation

All sections of the riverways would continue to be open to nonmotorized watercraft year-round. Concession dropoff and pickup locations for river users using nonmotorized watercraft would be redistributed to reduce peak-season crowding effects and to protect river resources in response to potential changes in river flow conditions. This would require closure and restoration of about 20 access points and the careful design and opening of 20 new designated access points. Total designated access points would remain constant or decrease.

The National Park Service would pursue a change in the existing regulations to allow 60/40 horsepower motors on certain portions of the Current and Jacks Fork rivers. See table 4 for motorboat horsepower limits by alternative.

The riverways would continue to be available for fishing and gigging activities, consistent with applicable restrictions set forth by the park unit or state. For example, fishing by motorized boat would be allowable in areas zoned by alternative C for motorized boating. The National Park Service would continue to partner with the state to sustain healthy native fish populations.

Land-based Recreation

Additional walking and hiking trails would be opened over time. About 5 miles of roads in primitive zones would be removed and replaced with hiking trails. One additional mile of accessible trail would be opened. Mountain biking would be a new, allowable trail use, but only on designated trails.

A recreational horse use and trail management plan would be prepared. Approximately 45 miles of additional designated horse trails would be provided to allow for longer distance riding, including some new stream crossings. Approximately 25-campsite horse campgrounds along the Jacks Fork may be established. Approximately 65 miles of undesignated horse trails would be closed and restored. Design of the designated approximately 23-mile-long horse trail system would be improved to discourage creation of social trails; decrease impact of horses on sensitive areas, including streams and riparian areas; reduce conflicts with

other users; and reduce trail damage, erosion, and manure pollution. A permitting system would be established, as necessary, to manage impacts of horse use. Law enforcement would be increased for compliance.

Two additional developed campgrounds would be provided at existing day use areas: Upper Current River (Akers) and Upper Jacks Fork (Blue Spring).

Vehicular access to designated sites on gravel bars for day use and overnight camping would continue to be allowed. Camping on gravel bars would be allowed in designated campsites only.

Backcountry campsites would continue to be provided throughout the NPS Riverways and would require a fee. The total number of backcountry campsites may increase, but backcountry campsites would be removed from primitive zones. Some backcountry sites would continue to have some basic amenities, such as restrooms, tables, fire rings, and/or lantern posts.

Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. The total number of primitive campsites may be increased, but roads to primitive sites would be removed. Primitive sites would have no amenities.

Currently all caves in the National Riverways, other than Round Spring cave, are closed in attempt to limit the spread of white-nose syndrome amongst gray bats. However, guided cave tours at Round Spring would continue to be provided. The caves are home to a wide variety of unique and important natural resource species. Depending upon the notable effects on the natural resource species the Park may continue to keep other caves closed or determine certain caves may be reopened in the future depending upon impact to the natural resources.

VISITOR SERVICES AND FACILITIES

Additional facilities would be necessary to accommodate higher levels and different types of visitor use. There would be more types of designated camping opportunities, including primitive, semiprimitive, semideveloped, and developed sites. There would also be more trails for hiking and horseback riding.

The visitor entry services and information conditions that were described for the no-action alternative would continue. However, the size of current visitor contact locations at some sites may be expanded based on demand. One or two additional visitor contact locations may be provided.

NPS roads and river access points would be managed by zoning prescriptions. The National Park Service would seek to establish a partnership with the counties regarding road management, including closures. Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 404 miles of roads. Law enforcement would be increased for compliance.

There would be potential opportunities for new concessions for shuttle services for river users using nonmotorized watercraft and overnight river activities such as guided float trips and guided (hike-in) backcountry trips in the natural and primitive zones. New concessions would require a feasibility study. New campgrounds and higher concentrations of visitors in developed zones may create the need for an additional camp store.

INTERPRETATION AND EDUCATION

Interpretive and educational opportunities would expand for visitors to connect with the natural and cultural resources while improving their outdoor recreation skills. The goal of such programs would be to

encourage resource stewardship and low-impact recreational uses. Example activities could include boating safety, safe hunting and fishing practices, and traditional Ozark lifeway skills.

NATURAL RESOURCE MANAGEMENT

Natural resources would be managed to provide high-quality scenery. There would be a higher tolerance for resource impacts in more heavily used areas. Impacted environments would be stabilized or restored to retain the natural settings. Monitoring efforts would be emphasized to track natural resource conditions so that unacceptable impacts from recreational activities do not occur.

Undesignated NPS roads, traces, crossings, and river access points would be closed.

The National Park Service would work closely with the U.S. Fish and Wildlife Service to conduct a programmatic consultation under Section 7 of the Endangered Species Act for the general management plan. The National Park Service would also work with the U.S. Fish and Wildlife Service to develop and implement conservation plans and strategies to protect all federal listed species in the NPS Riverways to fulfill the intent of Section 7(a)(1) of the Endangered Species Act.

The National Park Service seeks to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge. It also would seek to partner with communities about waste systems to improve water quality.

CULTURAL RESOURCE MANAGEMENT

Alternative C would continue to protect and preserve archeological resources, historic structures, and cultural landscapes. Opportunities would be expanded for visitors to access and experience historic structures and cultural landscapes throughout the National Riverways.

To accommodate more visitors, some historic structures and sites may require more intensive management actions to protect resource integrity. Efforts to track cultural resource conditions would be emphasized so that unacceptable conditions do not occur.

Additional historic structures would be restored and made available to the public as interpretive exhibits. These additional structures and associated landscapes would complete the historic representation of the continuum of Ozark cultural history in this region. Approximately five additional cemeteries would be restored. The more than 400 known archeological sites would continue to be monitored. Appropriate protection measures, such as riverbank stabilization or trail rerouting would be taken where archeological sites are threatened by erosion, visitor use, or other impacts.

A cultural affiliation landscape plan for pastoral areas would be completed and implemented according to the management zones. This would increase areas managed as meadows and agricultural sites that were once part of Ozark farms and settlement areas.

The park unit's certified curatorial facility would continue to be managed for park unit resource collections only.

WILDERNESS

Under this alternative, 1,779 acres of the Big Spring Wilderness Study Area, consisting of the area south of Chilton Creek, would be recommended for wilderness designation. This amount is 52% of the total wilderness study area.

The area recommended for wilderness designation would be zoned primitive. The remaining area would be zoned natural.

The fire tower, incinerator, barn, NPS training range, and Civilian Conservation Corps era camp would be outside the area proposed for wilderness designation and would continue to be retained. The fire tower, barn, and NPS training range would continue to be used for administrative purposes. The access roads to these facilities would continue to be maintained for NPS Riverways administration.

The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be maintained.

PARK OPERATIONS

Three multioperational facilities, one for each management district, would be constructed. Each facility would be 4,500 square feet. Maintenance and field staff offices would be consolidated into these facilities and removed from Civilian Conservation Corps structures. Approximately ten nonhistoric obsolete structures that are part of the deferred maintenance backlog and pose health and safety concerns would be removed and their sites would be restored.

Approximately four new housing duplex units to support additional need for seasonal or term staff would be provided.

No additional water systems are proposed.

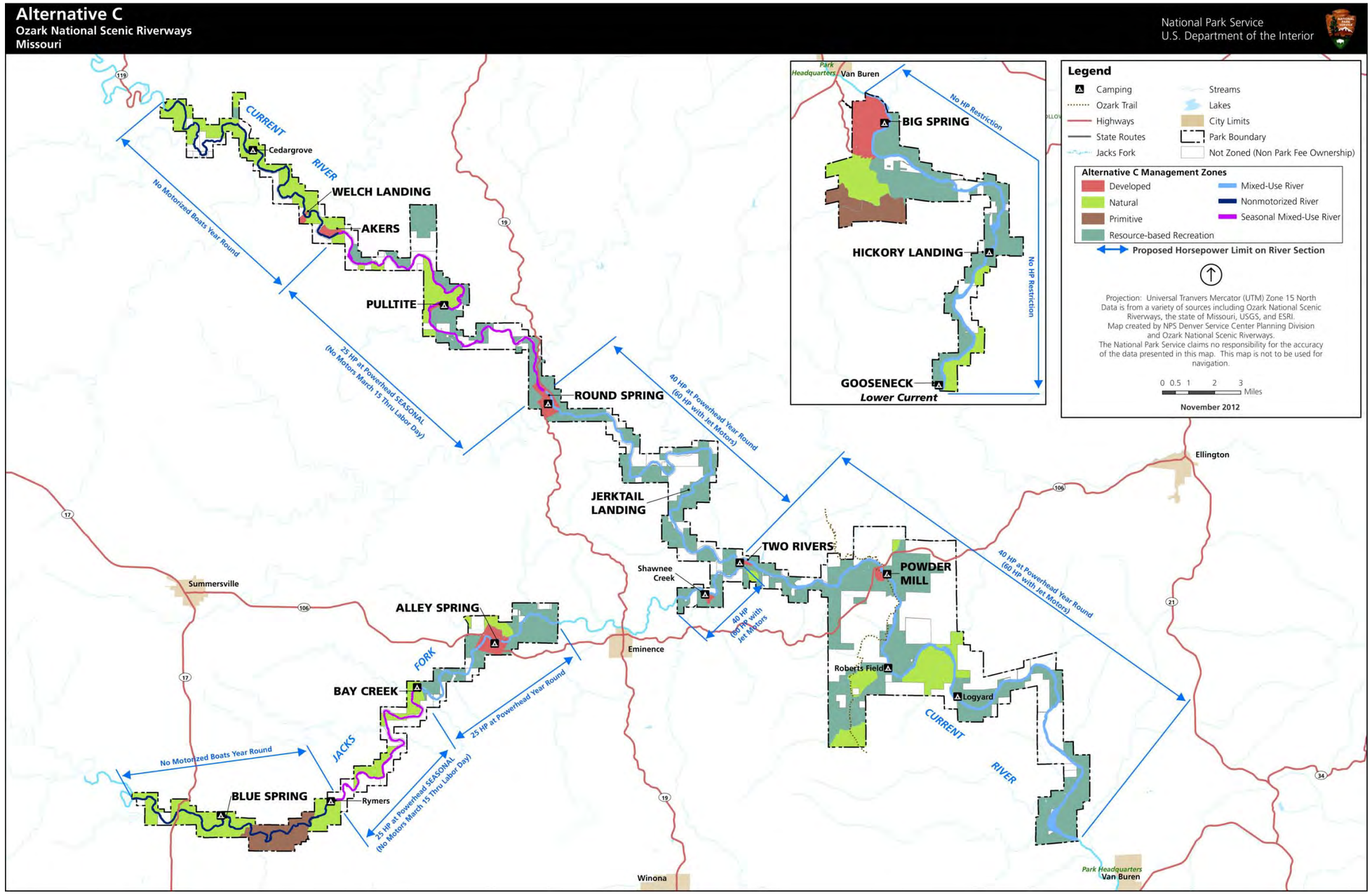
PARTNERSHIPS

The National Park Service would seek to develop a friends group.
The park unit would continue to share office space at the Van Buren headquarters with other federal and state agencies.

Eastern National Association would continue to provide bookstore services at park visitor contact facilities, including the Van Buren headquarters, Round Spring, and Alley Mill. When the Big Spring contact facility is opened, Eastern National Association may provide services there.

Under alternative C, the National Park Service would

- seek to partner with volunteers and others to accomplish cultural resource stewardship projects
- seek to establish a partnership with the counties regarding road management, including closures
- seek to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge
- seek to partner with communities about waste systems to improve water quality
- continue to partner with the state to enhance healthy native game fish populations


Alternative C
Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
Legend
Camping
Ozark Trail
Highways
State Routes
Jacks Fork
Streams
Lakes
City Limits
Park Boundary
Not Zoned (Non Park Fee Ownership)
Alternative C Management Zones
Developed
Natural
Primitive
Resource-based Recreation
Mixed-Use River
Nonmotorized River
Seasonal Mixed-Use River
Proposed Horsepower Limit on River Section
Projection: Universal Tranvers Mercator (UTM) Zone 15 North
Data is from a variety of sources including Ozark National Scenic Riverways, the state of Missouri, USGS, and ESRI.
Map created by NPS Denver Service Center Planning Division and Ozark National Scenic Riverways.
The National Park Service claims no responsibility for the accuracy of the data presented in this map. This map is not to be used for navigation.
0 0.5 1 2 3 Miles
November 2012
Park Headquarters
Van Buren
BIG SPRING
HICKORY LANDING
GOOSENECK
Lower Current
No HP Restriction
No HP Restriction
CURRENT
RIVER
Cedargrove
WELCH LANDING
AKERS
PULLTITE
ROUND SPRING
JERKTAIL LANDING
TWO RIVERS
POWDER MILL
Shawnee Creek
ALLEY SPRING
BAY CREEK
BLUE SPRING
Rymers
JACKS
FORK
Summersville
Eminence
Winona
Ellington
Roberts Field
Logyard
No Motorized Boats Year Round
25 HP at Powerhead SEASONAL (No Motors March 15 Thru Labor Day)
40 HP at Powerhead Year Round (60 HP with Jet Motors)
40 HP (60 HP with Jet Motors
25 HP at Powerhead Year Round
No Motorized Boats Year Round
25 HP at Powerhead SEASONAL (No Motors March 15 Thru Labor Day)
40 HP at Powerhead Year Round (60 HP with Jet Motors)
Park Headquarters
Van Buren

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MITIGATION MEASURES COMMON TO THE ACTION ALTERNATIVES

Congress has charged the National Park Service with managing the lands under its stewardship "in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (NPS Organic Act, 16 USC 1). As a result, the National Park Service routinely evaluates and implements mitigation whenever conditions occur that could adversely affect the sustainability of national park system resources.

To ensure that implementation of the final selected management alternative protects natural and cultural resources unimpaired for future generations and provides for a high-quality visitor experience, a consistent set of mitigation measures would be applied to all alternatives.

As global and regional climates continue to change, a management approach that enhances the protection and resilience of climate-sensitive resources will become increasingly important.

For all future actions that resulted from the implementation of this plan, the National Park Service would prepare appropriate environmental compliance reviews, such as those required by the National Environmental Policy Act, National Historic Preservation Act's sections 106 and 110, Archaeological Resources Protection Act, Endangered Species Act, Clean Water Act, and other relevant legislation. As part of the environmental review, the National Park Service would avoid, minimize, and mitigate adverse impacts. The park unit could consider implementing a compliance monitoring program that would apply these mitigation measures and also include reporting protocols.

The following mitigation measures and best management practices would be applied to avoid or minimize potential adverse impacts from implementation of the general management plan.

NATURAL RESOURCES

General

- Periodically inventory and monitor the NPS Riverways' resources, including air, water, soils, vegetation, and wildlife, to provide information needed to avoid or minimize impacts of future development.
- Manage any museum collections related to natural resources generated by such activities according to NPS policies.
- Whenever possible, build new facilities in previously disturbed areas or in carefully selected sites with as small a construction footprint as possible and with sustainable design. During design and construction periods, use NPS natural and cultural resource staff to identify areas to be avoided and monitor activities.
- Use fencing or other means to protect sensitive resources adjacent to construction areas.
- Keep construction materials in work areas, especially if the construction takes place near streams, springs, natural drainages, or other water bodies.
- Inform visitors of the importance of protecting the NPS Riverways' natural resources and leaving these undisturbed for the enjoyment of future generations.

Vegetation

- Monitor areas used by visitors (for example, trails) for signs of native

vegetation disturbance. Use public education, revegetation of disturbed areas using native plant species, erosion control, and barriers to control potential impacts on plants from trail erosion or social trail creation.

- Develop revegetation plans for disturbed areas and require the use of native species. Revegetation plans should specify features such as seed/plant source, seed/plant mixes, and soil preparation. Salvage vegetation should be used to the extent possible.
- Survey proposed sites for new trails and other facilities for sensitive species before construction. If sensitive species were present, relocate new developments to avoid impacts.

Wildlife

- Employ techniques to reduce impacts on wildlife, including visitor education programs, restrictions on visitor activities, and park ranger patrols.
- Reduce the potential for wildlife to get food from humans. Require wildlife-proof garbage containers in developed areas, such as visitor centers, picnic areas, trails, and interpretive waysides. Educate visitors about the need to refrain from feeding wildlife.
- Site new or rehabilitated facilities, to the extent possible, to avoid sensitive wildlife habitats, including feeding and resting areas, major travel corridors, nesting areas, and other sensitive habitats.
- Restrict visitor use and NPS operational activities if their potential level of damage or disturbance warrants such restrictions.
- Implement a natural resource protection program that includes standard measures such as the following:
  - Schedule construction during seasons that are best for wildlife
  - Monitor for adverse impacts.
  - Implement best management practices to prevent and reduce erosion and sediment.
  - Install and maintain fences or other barriers to protect sensitive resources adjacent to construction sites.
  - Remove all food-related items to reduce or prevent bear intrusion.
  - Salvage topsoil.
  - Replant with native vegetation.
  - Provide periodic monitoring by resource management specialists or other park staff who would provide treatment and status reports.

Invasive Species

- Apply an integrated pest management approach to comprehensively address invasive, nonnative plants and animals, in terrestrial, aquatic, and subterranean environments. Implement integrated pest management at existing, developed park sites, at proposed future sites, and other areas in need of pest management. Standard measures could include the following elements:
  - Ensure construction- and maintenance-related equipment arrives onsite free of mud or seed-bearing material.
  - Use only seeds and straw material certified as weed-free.
  - Identify areas of noxious weeds before construction.
  - Use registered herbicides, where applicable (and low-toxicity applications in areas with sensitive resources).

  - Treat noxious weeds or noxious weed topsoil before construction (for example, using topsoil segregation, storage, or herbicide treatment).
  - Revegetate with appropriate native species.
  - Consider use of other management techniques such as mechanical removal, biological controls, or prescribed fire.
- Implement an abatement program for nonnative, invasive wildlife, such as the feral hogs and Asiatic clam.
- Address nonnative animals with direct, species-specific control methods. In many cases, NPS control methods would be in cooperation with other agencies, such as the Missouri Department of Conservation.

Threatened and Endangered Species and Species of Concern

Mitigation actions would occur during normal park operations as well as before, during, and after construction to minimize immediate and long-term impacts on rare, threatened, and endangered species. These actions would vary, depending on the type of project and its location. These mitigation measures would be incorporated, as necessary, into each specific action as the general management plan is implemented.

These measures may vary slightly for each specific project and for each affected area of the NPS Riverways. Many of the measures listed previously for vegetation and wildlife would also benefit rare, threatened, and endangered species by helping to preserve habitat. Mitigation actions specific to rare, threatened, and endangered species would include the following:

- Conduct surveys for rare, threatened, and endangered species before deciding to take any action that may cause harm or disturb habitat value. To provide baseline data, conduct surveys before any introduced action or disturbance, including recreational facilities and uses. In consultation with the U.S. Fish and Wildlife Service and/or the Missouri Department of Conservation, take appropriate measures to protect any sensitive species whether identified through surveys or presumed to occur.
- If breeding or nesting areas for threatened and endangered species were observed in the NPS Riverways, protect these areas from human disturbance to the greatest extent possible, in accordance with the guidelines and recommendations of the U.S. Fish and Wildlife Service and/or Missouri Department of Conservation.
- Locate and design new facilities and management actions to avoid adverse effects on habitat for rare, threatened, and endangered species. If avoidance of adverse effects on rare, threatened, and endangered species is not possible, take appropriate conservation measures in consultation with the appropriate resource agencies.
- Develop and implement a special status species education plan that targets all human occupants of the park unit (including NPS staff, contractors, concessioners, and the public). The plan would aim at providing important information about the various species in an attempt to minimize or eliminate avoidable habitat disturbances from human activity.
- Develop and implement restoration or monitoring plans in accordance with the recommendation and standards of the appropriate resource agencies. Plans would include methods for implementation, performance standards, monitoring

criteria, and adaptive management techniques. The plans would include scheduling future surveys of special status species, which would be used to assess the impact of management actions and public uses on the various species.

- Take measures to reduce adverse effects of nonnative plants and wildlife on habitat for rare, threatened, and endangered species.

Water Resources

- Establish effective water quality best management practices to prevent offsite soil erosion and sedimentation into creeks, rivers, and other water bodies (including measures such as silt fences, geotech fabric, or coconut fiber matting). Apply on all construction projects on NPS Riverways lands.
- Use erosion control measures in accordance with best management practices, minimize discharge to water bodies, and regularly inspect construction equipment for leaks of petroleum and other chemicals to prevent water pollution during construction.
- Design, build, and/or maintain all trails and traces that would receive motorized vehicle, hiking, biking, or equestrian use (for NPS operations or public use) to prevent disruption of natural surface water flows. Keep trail surfaces at the natural grade of the surrounding landscape. Mitigate trail rutting that could otherwise occur in wet areas through "at-grade" maintenance, trail stabilization with aggregate material, the use of culverts, and/or low-water crossings. Preserve the natural sheet flow across the landscape. If trail conditions eventually become degraded in areas and surface flow becomes altered, apply an indicator and standards monitoring program to remedy the situation and restore surface water flows.
- Exercise caution to protect water resources from activities with the potential to damage water resources, including damage caused by construction equipment, erosion, and siltation. Take measures to keep fill material from escaping work areas, especially near rivers, streams, springs, natural drainages, and wetlands.
- Implement storm water management measures for new facilities, and to the extent practicable for existing facilities, to reduce nonpoint source pollution discharge from parking lots and other impervious surfaces. Such actions could include use of oil/sediment separators, street sweeping, infiltration beds, permeable surfaces, and vegetated or natural filters to trap or filter storm water runoff.
- As per NPS policy (Director's Order 77-2), develop a "floodplain management statement of findings", which identifies and analyzes all park development and uses in floodplain areas and the associated effects, implications, and risks.

Wetlands

- Avoid wetlands if possible, and apply protection measures during construction. Wetlands would be delineated by qualified NPS staff or certified wetland specialists and clearly marked before construction work. Perform construction activities in a cautious manner to prevent damage caused by equipment, erosion, or siltation.
- Conduct additional future wetland impact and mitigation analysis, in accordance with NPS policy and

section 404 of the Clean Water Act (as administered by the U.S. Army Corps of Engineers). NPS policy requires the development of a "Wetlands statement of findings," which identifies and analyzes all wetland functions and values affected by NPS actions in a park unit. Although section 404 of the Clean Water Act pertains only to wetland filling and dredging, the NPS statement of findings policy addresses the impacts on several other wetland values, such as wildlife habitat, soils, vegetation communities, surface hydrology, aesthetics, and cultural values. The detailed functional analysis of wetland impacts and the development of wetland avoidance and mitigative measures would be completed as part of the wetlands statement of findings.

Soils

- Build new facilities on soils suitable for development.
- Minimize soil erosion by limiting the time that soil is left exposed and by applying other erosion control measures, such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies. Once work is completed, revegetate construction areas with native plants in a timely period.
- Use best management practices for trail construction to minimize soil erosion on new trails, including installing water bars, check dams, and retaining walls; providing contouring to avoid erosion; and minimizing soil disturbance.
- Identify potential acid-bearing rocks prior to construction activities and take proper precautions to prevent acid drainage from rocks exposed during construction.

Air Quality

- Implement a dust abatement program. Standard dust abatement measures could include the following elements: water or otherwise stabilize soils, cover haul trucks, employ speed limits on unpaved roads, minimize vegetation clearing, and revegetate after construction.

Soundscape (Noise Abatement)

- Implement standard noise abatement measures during park operations. Standard noise abatement measures could include the following elements: a schedule that minimizes impacts on adjacent noise-sensitive uses, use of the best available noise control techniques wherever feasible, use of hydraulically or electrically powered impact tools when feasible, and location of stationary noise sources as far from sensitive uses as possible.
- Site and design facilities to minimize objectionable noise.
- Explore options to reduce the noise levels from vehicular traffic, including motorcycles.

CULTURAL RESOURCES

In general, all reasonable measures would be taken to avoid, minimize, or mitigate adverse effects in consultation with the Missouri State Historic Preservation Officer, traditionally associated tribes, local governments, and other concerned parties as appropriate, in accordance with 36 CFR 800 and the 2008 Programmatic Agreement Among the National Park Service (U.S. Department of the Interior), Advisory Council on Historic Preservation, and National Conference of State Historic Preservation Officers for Compliance with section 106 of the National Historic Preservation Act.

General

- Survey all areas selected for construction (including any trail improvements) to ensure that cultural resources (that is, archeological, historic, ethnographic, and cultural landscape resources) in the area of potential effects are adequately identified and protected by avoidance or, if necessary, that appropriate mitigation measures are completed prior to construction disturbance.

Archeology

- Follow the mitigation measures concerning archeological resources in Director's Order 28A for archeological management and *The Secretary of the Interior's Standards for Archeology and Historic Preservation* (1983, as amended and annotated). Curate archeological collections in accordance with the regulations in 36 CFR 79.
- Wherever possible, construct new facilities in previously disturbed areas where archeological resources are not likely to occur. Archeological surveys would precede any ground disturbance of undisturbed or unsurveyed lands. National register-listed or -eligible archeological resources would be avoided during construction activities. Mitigation activities associated with invasive species may also require cultural resource compliance to ensure that ground-disturbing activities such as collecting soil samples, installing data collection devices have minimal impact and avoid archeological resources or other cultural resources.
- If previously unknown archeological resources are discovered during construction, halt all work in the immediate vicinity of the discovery until the resources could be assessed and documented. If the resources cannot be avoided or preserved in situ, an appropriate mitigation strategy would be developed, following prompt notification and consultation with the state historic preservation officer, American Indian tribes traditionally associated with park lands, and other concerned parties, as necessary.
- In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, follow provisions outlined in the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001). If non-Indian human remains were discovered, standard reporting procedures to notify the proper authorities would be followed, as would all applicable federal, state, and local laws.

Cultural Landscapes

- Undertake the preservation and rehabilitation of cultural landscapes in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties* with *Guidelines for the Treatment of Cultural Landscapes*.
- Rehabilitate and/or restore cultural landscape resources to the extent feasible. This could entail restoring important historic viewsheds through manual thinning, rehabilitating agricultural fields and orchards, removing noncontributing and incompatible structures, and incorporating new additions using compatible design.
- Whenever possible, modify project design elements to avoid adversely affecting cultural landscapes. Careful design would ensure that new construction would minimally affect

the scale and visual relationships among significant landscape features. The topography, vegetation, circulation features, and land use patterns of the cultural landscape would be minimally affected. If necessary, use vegetative screening, as appropriate, to minimize visual impacts on cultural landscapes.

Ethnography

- Protect ethnographic resources by identifying and maintaining access for recognized and associated groups to traditional, spiritual/ceremonial, resource gathering, and other activity areas. As practical, screen new developments from these areas, and relocate or time conflicting uses to minimize disruptions.
- Accommodate and facilitate access to and ceremonial use of sites and resources of significance to American Indians or other associated individuals and groups in a manner that is consistent with the park unit purposes, and avoids adversely affecting the physical integrity of these sites and resources.
- Document cultural and ethnographic landscapes and other resources in the park unit and identify treatments to ensure their preservation.

Historic Structures

- Undertake the preservation and rehabilitation of National register-listed or -eligible structures in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995)* to ensure that the character defining features and integrity of the structures are minimally affected.
- Evaluate any materials removed during rehabilitation efforts to determine their value to the park unit's museum collections and/or for their comparative use in future preservation work at the sites.
- Perform further background research, resource inventories, and National Register of Historic Places evaluation of historic properties wherever management information is lacking. The surveys and research necessary to determine the eligibility of a structure, district, or cultural landscape for listing in the national register are a prerequisite for understanding the resource's significance, as well as the basis of informed decision making in the future regarding how the resource should be managed. The results of these efforts would be incorporated into site-specific planning and compliance documents.
- Do not allow any National Register of Historic Places-listed or -eligible property to decay naturally ("molder") without prior review by NPS cultural resource specialists and consultation with the Missouri State Historic Preservation Office. Before a national register-listed or -eligible property is allowed to molder, appropriate documentation recording the property would be prepared in accordance with section 110 (b) of the National Historic Preservation Act and the documentation submitted, as appropriate, to the Historic American Buildings Survey / Historic American Engineering Record / Historic American Landscapes Survey Program.
- Educate visitors on the importance of protecting the NPS Riverways' historic properties and leaving them undisturbed for the enjoyment of future visitors.

Museum Collections

- Protect museum collections in accordance with all approved NPS curatorial policies and guidelines.
- Collections items would be professionally and securely handled and packaged for temporary storage in the event that a new/expanded collections storage facility is constructed at the park unit.

VISITOR SAFETY AND EXPERIENCE

- Implement NPS Riverways-wide or site-specific traffic control plans, as warranted. Standard measures include strategies to maintain safe and efficient traffic flow during the construction period.
- Implement measures to reduce adverse effects of construction on visitor safety and experience, including project scheduling.
- Implement an interpretation and education program that integrates visitor safety concerns. Continue directional signs and education programs to promote understanding among NPS Riverways visitors.
- Conduct an accessibility study to understand barriers to NPS Riverways programs and facilities. Based on this study, implement a strategy to provide the maximum level of accessibility.

HAZARDOUS MATERIALS

- Follow and update the NPS spill prevention and pollution control program for hazardous materials. Standard measures could include hazardous materials storage and handling procedures; spill containment, cleanup, and reporting procedures; and limitation of limitations on where refueling and other hazardous activities can be performed.

SCENIC RESOURCES

- Where appropriate, use facilities such as boardwalks and fences to route people away from sensitive natural and cultural resources while still permitting access to important viewpoints.
- Design, site, and construct facilities to avoid or minimize visual intrusion into the natural environment or landscape.
- Provide vegetative screening, where appropriate.

SOCIOECONOMIC ENVIRONMENT

- During the future planning and implementation of the approved general management plan, work with local communities and county governments to further identify potential impacts and mitigation measures that would best serve the interests and concerns of both the National Park Service and the local communities.
- Pursue partnerships to improve the quality and diversity of community amenities and services.

SUSTAINABLE DESIGN AND AESTHETICS

Sustainable Development

- Design projects so that they will avoid or minimize adverse impacts on natural and cultural resources.
- Design development projects, such as buildings, utilities, roads, and bridges, and reconstruction projects, such as road reconstruction, building

rehabilitation, and utility upgrade, to work in harmony with the surroundings, particularly in historic districts.

- Encourage projects that would reduce, minimize, or eliminate air and water pollution.
- Make projects sustainable whenever practicable by recycling and reusing materials, minimizing materials, minimizing energy consumption during the project, and minimizing water and energy consumption throughout the lifespan of the project.

Sustainable Trails

- Design and construct trails in a sustainable manner so they minimize natural and cultural resource damage, including erosion; accommodate appropriate uses; require minimum maintenance while providing maximum ecological variety; and minimize conflict between trail users.
- Conduct archeological investigations on a site-specific basis to ensure that there is no impact to cultural or historic resources before trail alignments are considered.
- Where possible, align trails to conform with the following characteristics:
  - Follow the natural contour.
  - Incorporate drainage to prevent erosion.
  - Have a durable tread.
  - Maintain a grade of less than 10%.
  - Avoid environmentally sensitive areas, including wetlands and habitat for species of concern.
  - Avoid wildlife migration routes.
- Choose trail construction materials, grades, and trail clearances to reflect sustainability goals, based on the type and volume of use anticipated, stability of native materials, and type of terrain along the route. Choose surface treatments on some trails to provide accessibility in compliance with the *Uniform Federal Accessibility Standards* and the *Americans with Disabilities Act Accessibility Guidelines*. Treatments could include crushed gravel, asphalt, and appropriate grading.

VISITOR USE MANAGEMENT AND VISITOR CAPACITY

General management plans for national park system units, including the Ozark National Scenic Riverways, must address visitor use management and visitor capacity. The National Park Service defines visitor use management as the proactive and adaptive process of planning for and managing characteristics of visitor use and the physical, social, and managerial setting through a variety of strategies and tools to sustain desired resource conditions and visitor experiences. In short, visitor use management strives to maximize the benefits of visitor use while meeting resource and experiential protection goals. This planning and management process provides the framework within which visitor capacity should be addressed, where it is necessary. As part of the visitor use management process, visitor capacity is the maximum amount and type of visitor use that an area can accommodate while sustaining desired resource conditions and visitor experiences consistent with the values for which the area was established.

Managing visitor use in national parks is inherently complex and depends not only on the number of visitors, but also on where the visitors go, what they do, and the "footprints" they leave behind. In managing visitor use, the park staff and partners rely on a variety of management tools and strategies rather than relying solely on regulating the number of people in a park area. In addition, the ever-changing nature of visitor use in park units requires a deliberate and adaptive approach to visitor capacity and visitor use management.

The foundations for making visitor use management decisions in this general management plan are the purpose, significance, special mandates, and management zones associated with the NPS Riverways. The purpose, significance, and special mandates define why the park unit was established and identify the most important resources, values, and visitor opportunities that would be protected and provided. The management zones in each action alternative describe the desired resource conditions and visitor experiences, including appropriate types of activities and general use levels, for different locations throughout the NPS Riverways. The zones, as applied in the alternatives, are consistent with, and help the National Park Service achieve the NPS Riverways' specific purpose, significance, and special mandates. As part of the National Park Service's commitment to implement visitor use management, the NPS Riverways staff would abide by these directives for guiding the types and levels of visitor use that would be accommodated while sustaining the quality of NPS Riverways resources and visitor experiences consistent with the purposes of the NPS Riverways.

In addition to these important directives, this plan includes indicators and standards. Indicators and standards are measureable variables that would be monitored to track changes in resource conditions and visitor experiences. Indicators and standards are important feedback mechanisms that help the National Park Service make decisions about managing all aspects of visitor use to ensure desired conditions are attained and that NPS Riverways' legislative and policy mandates are fulfilled. The general management plan also identifies the types of management actions that would be taken to achieve desired conditions and related legislative and policy mandates.

Table 8 includes the indicators, standards, and potential future management strategies, allocated by management zones that would be implemented as a result of this planning effort. The planning team considered many potential issues and related indicators that would identify impacts of concern, but those described below were considered the most significant, given the importance and vulnerability of the resource or visitor experience affected by visitor use. The

planning team also reviewed the experiences of other park units with similar issues to help identify meaningful indicators. Standards that represent the minimum acceptable condition for each indicator were then assigned, taking into consideration the qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, staff management experience, and scoping on public preferences. Some management strategies in table 8 vary across alternatives and would be implemented upon completion of the plan. The rest of the strategies represent a range of strategies that could be used if needed to ensure standards are maintained and desired conditions are achieved. Several of these strategies are currently in use within the NPS Riverways to varying degrees, and may be increased in response to changing conditions. If new strategies are needed, an analysis will be done to identify the most effective and feasible action for implementation. Implementation of some of these management strategies in the future may require additional compliance and public involvement.

Some of the indicators and standards are more directly tied to helping the National Park Service address visitor capacity. These indicators include numbers of campers on gravel bars designated for camping, density of parked cars at visitor-created river crossings and access points, and number of watercraft on the riverways. These indicators and standards directly inform management of the kinds and amounts of use that can be accommodated in different areas of the park while maintaining desired conditions. Further guidance for addressing visitor capacity will be found in subsequent implementation level plans that have a significant visitor use management component. These types of plans may include trails and camping management plans, site plans, and commercial services plan, amongst others.

Visitor use management is a form of adaptive management (see figure 7) in that it is an iterative process in which management decisions are continuously informed and improved. Indicators are monitored, and adjustments are made as appropriate. As monitoring of conditions continues, managers may decide to modify or add indicators if better ways are found to measure important changes in resource and social conditions. Monitoring indicators help the National Park Service determine the most effective way to manage kinds and amounts of visitor use in order to attain desired visitor experience and resource conditions. Information on the NPS monitoring efforts, related visitor use management actions, and any changes to the indicators and standards would be available to the public.

VISITOR EXPERIENCE INDICATORS AND STANDARDS

The priority *visitor experience* indicators for Ozark National Scenic Riverways are associated with the following topics:

- percent of facilitated interpretive contacts per year regarding programs, demonstrations, and activities
- number of campers on gravel bars designated for camping
- density of parked cars at visitor-created river crossings and access points
- number of watercraft on the riverways
- number of citations related to inappropriate behavior

Percent of Annual Visitors with Facilitated Interpretive Contacts as a Result of Programs, Demonstrations, and Activities

The NPS Riverways staff puts a great deal of time and energy into NPS interpretive and outreach programs. These programs aim to educate visitors and local community members about what makes Ozark National Scenic Riverways unique and worthy of

conservation. The number of visitors participating in interpretive programs and the time NPS Riverways staff members spend participating in outreach activities are part of existing monitoring protocols. The standard would be no less than 8% of total visitors per year participating in interpretive programs and activities at the NPS Riverways, which is consistent with current participation rates. If participation rates begin to trend downward, then NPS Riverways staff would evaluate the effectiveness of current program offerings, provide more opportunities for outreach and interpretation, increase community engagement programs, or bring on additional interpretive staff to reach more visitors.

Number of Campers at One Time at Designated Campsites on Gravel Bars Designated for Camping

Gravel bars along and within the rivers are a popular place for visitors to relax during the day and camp at night. Currently, camping is allowed on all gravel bars accessed from the water.

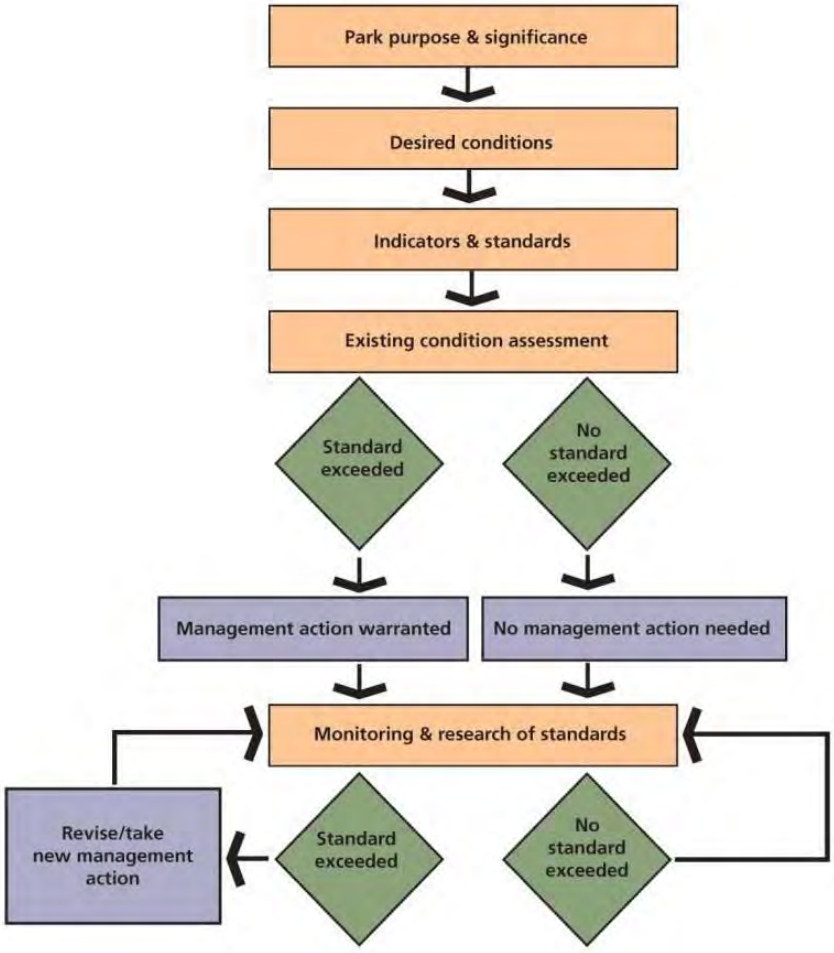


FIGURE 7. VISITOR USE MANAGEMENT FRAMEWORK

On the designated gravel bars accessible by motorized vehicles (for example, cars and recreational vehicles), there are limited designated sites for camping and high demand for these sites. Increasing demand for these sites often leads to crowded conditions along the gravel bars that may detract from visitors' experiences on the riverways and may also impact natural resources such as vegetation and soundscapes of the NPS Riverways. The gathering of several vehicles on the gravel bars along the river can also detract from the scenic experience of those visitors floating on the river.

To address the issues related to visitor experience and the density of vehicles parked (camping) next to the river, an indicator measuring the number of campers on the designated gravel bars was developed. The standard was set at no more than 6 campers per designated site on gravel bars within 50 feet of the river. This standard would provide more space between campers and manage the total number of people on the gravel bars.

If this standard begins to trend upward or is exceeded, NPS Riverways managers may incorporate this standard into the Superintendent's Compendium, add signage at campsites, and require permits to camp on the gravel bars. If the standard is repeatedly exceeded, the National Park Service may consider temporary or permanent closure of the gravel bars to camping.

Density of Parked Cars at Visitor-created Access Points and River Crossings Outside Designated Parking Areas and Designated Campsites

The riverways have many designated river access points and crossings for visitors to enjoy. However, there are also many undesignated, visitor-created river crossings and river access points that have become popular areas for visitors to congregate.

When visitors begin to cluster around undesignated river crossings and access points, the noise level is typically high. This congestion along the river also has a negative impact on those visitors who are floating the river, looking for a primitive experience and solitude.

Due to the potential for visitors to impact the natural qualities of the NPS Riverways through congestion at visitor-created river crossings and access points, the density of parked cars at these areas was developed as an indicator. To emphasize existing management direction that visitors use only designated river crossings and access points, the standard was established as no parked vehicles in these areas.

Due to the zero tolerance nature of this standard, many potential management strategies may need to be implemented immediately. This includes increasing the amount of education related to regulations associated with visitors' use of designated and nondesignated river crossings and access points.

In addition to visitors accessing undesignated river access points, visitors will sometimes park outside the established parking areas at designated river crossings and access points. Parking outside designated areas often leads to congestion at the river crossing and access points and can also impact natural and cultural resources. In order to achieve the standard of no parked vehicles outside designated parking areas, managers might need to implement management strategies including better signage for designated river crossing and access points to delineate appropriate use areas, creating new parking areas, expanding existing parking areas, and providing better delineation of current parking areas, if appropriate.

Number of Watercraft per River Mile at Specified Locations

A popular activity and means of travel on the riverways is through the use of motorboats. Motorboats are used to access fishing areas, cruise the river, and take families out on the weekends to enjoy scenic views. Motorboat use is currently managed with horsepower regulations based on river sections. In addition to these existing regulations, there are concerns about the volume of motorboat use in certain sections of river. One concern is the effect of noise on those visitors seeking a quiet experience (for example, visitors in canoes). Also, on busy weekends during the summer, the total number of motorboats on certain sections of the riverways can pose a safety hazard due to conflicts between visitors.

Weekends during the summer season also bring many different types of nonmotorized use to the riverways. Many access points along the river have become popular areas for concessioners and private users to launch their nonmotorized watercraft (for example, tubes, rafts, canoes, and kayaks). Often, several different groups enter the river at the same place and time, which can lead to congestion and conflicts.

Most visitors to the NPS Riverways rent their nonmotorized watercraft from NPS Riverways-approved concessioners and then return them at the end of their trip. However, over the past 20 years, the number of nonmotorized river users bringing their own equipment has steadily increased. If the number of private nonmotorized users on the river continues to increase at a similar rate, issues related to crowding and conflicts would also likely increase. On some river sections most popular with nonmotorized users, motorized boat use is also occurring, increasing the potential for conflict among users and creating potentially dangerous situations, such as people in tubes, rafts, kayaks, and canoes being overwhelmed by waves.

The need to manage the number of motorized and nonmotorized users on the river to promote high quality visitor experiences, minimize conflicts among the different users groups, and promote a safer environment was recognized in the 1989 river use management plan. At that time the dominant nonmotorized watercraft used in the NPS Riverways were canoes. The 1989 plan developed standards for the maximum number of canoes by river section and provided for monitoring and review of concession operations in order to achieve canoe standards. These standards were characterized as ranges for three types of use levels (low, medium, and high) in order to provide a variety of high quality river experiences. The 1989 plan also designated zones of motorboat operation and maximum horsepower, and provided for monitoring of impacts to natural resources. The 1989 river use management plan acknowledged there may be concerns with current and future use levels by motorboats and tubes, but the plan did not propose maximum use levels for these types of uses.

To better reflect changing watercraft use patterns on the riverways, particularly the greater diversity of watercraft, this general management plan applies the standards set in the 1989 plan for canoes to include all watercraft (motorized and nonmotorized).The indicators and standards for watercraft included in this plan are important tools for continuing to alleviate crowding in certain areas during times of high use, as well as to address potential resource and safety concerns of multiple uses in one area. Research conducted in 2010 (Park 2011) was compared to past research (Brown and Chilman 1999; Chilman and Vogel 2001; and Brown and Chilman 2002) and the 1989 river use management plan to help confirm that these indicators and standards are still effective and valid. For more specific information on these research studies, see the "Visitor Use and Experience" section in chapter 4. Some of these river sections overlap with areas outside the park unit boundary. Standards for number of

watercraft per mile would not apply to any area outside of the park unit boundary.

Use patterns at the NPS Riverways have changed over the past 30 years, but overall use levels have not varied dramatically (NPS 2011a Public Use Statistics), with the exception of the section of river from Chilton Creek to the park unit boundary north of Watercress. Most of the current watercraft use levels (such as for canoes, kayaks, motorboats, and tubes) for the majority of river sections are within the use levels established by the 1989 plan (Park 2011). The Chilton Creek to Watercress section (within park unit boundaries) is above the use levels established in the 1989 plan. Other exceptions exist along the riverways, but they are few and occur only on weekends during peak season.

The only changes in application of the standards set in the 1989 river use management plan is to apply the standards to all watercraft and to amend the direction for the river section from Chilton Creek to the park unit boundary north of Watercress. The 1989 plan identified this section as medium use, but did not account for other river use besides canoes. Tube use has grown dramatically in this particular river section. This general management plan would reassign this section of river from a medium use to high use section, as defined in the 1989 plan. That plan defined high use zones as social park settings with moderate to high development and visitation and allowed up to 70 canoes per mile. Converting this section of river to a high use zone is more consistent with the desired conditions established for this area in the general management plan. This standard will apply to all watercraft and will allow for a higher level of use than the 1989 plan, but is below current use levels in this section of river. This reduction in use from current levels is needed to ensure ranger patrols are able to navigate river traffic and respond to emergencies safely and appropriately, as well as help minimize visitor use conflicts and crowding.

If use levels are nearing or exceed the standards for a section of river, management actions would be needed. The standards allow for some flexibility to accommodate high-use times on the riverways by assigning a percentage to the amount of time the river section will need to be within standard. For example, there would be no more than 70 watercraft per mile from Akers to Pulltite for 85% of the summer season (see table 8).

To ensure compliance with the standards, staff at the NPS Riverways may develop an education outreach program to encourage voluntary dispersal of use on the rivers to reduce the number of watercraft in certain popular areas. Also, current concessioner contracts or operating plans may be evaluated and modified to better distribute and manage the number of watercraft, both across times of day and by physical location. NPS Riverways staff may also consider a shuttle system to further disperse use on the rivers. Finally, if needed to ensure compliance with standards, watercraft permits may also be required. Implementation of some of these management strategies may require additional compliance and public involvement.

Number of Citations or Documented Warnings Related to Inappropriate Behavior

The NPS Riverways attracts a wide variety of visitors from different parts of the country. Many come to enjoy the peace and serenity the NPS Riverways has to offer, while others come to unwind and be outdoors with their friends and family. There are times when the social atmosphere of the river leads to inappropriate activities (e.g., disorderly conduct, alcohol, and drug violations) and related conflicts between user groups. These conflicts can detract from the family-friendly atmosphere of the NPS Riverways. Law enforcement personnel respond to many incidents of inappropriate behavior on the

river, along the banks of the river, and in the campgrounds.

Although NPS Riverways managers have been working toward minimizing the incidences of these behaviors, an indicator measuring the number of citations related to inappropriate behaviors would be used to ensure protection of resources and high-quality visitor experiences. The case records at the NPS Riverways shows that incidents related to alcohol, drugs, and disorderly conduct are the most frequent and disruptive.

For this reason, the standard would be that no more than 120 citations or documented warnings per month would be related to drugs, alcohol, or disorderly conduct. To ensure that this standard is not violated and the number of citations related to inappropriate behavior improves, NPS Riverways managers may institute an educational program in partnership with other agencies and local media outlets. Increasing the number of interpretive contacts and potentially instituting a gravel bar greeter program might be appropriate. Increased law enforcement presence on the riverways might help to increase the family-friendly atmosphere, as well as possibly offering alcohol-free zones on the rivers. If this standard is repeatedly violated, managers might consider temporarily or permanently closing areas of concern.

TABLE 8. VISITOR USE INDICATORS AND STANDARDS

Visitor experience indicators and standards

Indicator	Zone	Standard	Potential management strategies[1]
Percent of annual visitors with facilitated interpretative contacts as a result of programs, demonstrations, and activities.	Parkwide	At least 8% of annual visitors would participate in facilitated interpretive programs, demonstrations and activities	• Increase interpretation contacts from law enforcement and maintenance. • Create new programs to reach a more diverse audience. • Seek out funding for additional programming. • Increase interpretive staff to reach more visitors.
Number of campers at one time at designated campsites on gravel bars designated for camping.	Parkwide	No more than 6 campers per designated site on gravel bars within 50 feet of the river	• Provide education related to the sensitive nature of the river and gravel bar environment. • Post signs. • Designate campsites on the gravel bars. • Establish a pay station for campers. • Require permits to camp on gravel bars. • Implement temporary or permanent closure of gravel bars to camping.
Density of parked cars at visitor-created access points and river crossings outside designated parking areas and designated campsites.	Parkwide	Zero vehicles parked at visitor-vehicle-created access points and crossings outside designated parking and designated campsites	• Provide education programs directed at resource damage caused by visitor-created access points. • Use signs to direct visitors to designated access points. • Designate and delineate parking, such as with barriers or boulders. • Create parking areas.
Number of watercraft per river mile at specified locations. *Note: The term "watercraft" applies to all forms of watercraft, motorized and nonmotorized, allowed within a particular section of river.*	Parkwide (based on 1989 river use management plan zoning protocol)	The numbers of watercraft per river mile at specified locations listed below will not be exceeded for 85% of the peak season	• Educate visitors to encourage voluntary dispersal of use and off-peak times on the riverways. Modify concession contracts/operating plans to better distribute and manage the number of nonmotorized watercraft across areas of the riverways and throughout various times of the day. • Require motorboats to have quieter engines. • Use a shuttle system to better distribute watercraft. • Implement seasonal, temporary, or permanent closures. • Implement a permit system for watercraft use.
Number of citations or documented warnings related to inappropriate behavior.	Parkwide	There would be no more than 120 citations or documented warnings per month related to disorderly conduct and alcohol/drug-related activity.	• Provide education through the media outlets. • Work with other agencies to cut down on inappropriate behavior. • Increase interpretive contacts. • Institute gravel bar greeters. • Provide more uniformed presence at river. • Designate family-friendly zones. • Prohibit public intoxications beyond a preset limit (per Missouri State Statutes and 36 CFR). • Ban alcohol at trouble spots.

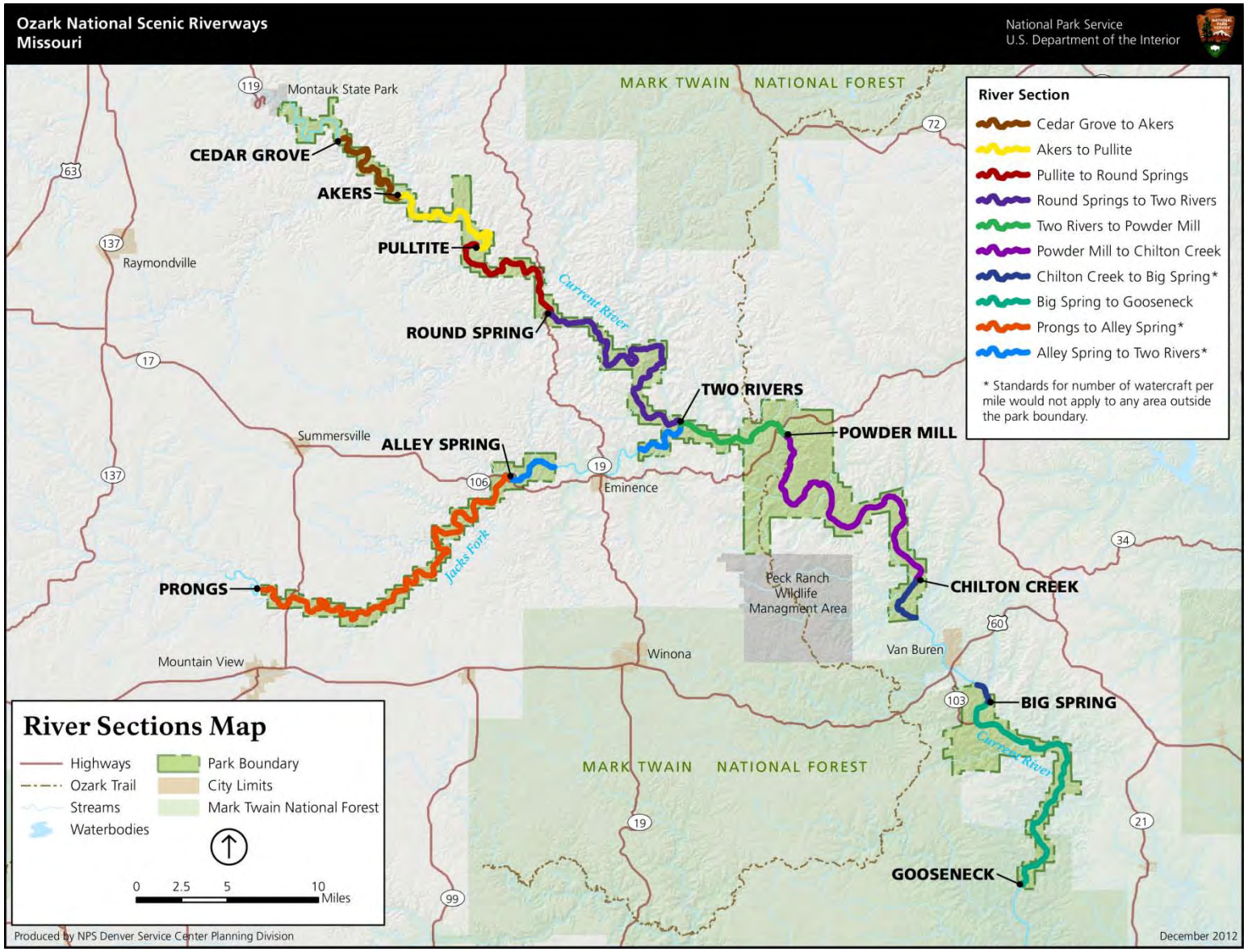
River section	Weekends and holidays (number of watercraft per mile)	Weekdays (number of watercraft per mile)
Upper Current		
Cedar Grove to Akers	up to 70	up to 40
Akers to Pulltite	up to 70	up to 40
Pulltite to Round Springs	up to 40	up to 40
Round Spring to Two Rivers	up to 10	up to 10
Lower Current		
Two Rivers to Powder Mill	up to 10	up to 10
Powder Mill to Chilton Creek	up to 10	up to 10
Chilton Creek to Big Spring[2]	up to 70	up to 40
Big Spring to Gooseneck (previously Hawes)	up to 10	up to 10
Jacks Fork		
Prongs to Alley Spring[2]	up to 40	up to 40
Alley Spring to Two Rivers[2]	up to 40	up to 40

TABLE 8. VISITOR USE INDICATORS AND STANDARDS (CONTINUED)

	Indicator	Zone	Standard	Potential management strategies[1]
Resource indicators and standards	Number of incidents of reported intentional vandalism.	Parkwide	There would be no more than six incidents of intentional vandalism per year to park unit facilities. There would be no more than one incident of intentional vandalism to cultural resources per year.	• Take appropriate law enforcement action. • Provide visitor education. • Use community outreach. • Post signs. • Partner with local law enforcement for community patrols. • Increase ranger patrols. • Increase surveillance. • Rehabilitate affected sites. • Limit access. • Closure sites.
	Number of times bacteria in the rivers exceed existing state of Missouri standard.	Parkwide	There would be zero tolerance for violations during the recreational season of the Missouri standard for *Escherichia coli*.	• Increase education and awareness. • Continue to monitor to detect changes in water quality, especially during high-use periods. • Continue immediate temporary closures when water quality standards are exceeded. • Increase regulation of events and activities, such as requiring permits for horse use. • Increase regulation of use levels and/or group sizes with a goal of dispersing visitors to lesser-used areas or limiting group sizes. • Initiate permanent site closures and/or relocations, such as specific trails and crossings; consider closures during rain events. • Other mitigation techniques as appropriate.
	Number of visitor-created roads and campsites.	Parkwide	There would be zero tolerance for visitor created roads, camping areas, and traces leaving designated county, state, or NPS roads per year (over baseline).	• Provide education and awareness on low-impact practices. • Increase enforcement of off-road and off-trail travel. • Institute a trail permit system. • Promptly close visitor-created roads. • Provide better signage and delineation of designated trail and road system. • If appropriate, designate additional trails. • Better delineation of roads. • Increase road maintenance techniques, such as installing water bars. • Harden road to better accommodate use type and levels. • Reduce use levels. • Reroute roads. • Implement temporary or permanent road closure.
	Number of horse crossings.	Parkwide	There would be no new equestrian crossings other than those associated with a designated trail.	• Use education to increase awareness. • Convert crossing to an access point with associated parking and trail access to the river. • Close and rehabilitate unauthorized crossings.
	Number of crossings associated with motorized vehicles.	Parkwide	There would be no motorized crossings other than those associated with a county road.	• Use education to increase awareness. • Convert crossing to an access point with associated parking and trail access to the river. • Close and rehabilitate unauthorized crossings.
	Number of incidents of reported intentional vandalism in caves.	Parkwide	There would be no more than four incidents of intentional vandalism per year in caves.	• Investigate and report all cases to establish an accurate incident count. • Continue immediate treatment of impacts. • Implement temporary or permanent closure via gating caves.

1 Some management strategies vary across alternatives and would be implemented upon completion of the plan. The rest of the strategies represent a range of strategies that could be used if needed to ensure that standards are maintained and desired conditions are achieved. Several of these strategies are currently in use within the NPS Riverways to varying degrees, and may be increased in response to changing conditions. If a new strategy is needed, the National Park Service will evaluate if the strategy requires additional compliance and public involvement in order to implement.

2 River sections are based off the 1989 river use management plan (see the River Sections Map). These sections were used in further research by both Chilman (1999, 2001, and 2002) and Park (2010) for consistency when collecting data. Standards for number of watercraft per mile would not apply to any area outside the NPS Riverways boundary.


Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
River Section
Cedar Grove to Akers
Akers to Pullite
Pullite to Round Springs
Round Springs to Two Rivers
Two Rivers to Powder Mill
Powder Mill to Chilton Creek
Chilton Creek to Big Spring*
Big Spring to Gooseneck
Prongs to Alley Spring*
Alley Spring to Two Rivers*
* Standards for number of watercraft per mile would not apply to any area outside the park boundary.
River Sections Map
Highways
Ozark Trail
Streams
Waterbodies
Park Boundary
City Limits
Mark Twain National Forest
0 2.5 5 10 Miles
Montauk State Park
CEDAR GROVE
AKERS
PULLTITE
ROUND SPRING
TWO RIVERS
POWDER MILL
ALLEY SPRING
PRONGS
CHILTON CREEK
BIG SPRING
GOOSENECK
Raymondville
Summersville
Eminence
Mountain View
Winona
Van Buren
Peck Ranch Wildlife Managment Area
MARK TWAIN NATIONAL FOREST
MARK TWAIN NATIONAL FOREST
Current River
Jacks Fork
Current River
Produced by NPS Denver Service Center Planning Division
December 2012

RESOURCE INDICATORS AND STANDARDS

The priority *resource* indicators for Ozark National Scenic Riverways are associated with the following topics:

- number of incidents of reported intentional vandalism
- number of times bacteria in the rivers exceed the state of Missouri standard
- number of visitor-created roads and campsites
- number of horse crossings
- number of crossings associated with motorized vehicles
- number of incidents of intentional vandalism in caves

Number of Incidents of Reported Intentional Vandalism

Visitor use impacts include unintentional wear and disturbances to park unit facilities, infrastructure, and other resources, along with intentional vandalism. In order to maintain park unit facilities and continue to provide high quality visitor experiences and services, the NPS Riverways created an indicator for intentional visitor caused vandalism to park unit facilities. The proposed standard is no more than six incidents of intentional vandalism to park unit facilities per year.

The NPS Riverways also created an indicator and standard for vandalism to cultural resources within the park unit. Cultural resources are nonrenewable, so vandalism must be minimized to the greatest extent possible. The NPS Riverways staff is already using internal guidelines to monitor these resources. The indicator for human impacts to cultural resources and sites is based on this existing monitoring protocol. Management efforts would be focused on maintaining the integrity and condition of all sites, with the proposed standard being no more than one incident of intentional vandalism per year. To ensure that both standards on vandalism are met, visitor education and enforcement of park regulations would be continued, and closures of particularly vulnerable areas would be considered, if needed.

Number of Times Bacteria in the Rivers Exceed the Existing State Standard

In locations of high recreational use, bacterial counts can be elevated. The presence of bacteria in the water is a threat to human health and safety as well as the health of the aquatic communities.

The NPS Riverways already has a monitoring program in place to determine the levels of *Escherichia coli* in the water column. This monitoring protocol is based on water quality standards developed by the state of Missouri. The standard would be zero tolerance for violations of the Missouri standard during the recreational season.

To ensure that this standard is not violated, the NPS Riverways managers might consider increasing educational efforts to raise awareness of the impacts that river users can have on water quality. Increased monitoring efforts, especially during periods of high use, may be needed to remain within standard. If conditions are trending toward the standards, management actions such as moving trails farther from the river could be considered.

Number of Visitor-created Roads and Campsites

Visitors leaving designated roads with their vehicles can lead to impacts to areas adjacent to the road, such as erosion, compaction of soils, loss of vegetation, and the creation of disturbed areas that become

prime habitat for invasive plant species. Visitor-created roads leading to precarious overlooks, areas of loose rock, and sensitive cultural and natural areas are also a concern due to safety and potential resource impact issues. These roads often lead to visitor-created camping areas that have the potential for similar impacts on natural and cultural resources.

Monitoring the number of visitor-created roads, traces, and camping areas per year would allow NPS Riverways staff to ensure that the resources adjacent to these areas are not being adversely impacted. Monitoring would also allow the NPS Riverways to close visitor-created roads and rehabilitate visitor-created camping areas. To emphasize existing management direction that visitors use only designated roads and campsites, the standard was established as zero new visitor-created roads and camping areas per year compared to baseline conditions.

If the standard for this indicator was exceeded and if it was determined that unauthorized roads and camping areas were caused by visitor use, initial management strategies may include visitor education, increased enforcement, and installation of temporary or permanent signs. If the standard is continually violated, increased law enforcement patrols may be necessary. NPS Riverways staff may also consider official designation of certain visitor-created roads, traces, or camping areas, if they meet the criteria for a suitable site.

Number of Horse Crossings

Horseback riding is a popular activity at the NPS Riverways and is enjoyed by many visitors throughout the year. The NPS Riverways has 23 miles of designated trails with seven designated river crossings for visitors to use. However, miles and miles of undesignated trails have developed over time, with 24 identified undesignated river crossings associated with these trails (Park 2011).

The undesignated trails and crossings are not designed to withstand the use they receive or control potential impacts to natural resources. Typically, undesignated trails and crossings are susceptible to erosion and a loss of vegetation, which can lead to impacts on wildlife habitat, hydrologic processes, and water quality, including increased turbidity. These sites also become prime habitat for invasive plant species. Water quality can also be impacted by the horses entering the water at the unplanned crossings. A decrease in water quality, the physical disturbance to the river bed, and a proliferation of horse river crossings can also impact wildlife at the site of the crossing as well as down river of the crossing.

Given the significant resource concerns associated with the use of undesignated river crossings and the connection of these crossings to informal trail proliferation, NPS Riverways staff would begin to immediately close and rehabilitate all undesignated horse river crossings. However, to ensure that further crossings are not created, an indicator measuring the number of new horse river crossings was developed. The standard would be no new horse river crossings that are not associated with a designated trail.

Law enforcement would be increased for compliance. In addition, the NPS staff would need to implement an education and awareness plan to help visitors understand regulations associated with the use of designated trails and river crossings, along with raised awareness on the impacts associated with undesignated crossings.

Number of Crossings Associated with Motorized Vehicles

Vehicles crossing the rivers can also cause a variety of resource concerns. These

include, but are not limited to, vegetation loss, wildlife disturbances (in and adjacent to the rivers), erosion, and water quality degradation directly associated with vehicles crossing the rivers.

The indicator and standard for the number of vehicle crossings is based on the existing NPS Riverways management policy, which does not allow river crossings except at designated areas associated with a designated county or state road. The standard of zero motorized crossings not associated with a designated county or state road would help strengthen the existing policy.

This indicator and standard would require the NPS Riverways staff to begin closing and rehabilitating undesignated river crossings immediately. In the future, the NPS Riverways staff would use visitor education to encourage the use of designated crossings and inform visitors of the resource damage caused by visitor-created crossings. If the standard has been violated on several occasions and other management strategies have not been successful, the NPS Riverways staff may consider converting undesignated crossings to a river access point with associated parking and trail access to the river.

Number of Incidents of Reported Intentional Vandalism in Caves

Karst resources, especially caves, are vulnerable to intentional acts of vandalism such as graffiti on cave walls and floors, trash dumping or littering, digging, and building campfires. These behaviors have impacts to the aesthetic experience for visitors, but may also impact sensitive, cave-adapted species such as bats and salamanders. The National Park Service is already monitoring these impacts to cave resources. The indicator for vandalism is based on the existing monitoring protocol. Management efforts would be focused on maintaining the integrity and condition of caves by not allowing more than four incidences of intentional vandalism per year. To ensure that this standard is maintained, visitor education and enforcement of park unit regulations would be continued. A possible increase in surveillance and closure of particularly vulnerable areas would be considered. (Note: All of the caves at the NPS Riverways, with the exception of Round Spring cave, are currently closed due to white-nose syndrome.)

LONG-TERM MONITORING

The National Park Service would continue to monitor visitor use levels and patterns throughout the NPS Riverways. In addition, it would monitor the visitor use indicators. The rigor of monitoring the indicators, such as the frequency of monitoring cycles, and area monitored, may vary considerably depending on how close existing conditions are to the standards. If the existing conditions are far from exceeding the standard, the rigor of monitoring would be less than if the existing conditions were close to or trending toward the standard.

Initial monitoring of the indicators would determine if the indicators were accurately measuring the conditions of concern and if the standards truly represented the minimally acceptable condition of the indicator. The National Park Service may decide to modify the indicators or standards and revise the monitoring program if better ways are found to measure changes caused by visitor use. Most of these types of changes should be made within the first several years of initiating monitoring. After this initial testing period, adjustments would be less likely to occur.

If use levels and patterns change appreciably, the National Park Service would need to identify new indicators to ensure that desired conditions are achieved and maintained. This iterative learning and refining process, a form of adaptive management, is a strength of the NPS visitor use management program.

MANAGEMENT STRATEGIES TO ADDRESS CLIMATE CHANGE

CLIMATE CHANGE AND OZARK NATIONAL SCENIC RIVERWAYS

Climate change has the potential to adversely affect the future resource conditions of the NPS Riverways. As global and regional climates continue to change, a management approach that enhances the protection and resilience of climate-sensitive resources is becoming increasingly important. The following outlines such a strategy that adapts to the growing understanding of climate change influences and the effectiveness of management to contend with them.

Climate change science is a rapidly advancing field and new information is continually being collected and released. However, the full extent of climate change impacts on resource conditions is unknown. As such, park unit managers and policy makers have not determined the most effective response mechanisms for minimizing impacts and adapting to change. Because of this, the proposed management strategies in this section do not provide definitive solutions or directions; rather they provide science-based and scholarship-based management principles to consider when implementing the broader management direction of the NPS Riverways.

Climate change presents considerable threats and challenges to park unit natural and cultural resources, infrastructure, and visitor experience. While some effects of climate change are known and are already visible on the landscape, many are just beginning to be understood. Most climate change impacts are complex and far-reaching. Some of the known and future effects that may directly or indirectly affect the NPS Riverways include

- warming temperatures
- changing weather patterns
- accelerated melting of sea ice (which can further alter global weather patterns)
- expanded fire seasons
- species range and migration shifts
- more frequent precursor conditions for pests, pathogens, disease, and nonnative species invasion
- potential for river flows to be affected by altered precipitation regimes (due to climate change) which may affect surface flows as well as aquifer recharge

Most notably, climate change has the greatest potential to alter ecological systems in the NPS Riverways. Changes to the frequency and degree of weather patterns, temperature ranges, extreme events, and other climate-related variables may alter one or several components of the park unit's ecological system. Given the direct ecological connectivity of hydrology, plant communities, wildlife, and other building blocks of a healthy ecological system, even a small change in one or two of these components could potentially have "domino effects" through the overall system. Surface water and groundwater flow quantities and water quality and plant and animal species composition (e.g., biodiversity) are just two examples of park unit resources that may change as a result of climate change.

Climate change is also anticipated to have an overall adverse effect on the park unit's cultural resources, primarily as a result of the increased intensity and frequency of severe storm activity contributing to damaging winds and erosion. Heavy, prolonged, and/or frequent rainstorms could result in rising river levels and swifter currents, potentially resulting in the erosional disturbance of archeological sites located along riverbank terraces. Many archeological sites also retain ethnographic importance for traditionally associated tribes and other groups. Site disturbances would diminish the cultural connections that many have for traditional

use areas and sites, and possibly impede their ability to access these areas.

Historic buildings, structures, and cultural landscape features may also be adversely impacted by increased storm-related weathering, high winds, drought, and fire that could result in the loss or damage of historic fabric and other character-defining features.

STRATEGY

To effectively respond to the challenge of rapid climate change and its impacts, the National Park Service is undertaking a collective and coordinated strategy that involves park units, regions, national program offices, and external partners including universities, nonprofit organizations, and other federal agencies. The Climate Change Response Program is providing guidance, recommendations, and information that support NPS actions to preserve the natural and cultural resources and values of the National Park System from detrimental impacts due to rapid climate change.

The NPS Climate Change Response Program aims to prepare the agency and its park units for the anticipated management needs that result from climate change. To help park units cope with the uncertainty in future climate conditions, this program helps park managers determine the extent to which they can and should act to protect the park units' current resources while allowing the park units' ecosystems to adapt to new conditions. Strategies of the NPS Climate Change Response Program are outlined below.

Science

- Conduct scientific research and vulnerability assessments necessary to support NPS adaptation, mitigation, and communication efforts.
- Collaborate with scientific agencies and institutions to meet the specific needs of management as it confronts the challenges of climate change.
- Learn from and apply the best available climate change science.

Mitigation

- Reduce the carbon footprint of the National Park Service.
- Promote energy efficient practices, such as alternative transportation.
- Integrate mitigation into all business practices, planning, and the NPS culture.

Adaptation

- Develop the adaptive capacity for managing natural and cultural resources and infrastructure under a changing climate.
- Inventory resources at risk and conduct vulnerability assessments.
- Prioritize and implement actions, and monitor the results.
- Explore scenarios, associated risks, and possible management options.
- Integrate climate change impacts into facilities management.

Communication

- Provide effective communications to the public about climate change and impacts.
- Train park staff and managers in the science of climate change and decision tools for coping with change.
- Lead by example.

MANAGEMENT APPROACH

With the guidance of the above strategies, the NPS Riverways would use the following management approach to address climate change throughout the implementation of this plan. Many of these specific management strategies are adopted from "Some Guidelines for Helping Natural Resources Adapt to Climate Change" (Baron et al. 2008). Further elaboration and adaption of these are anticipated as implementation of the plan proceeds.

- Through targeted vulnerability assessments, identify key natural and cultural resources and processes that are at risk from climate change; establish baseline conditions for these resources, identify their thresholds, and monitor for change. Increase reliance on adaptive management to minimize risks.
- Restore key ecosystem features and processes, protect cultural resources to increase their resilience to climate change, and examine the potential for NPS Riverways to provide climate refugia for sensitive species. Use best management practices to reduce human-caused stresses (that is, park unit infrastructure and visitor-related disturbances) that hinder the ability of species or ecosystems to withstand climatic events.
- Form partnerships with other resource management entities to maintain regional habitat connectivity and refugia that allow species dependent on NPS Riverways resources to better adapt to changing conditions.
- Reduce or mitigate greenhouse gas emissions associated with NPS Riverways operations and visitor use, such as alternative transportation options (for example, using shuttles and employing low-emission vehicles in the park unit's fleet) and biofuels and other renewable energy sources for contact stations, administrative buildings, and campgrounds.
- Use the fragile environments of the Ozark National Scenic Riverways as an opportunity to educate visitors about the effects of climate change on the resources they are enjoying. Inspire visitors to take action through leadership and education.
- Manage NPS Riverways facilities and infrastructure, such as structures, trails, roads, and drainage systems, in a way that prepares for and adapts to the effects of climate change.

FUTURE STUDIES AND IMPLEMENTATION PLANS NEEDED

INTRODUCTION

After completion and approval of this general management plan, other more detailed studies and plans would be needed before certain actions could be implemented. Some of these actions would require additional environmental compliance, public involvement, and consultation. The extent of further public input and environmental analysis would vary, depending on the impacts anticipated from a proposed action. Appropriate permits may also be needed for certain actions.

Implementation of these studies and plans would also depend on future funding and staffing levels. The approval of this general management plan does not guarantee that the funding needed for implementation would be forthcoming.

This section identifies future studies (including inventories, evaluations, and condition assessments) and plans (including strategies) that would likely be needed to implement the action alternatives. If a particular study or plan is only associated with one of the action alternatives, that is noted in the list. The list is organized by NPS Riverways-wide management strategies presented earlier in this chapter.

Please note that certain plans and studies that are similar in nature may be combined for efficiency.

Natural Resources

- Develop a fire management plan.
- Develop an open fields management plan.
- Develop a nonnative plant management plan.
- Update the land protection plan.
- Develop a resource stewardship strategy that provides comprehensive, long-range direction for natural resource management (NPS policy now requires that a resource stewardship strategy be completed to replace the resource management plan). This strategy would establish a multiyear, ecosystem-based planning process for the natural resource program to implement inventories, condition assessments, monitoring, and restoration projects for the following:
  - vegetation, including both native and invasive species
  - wildlife, including mammals, birds, reptiles, fish, and amphibians
  - wetlands, including bogs, springs, seeps, and riparian areas
  - ecologically sensitive areas, including globally imperiled habitats, state natural heritage areas, conservation sites, and critical habitat for endangered species
  - special status species, including federally and state-listed plants and animals
- Develop a water quality and air quality monitoring plan.
- Develop a restoration plan or plans that provide guidance for restoring rare habitats and special status species.

Climate Change

- Develop a climate change action plan that builds on the NPS' approach to addressing climate change outlined in this general management plan, including strategies to reduce the NPS Riverways' carbon footprint and an analysis to determine the effects of

climate change on park resources, values, facilities, and visitor services.

- Pursue data collection and research that addresses climate change effects on natural and cultural resources, as well as human dimensions. These efforts could include scenario planning with the assistance of the Climate Change Response Program and partnership research efforts with other agencies or institutions.
- Pursue climate change adaptation planning as a part of all other planning processes included in this section (e.g. RSS, river use management plan, etc.). Climate change will affect all aspects of park stewardship and operations and therefore should be considered as part of any park strategic planning effort.
- Pursue studies concerning the relationship between projected climate changes, output from the natural springs, river flows and an examination of potential future fire regimes.

Cultural Resources

- Develop a resource stewardship strategy that provides comprehensive, long-range direction for cultural resource management, including the establishment of a multiyear planning process for resource inventory, assessment, research, interpretation, and protection. Cultural resources such as archeological sites, historic structures, and cultural landscapes would continue to be inventoried and assessed NPS Riverways-wide.
- Update the collection and archive management plan, integrated pest management plan for collections, and scope of collections, as needed.
- Develop a NPS Riverways-wide strategy to identify, monitor, and mitigate the impacts of climate change on cultural resources.
- Develop treatment plans for special cultural resource areas and cultural landscapes.
- Develop treatment plans for cultural resources in need of rehabilitation and stabilization.
- Develop a cultural affiliation landscape plan (pastoral areas).This would increase areas managed as meadows and agricultural sites that were once part of Ozark farms and settlement areas.

Visitor Use and Interpretation

- Develop development concept plans for Akers, Alley Spring, Big Spring, Round Spring, Pulltite, Two Rivers, and Powder Mill.
- Develop an implementation plan or plans to upgrade campgrounds.
- Update the river use management plan, which was published in 1989.
- Develop a horse use management plan.
- Develop a roads and trails plan.
- Develop a right-of-way management plan.
- Develop a sign plan.
- Rewrite the long-range interpretation plan.
- Develop a visitor use management plan.
- Develop an implementation plan or plans to substantially increase the number of visitors contacted over current levels, such as by improving visitor orientation services.
- Develop a visitor use management strategy for the NPS Riverways consistent with the visitor use management framework presented in this general management plan.

- Update visitor use and analysis data to serve as a foundation for a variety of other implementation studies and plans.
- Develop new methods to reach a wider variety of audiences using available new technologies.
- Develop a new commercial services plan to provide viable concession services at all locations to ensure the long-term availability of watercraft rentals, lodging, food, and other services. An implementation plan would be developed if either upgrades to infrastructure or the addition of new facilities is appropriate.

Partnerships

- Incorporate strategies to enhance existing partnerships or actively pursue new ones with public and private entities into the future studies and plans listed previously.

STAFFING AND COST ESTIMATES

National Park Service decision makers and the public must consider the costs and advantages of various alternatives, including the no-action alternative, to make relevant comparison among the alternatives.

The costs presented here are estimates for comparison purposes only and are not to be used for budgetary purposes or implementation funding requests. If and when the actions are implemented, actual costs would vary. Specific costs would be determined in subsequent, more detailed planning and design efforts.

Presentation of costs in this plan does not guarantee future NPS funding. Project funding would not come all at once; it would likely take many years to secure, and some could be provided by partners, donations, or other nonfederal sources. Although Ozark National Scenic Riverways hopes to secure this funding and would prepare itself accordingly, the NPS Riverways might not receive enough funding to achieve all desired conditions within the timeframe of the general management plan (the next 20 or more years).

The estimates in this section include annual operating, staffing, deferred maintenance, one-time facility and nonfacility, and other costs. These are defined as follows:

- ***Annual Operating Costs*** are the total costs per year for operations and maintenance associated with each alternative, including utilities, supplies, staff salaries and benefits, leasing, and other materials. Cost and staffing estimates assume that the alternative is fully implemented as described.
- ***Staffing*** is the total number of person-years of staff required to maintain the assets of the park unit at an acceptable level, provide visitor services, protect resources, and generally support the park's operations. The full-time equivalency (FTE) number indicates NPS staffing levels, including seasonal staff, but not volunteer positions or positions funded by partners. Full-time equivalency salaries and benefits are included in the annual operating costs.
- ***Deferred Maintenance Costs*** include costs related to maintenance that was not performed when it was scheduled. A lack of funding is the primary reason for delays in addressing maintenance needs.
- ***One-time Facility Costs*** include costs for the design, construction, rehabilitation, upgrades, or adaptive reuse of visitor centers, campgrounds, picnic areas, roads, parking areas, administrative facilities, comfort stations, educational facilities, maintenance facilities, trails, and other visitor and management facilities.
- ***One-time Nonfacility Costs*** include actions for the preservation of cultural or natural resources not related to facilities, the development of visitor use or management tools, and other park management activities that would require substantial funding above annual operating costs.
- ***Other Costs*** are identified separately for projects that are wholly or partially funded from other sources.

Staffing and annual operating cost estimates for the action alternatives are calculated by adding additional staffing and annual operating costs associated with the implementation of each action alternative to the staffing and annual operating costs under the no-action alternative.

Table 9 provides cost estimates and staffing levels for implementing the four alternatives.

STAFFING

Staffing levels expressed as full-time equivalents (FTEs) shown under the no-action alternative in table 10 (72 total), indicate the actual number of positions funded in fiscal year 2011. Due to current funding limitations the authorized funding level (of 95) has not been reached and 23 full-time positions are currently vacant in various divisions at the NPS Riverways.

Table 10 also shows the total number of proposed additional staff required above the 2011 funded staffing levels to implement the management strategies described under alternatives A, B, and C. The 2011 staffing levels are identified for the no-action alternative and serve as a baseline for comparison against the action alternatives. The increase in annual operating cost above the no-action alternative is mainly the result of the increased number of staff proposed to fully implement each action alternative.

Volunteers would continue to be key contributors to NPS operations under all of the alternatives. In 2011, the National Riverways had 214 volunteers working in the following categories:

- Interpretation: 6,534 hours
- Maintenance: 2,677 hours
- Natural Resource Management: 416 hours
- Protection / Operations / Law Enforcement: 60 hours
- Campground Hosts: 6,840 hours

These volunteer contributed a total of about 16,500 hours, which is equivalent to eight full-time positions. Volunteers (and future partners) would continue to be an important part of ongoing management and a vital component of the NPS Riverways' efforts to implement any of the action alternatives. Staffing for each of the alternatives is described below. The Interpretation and Education Division and Resource Management and Science Division are discussed in more detail because the substantial number of additional personnel that would be needed in these divisions to fully implement alternative A, B, or C.

No-action Alternative

The NPS staffing level under this alternative would remain at the Operation of the National Park Service currently authorized level of 95 full-time equivalent positions.

The Interpretation and Education Division is the only park unit division that relies on Operation of the National Park Service base-funded seasonal positions to carry out its program from year to year. For consistent comparison purposes, only permanent and seasonal full-time equivalent positions are reflected in these general management plan staffing estimates.

Alternative A

The NPS staffing level under alternative A would require additional employees, 34 full-time equivalent positions, relative to the no-action alternative and current funding levels. The proposed additional 34 full-time positions equates to an additional 11 staff over the current authorized funding level of 95 full time positions.

The Interpretation and Education Division would use the additional 12 full-time equivalent positions to improve informational services, educational services, and orientation services along the riverways. This alternative emphasizes visitor awareness of the historical human presence in the Ozark region, and includes regularly scheduled cultural demonstrations as well as guided hikes and float trips.

TABLE 9. COST ESTIMATES AND STAFFING FOR FULL IMPLEMENTATION OF THE ACTION ALTERNATIVES

Cost type	No-action	Alternative A	Alternative B (NPS preferred)	Alternative C
Staffing (full-time equivalency)	72	34 (106 total)	26 (98 total)	47 (119 total)
Annual operating costs	$6,582,000	$9,304,000	$8,821,000	$10,072,000
One-time facility costs	$0	$7,498,000	$6,703,000	$12,259,000
Deferred maintenance	$27,083,000	$23,062,000	$23,803,000	$23,228,000

TABLE 10. ESTIMATED STAFFING LEVELS (FTES) TO IMPLEMENT THE ALTERNATIVES

Division	No - action	Alternative A		Alternative B (NPS preferred)		Alternative C	
	Funded	New FTEs	Total FTEs	New FTEs	Total FTEs	New FTEs	Total FTEs
Total FTEs	72	34	106	26	98	47	119
Superintendent's Office	5	0	5	0	5	0	5
Administration	5	2	9	2	7	2	7
Maintenance and Engineering	28	7	35	12.5	40.5	10	38
Interpretation and Education	10	12	22	3	13	13	23
Resource Management and Science	7.5	8	15.5	0	7.5	10	17.5
Law Enforcement, Safety and Emergency Services	16.5	5	21.5	8.5	25	12	28.5

The Resource Management and Science Division would significantly expand resource monitoring, including aquatic resources, karst systems, and threatened species. The additional 8 full-time equivalent positions would also support restoration of environmentally degraded park unit lands and facilities.

The Law Enforcement, Safety, and Emergency Services Division would require an additional 5 full-time equivalent positions to improve protection and monitoring of cultural and natural resources in key areas of the park unit.

The Maintenance and Engineering Division would use the additional 7 full-time equivalent positions to help close unofficial accesses, crossings, and trails and to rehabilitate accesses, crossings, roads, and facilities that would remain in use. This additional staff also would work to restore and protect degraded surface and karst communities and ensure water quality in the NPS Riverways. The relatively small increase in this division's staff relate to the no-action alternative is the result of rehabilitation and making improvements to existing developments, rather than adding substantial new infrastructure to the NPS Riverways.

Alternative B (NPS Preferred)

The NPS staffing level under this alternative would increase by 26 full-time equivalent positions relative to the no-action alternative and current funding levels. The proposed additional 26 full-time positions equates to 3 additional staff over the current authorized funding level of 95 full time positions.

The Interpretation and Education Division would use the additional 3 full-time equivalent positions to expand visitor services at key locations along the riverways to meet visitor needs. The additional staff would increase visitor contacts over current staffing levels; improve information, education, and orientation services; and provide indirect monitoring along the river and its adjacent lands.

Alternative B proposes a more comprehensive approach to Resource Management; however, this approach would not require additional full-time equivalent positions in the Resource Management and Science Divisions to implement the natural and cultural resource protection components of the preferred alternative. The proposed management strategies are not about doing substantially more; but rather are more about managing differently, in a more proactive way that is in accordance with the purpose of the park. Strategies would include monitoring of aquatic resources, karst systems, and threatened species. They would also help restore environmentally degraded park unit lands and facilities.

In the Maintenance and Engineering Division, the additional 12.5 full-time equivalent positions would assist with the coordination of upgrades to campgrounds, picnic areas, trail systems, wastewater treatment, maintenance, and visitor service facilities.

In the Law Enforcement, Safety, and Emergency Services Division, the additional 8.5 full-time equivalent positions would help improve protection and monitoring of cultural and natural resources in key areas of the NPS Riverways.

Alternative C

The NPS staffing level under this alternative would include an additional 47 full-time equivalent positions relative to the no-action alternative and current funding levels. The proposed additional 47 full-time positions equates to 24 additional staff over the current authorized funding level of 95 full time positions.

The Interpretation and Education Division would use the additional 13 full-time equivalent positions to expand visitor services at key locations along the riverways, partially due to the switch from a six-month to a nine-month season, and the ensuing switch from seasonal to permanent staff. Furthermore, visitor services would be expanded to a 12-month visitor season at several other locations along the National Riverways. This division would also improve information and orientation services at the north and south entrances to the National Riverways and in several major access points for visitors to the NPS Riverways. The goal would be to substantially increase visitor contacts over current levels. Staff increases would also improve interpretive media and educational programs.

The Resource Management and Science Division would gain 10 full-time equivalent positions to implement the natural and cultural resource protection components of alternative C that would result from the increase in river activities. The additional staff would allow the NPS Riverways to pursue a comprehensive, ecosystem-based approach to natural resource management and to improve management of historic settlement sites as cultural landscapes.

The Maintenance and Engineering Division would use the additional 10 full-time equivalent positions to assist with the coordination of upgrades to campgrounds, picnic areas, trail systems, and other visitor service facilities, and to perform maintenance.

The additional 12 full-time equivalent positions in the Law Enforcement, Safety, and Emergency Services Division would improve protection and monitoring of cultural and natural resources in key areas of the park unit.

Deferred Maintenance

The deferred maintenance backlog is the same for all of the action alternatives. As shown in table 9, accumulated operational deficiencies have led to a $27 million deferred maintenance backlog at the NPS Riverways. This backlog represents 9.4% of the NPS Riverways' $288 million asset current replacement value (CRV).
All three action alternatives would address this deferred maintenance backlog. As shown in table 11, the $3.2 million budgeted in alternative B would address approximately 12% of the backlog.

One-time Facility Costs

One-time facility costs are included in table 12, followed by a more detailed description of each cost category.

TABLE 11. ESTIMATED DEFERRED MAINTENANCE ADDRESSED BY ONE-TIME FACILITY COSTS

Type of deferred maintenance	Deferred maintenance	Targeted project funds in alternative B
Trails	$1,600,764	$353,796
Landscapes	$1,684,232	$263,896
Buildings[1]	$5,091,146	$2,154,660
Wastewater systems	$1,571,729	$507,780
Total DM Targeted	**$9,947,871**	**$3,280,132**
Total DM Backlog in Riverways	**$27,082,740**	**$23,802,608**

[1] Includes only structures, not associated infrastructure and utilities.

TABLE 12. ESTIMATED ONE-TIME FACILITY COSTS TO IMPLEMENT THE ALTERNATIVES

Cost type	No-action	Alternative A	Alternative B (NPS preferred)	Alternative C
Upgrade selected campgrounds and picnic areas	$0	$166,205	$91,576	$166,205
Upgrade selected visitor service facilities	$0	$423,521	$480,000	$1,230,000
Upgrade selected maintenance facilities	$0	$3,117,500	$1,600,000	$3,117,500
Improve trail systems and access points	$0	$1,553,136	$2,594,136	$3,384,784
Other one-time facility costs	$0	$521,300	$1,085,210	$521,300
Total one-time facility costs	**$0**	**$5,781,662**	**$5,850,922**	**$8,419,789**

Upgrade Selected Campgrounds and Picnic Areas. Estimated one-time facility costs to upgrade selected campgrounds and picnic areas shown in table 12 are $166,205 in alternative A and C while the cost of upgrades in alternatives B is approximately 40% less, at $91,576. All three action alternatives would bring primitive sites up to standards. Alternatives A and C would address 15 sites each, while alternative B

would address eight. Each action alternative would also include restoration of 20 acres of disturbed areas.

Upgrade Selected Visitor Service Facilities. Alternative A would add a boathouse at Big Spring with an estimated one-time facility cost of $424,000. Alternative B would add an estimated one-time facility cost of $480,000 for adaptive reuse of the existing Powder Mill building, which would be rehabilitated and used as a visitor learning center. Alternative C one-time facility costs are approximately $1.2 million, reflecting the higher cost for the addition of the new Ozarks Highland Institute Center and the open-air exhibit Living History Farm.

Upgrade Selected Maintenance Facilities. All three action alternatives would add new multioperational facilities; alternatives A and C would add three of these facilities at a cost of $3.1 million, while alternative B would add one at a cost of $1.6 million.

The combined visitor service and maintenance facility upgrades specified in alternative B would direct $2.15 million toward the building-related deferred maintenance backlog of $5.09 million, contributing 42% of the total deferred maintenance in the riverways related to buildings.

Improve Trail Systems and Access Points. Table 12 shows one-time facility costs to improve selected trail systems and access points. The total estimated costs are approximately $790,000 lower under alternative B than under alternative C. The one-time cost in alternative B of $2.59 million to fully implement upgrades and enhancement to trails and access points includes funds to address the $1.6 million in trail-related deferred maintenance, which accounts for about 6% of the total deferred maintenance backlog in the NPS Riverways. In addition, all action alternatives include $50,000 for restoration of five historic cemeteries, $123,000 to stabilize archaeological sites, $20,000 to restore disturbed areas, $212,000 for historic landscape restoration, and $75,000 for removal of 10 obsolete structures and site reclamation.

One-time Nonfacility Costs

Estimated one-time nonfacility costs under all action alternatives include the restoration of damaged cultural and other archeological sites and the preservation of historical cemeteries within NPS Riverways lands. Additional improvements under alternative A are approximately two times higher than improvements under alternative B, the preferred alternative. Improvements under alternative C are approximately five times higher than alternative B. The additional cost allocated in alternative A and alternative C are associated with a more comprehensive and extensive interpretative and resource protection approach requiring more management tools.

Other One-time Facility Costs

Other costs include the removal and replacement of the bridge at Cedar Grove. To increase safety and functionality for both the road and riverways, a new high bridge would be constructed in place of the existing, at-grade, low bridge. The National Park Service would need to pursue other funding sources for such construction. This bridge replacement could be funded partly or in full through a combination of federal highway and/or state highway improvement design and construction funding.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The National Park Service is required to identify the environmentally preferable alternative in its NEPA documents for public review and comment. Guidance from the Council on Environmental Quality (CEQ) defines the environmentally preferable alternative as the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historical, cultural, and natural resources" (46 *Federal Register* 18026, Q6a). It should be noted there is no requirement that the environmentally preferable alternative and the NPS preferred alternative be the same.

The National Park Service has identified alternative A as the environmentally preferable alternative. Alternative A would best protect the biological and physical environment by zoning larger portions of the NPS Riverways as primitive, natural, and nonmotorized when compared to the other alternatives. Although alternatives A and B contain similar strategies to meet the goal that identifies the environmentally preferable alternative, alternative A was selected primarily because its greater ability to protect geologic resources and soils and water resources. The no-action alternative and alternative C would protect natural and cultural resources in accordance with NPS policies, but provide for more recreation and place less emphasis on biological and physical resource protection than alternatives A and B. All action alternatives would clarify desired conditions and provide more comprehensive direction to manage for these conditions than framework currently provided through the no-action alternative.

Alternative A would use management zones to place a stronger emphasis on managing natural resources in the NPS Riverways. Negative effects to water and geologic resources and soils would be reduced from greater limits on development, more closure and restoration of undesignated horse stream crossings, roads and traces, and prohibition of vehicular access to all gravel bars. Geologic resources and soils would benefit most under alternative A from reduction in karst degradation, erosion, sedimentation, and compaction. Out of all the alternatives, alternative A would manage the greatest portion of the riverways as nonmotorized. This would substantially reduce riverbed disturbances, minimize and control wake disturbances and associated erosion along riverbanks, and reduce petroleum-based pollutants from motorboats in nonmotorized areas and downstream. Other benefits to water resources from management strategies under alternative A include, reduced sedimentation and erosion, reduction in levels of nutrient loading in waterways from horse manure, and minimization of negative effects from facility development and park operations.

Each of the action alternatives, as well as the no-action alternative, would have similar minimal impacts on cultural resources. The action alternatives (A, B, and C) would enhance preservation of NPS Riverways cultural resources through the introduction of land and river management zones and implementation of additional cultural resource protection, restoration, and interpretation strategies. For example, under alternative A, protection and preservation of cultural landscapes, including open fields to preserve pastoral scenes would be emphasized. Under alternative B, selected structures and sites may receive special attention to support Ozark heritage educational programs. An oral history program would be restarted and the archive and collections program would be expanded to provide additional archeological storage space. Under alternative C, monitoring of cultural resource conditions would be emphasized in order to achieve desired conditions while allowing for expanded visitor access to historic structures and cultural landscapes.

CONSISTENCY OF THE ALTERNATIVES WITH THE NATIONAL ENVIRONMENTAL POLICY ACT SECTION 101(B)

The National Environmental Policy Act of 1969, as amended requires an analysis of how each alternative meets or achieves the purposes of the act, as stated in section 101(b). Each alternative analyzed in a NEPA document must be assessed as to how it meets the following purposes:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
2. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.
4. Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
5. Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities.
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The Council on Environmental Quality has promulgated regulations for federal agencies' implementation of the National Environmental Policy Act (40 CFR Parts 1500–1508). Section 1500.2 states that federal agencies shall, to the fullest extent possible, interpret and administer the policies, regulations, and public laws of the United States in accordance with the policies set forth in the act (sections 101[b] and 102[1]); therefore, other acts and NPS *Management Policies 2006* are referenced, where applicable, in the following discussion.

CRITERION 1: FULFILL THE RESPONSIBILITIES OF EACH GENERATION AS TRUSTEE OF THE ENVIRONMENT FOR SUCCEEDING GENERATIONS

All alternatives considered in this plan, including the no-action alternative, must comply with law and NPS policy requiring the agency to manage parks by such means and in such a manner "that will leave them unimpaired for the enjoyment of future generations." While each alternative, including the no-action alternative meets this criterion, the action alternatives (A, B, and C) would enhance stewardship of the NPS Riverways' resources through the introduction of zoning for land management and river management. Management zones would provide the NPS Riverways with a comprehensive vision for broad resource management objectives, as well as a clear direction on desired types and levels of recreational activity and visitor services. The zoning approach, along with other management strategies proposed in this general management plan, would help to achieve desired conditions within each zone.

Alternatives A and B would place stronger emphasis on managing for natural resources, while alternative C would place stronger emphasis on monitoring water quality, aquatic ecology, and terrestrial ecology to keep track of and mitigate impacts from increased recreation. Each action alternative includes some ecological restoration. In addition, alternative B would increase opportunities for volunteer stewardship projects and information sharing.

CRITERION 2: ASSURE FOR ALL AMERICANS SAFE, HEALTHFUL, PRODUCTIVE, AND AESTHETICALLY AND CULTURALLY PLEASING SURROUNDINGS

Under all alternatives, including the no-action, the National Park Service would strive to provide for safe, healthful, productive, and aesthetically and culturally pleasing surroundings. The ability of the NPS Riverways to achieve this purpose would be enhanced under all action alternatives. Each action alternative provides greater opportunities for NPS Riverways visitors to learn about the natural and cultural resources of the NPS Riverways and enjoy a variety of outdoor recreation activities in settings that are safe and aesthetically and culturally rich. It is important to note that judgment about whether or not surroundings are "aesthetically and culturally pleasing" is subjective. As such, surroundings that are pleasing to one person may not be pleasing to another person. Therefore, the NPS Riverways aim to provide for appropriate experiences that can effectively meet a broad spectrum of visitor interests and expectations (that is, for "all Americans") without impairing the NPS Riverways' fundamental resources and values.

Each of the action alternatives has been designed to provide high-quality visitor experiences and include improved visitor contact facilities and interpretation. Alternatives A and B would reduce congestion and disperse use across the NPS Riverways, which would help alleviate crowding, reduce user conflicts, and ultimately improve public safety. While alternative C would reduce congestion in some areas, overall levels of recreation could increase.

CRITERION 3: ATTAIN THE WIDEST RANGE OF BENEFICIAL USES OF THE ENVIRONMENT WITHOUT DEGRADATION, RISK TO HEALTH OR SAFETY, OR OTHER UNDESIRABLE AND UNINTENDED CONSEQUENCES

Each of the alternatives has been designed to provide a varying degree of high-quality recreation opportunities while providing additional resource protection. Among the alternatives, there are some differences in the amounts of opportunities provided for each use, including reductions in some types of recreation specifically in order to expand opportunities for other types of recreation. For example, alternative A would favor nonmotorized recreation at the expense of motorized recreation. Alternative C would expand motorized and nonmotorized river use, thereby possibly limiting opportunities for a slow paced river experience for other visitors.

Alternative B would provide a balanced and wide range of visitor use opportunities, while reducing crowding and enhancing resource protection. This alternative would strive to provide a manageable mix of recreational opportunities, while also increasing visitor awareness of the NPS Riverways' special resources and values. Restoration of biological communities and resource monitoring would actively support achieving desired conditions and avoiding undesirable consequences.

CRITERION 4: PRESERVE IMPORTANT HISTORIC, CULTURAL, AND NATURAL ASPECTS OF OUR NATIONAL HERITAGE; AND MAINTAIN, WHEREVER POSSIBLE, AN ENVIRONMENT WHICH SUPPORTS DIVERSITY AND A VARIETY OF INDIVIDUAL CHOICES

The preservation of important historic, cultural, and natural aspects of our national heritage would be maintained under the implementation of all alternatives. In

addition, mitigation measures common to all action alternatives, defined earlier in this chapter, would be implemented to minimize adverse effects to resources. Ozark National Scenic NPS Riverways is a large park unit with diverse resources and diverse opportunities for visitors. As such, all three action alternatives also support a variety of choices, including many self-directed activities. While alternative A would provide greatest protection of natural resources, all alternatives would have similar minimal impacts on cultural resources. Alternative B would support a larger variety of individual choices by providing a mix of traditional recreational activities, an assortment of guided and self-guided activities, and expanded educational and interpretive opportunities.

CRITERION 5: ACHIEVE A BALANCE BETWEEN POPULATION AND RESOURCE USE WHICH WOULD PERMIT HIGH STANDARDS OF LIVING AND A WIDE SHARING OF LIFE'S AMENITIES

All alternatives provide appropriate resource protection while accommodating use of resources by providing river- and land-based recreation opportunities. Each action alternative would enhance river- or land-based recreation opportunities, but in different ways, as discussed under criterion 3.

CRITERION 6: ENHANCE THE QUALITY OF RENEWABLE RESOURCES AND APPROACH THE MAXIMUM ATTAINABLE RECYCLING OF DEPLETABLE RESOURCES

In accordance with NPS *Management Policies 2006*, all action alternatives incorporate measures to ensure actions are conducted in an environmentally responsible and sustainable manner. Conservation and recycling of resources is encouraged throughout the National Park Service and, therefore, would be implemented under any alternative.

CONCLUSION

After evaluation of alternatives in this general management plan, each alternative in this plan meets the National Environmental Policy Act section 101 criterion.

ALTERNATIVE AND ACTIONS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

The management alternatives and actions in this document were developed over several years through an iterative process that incorporated public input and new information at every step. This process is described in detail in the "Introduction" at the beginning of this chapter.

ALTERNATIVE DISMISSED

Public scoping identified a desire by some members of the public to eliminate the use of alcohol on the river. The planning team determined that it would be infeasible to enforce a ban on alcohol due to the high levels of law enforcement that would be required. In addition, the National Park Service already has specific regulations to limit problems associated with alcohol use and other, sometimes-related, dangerous behavior:

- Volume-drinking devices are regulated by Missouri State Statutes within the park unit boundary.
- Excessively loud sound systems (such as stereos or boom boxes) that intrude on an area's enjoyment by family-oriented groups are not allowed. Visitors also cannot use air horns and other loud-noise-producing devices. Rangers use audio decibel readers to enforce NPS regulations on noise.
- Glass containers are regulated by Missouri State Statute on the rivers within the park unit boundary and there is active enforcement against the use of dry-ice bombs. Jumping from some cliffs and bluffs and the use of rope swings are prohibited. Cliff jumping is a serious safety issue that also impacts fragile vegetation growing in thin soils on the cliffs.

In addition, requirements in 36 CFR, along with applicable state and local laws, prohibit the following types of alcohol uses:

- It is prohibited for a person to be publicly intoxicated in regards to aberrant behavior or endangerment to oneself, another person, or damage to property or park resources.
- Carrying or storing a bottle, can, or other receptacle containing an alcoholic beverage that is open or seal is broken, or the contents of which have been partially removed, within a motor vehicle in a park unit is also prohibited.
- Operating a bicycle while consuming an alcoholic beverage or carrying in hand an open container of an alcoholic beverage is prohibited.
- It is prohibited for a minor to be in possession of alcohol (under 21 years of age) as well as any type of sale or gift of alcohol to a minor.
- It is also prohibited to operate or be in actual physical control of a vehicle/vessel while under the influence of alcohol or a drug, or drugs, or any combination thereof, to a degree that renders the operator incapable of safe operation, or if the alcohol concentration in the operator's blood or breath is 0.08 or greater.

Finally, further limiting or attempting to eliminate alcohol use on part or all of the riverways is an action that can be considered separately from the general management plan in the future.

SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES AND SUMMARY OF THE IMPACTS OF THE ALTERNATIVES

Table 13 provides a summary of key differences among the alternatives. The table is organized by the following topics:

- concept
- zoning
- visitor experiences and activities
- visitor services and facilities
- interpretation and education
- natural resource management
- cultural resource management
- wilderness
- park operations
- partnerships

Table 14 summarizes the environmental consequences that would result from each alternative. A more detailed explanation of the impacts is presented in "Chapter 5: Environmental Consequences."

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TABLE 13. SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

Topic	No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Concept	The no-action alternative describes how Ozark National Scenic Riverways has been and continues to be managed. It reflects current resource conditions and trends, existing recreational opportunities, types of development, and levels of service. The primary purpose of describing the no-action alternative is to provide a baseline for comparing the other management alternatives.	Management would focus on creating visitor experiences and providing resource conditions that help visitors better understand the riverways of the past, including the traditional river recreation activities reminiscent of those that occurred when the National Riverways was established. Management would emphasize greater opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter, less crowded, and slower paced.	Management would provide a high level of protection of natural and cultural resources, while expanding ways for visitors to experience and learn about these resources in interesting and enjoyable ways. Management would strive to improve visitors' connection to the natural, cultural, and scenic elements of the National Riverways with the major goal of helping improve visitor appreciation of its resources. Management would enhance visitor opportunities to discover and learn about the National Riverways' natural wonders and Ozark heritage.	Management would primarily seek to provide a diversity of outdoor recreational opportunities and experiences while maintaining the highly scenic natural setting and cultural resources. Management would provide a diversity of river recreational opportunities and experiences similar to that provided in the no-action alternative. In addition, management would offer land-based recreational opportunities. This is reflected in the increased amount of acreage for the resource-based recreation zone and the developed zone.
Zoning	The no-action alternative does not include management zones, but would continue to use river use management zones set forth in the 1989 river use management plan.	Land-based zone: • developed: 1.4% • resource-based recreation: 3.2% • natural: 68.6% • primitive: 26.8% River-based Zone: • mixed-use river: 36% • seasonal mixed-use river: 13% • nonmotorized river: 51%	Land-based zone: • developed: 2.8% • resource-based recreation: 8.8% • natural: 72% • primitive: 16.4% River-based zone: • mixed-use river: 52% • seasonal mixed-use river: 14% • nonmotorized river: 34%	Land-based zone: • developed: 5.7% • resource-based recreation: 59.6% • natural: 28.2% • primitive: 6.5% River-based zone: • mixed-use river: 59% • seasonal mixed-use river: 20% • nonmotorized river: 21%
Visitor experiences and activities	The current wide variety of visitor experiences and recreational activities would continue to occur. River-based recreational opportunities would continue to include canoeing, kayaking, tubing, rafting, johnboating, and fishing. Different stretches of the river would continue to be managed for different boating experiences. The current variety of land-based recreational opportunities would also continue to be offered, including hiking, horseback riding, hunting, picnicking, camping, and caving.	Visitors would have opportunities to float secluded stretches of the river where they would not experience the sights and sounds of motorized boats or vehicles. Along other stretches of the river, visitors would encounter low to moderate densities of lower-horsepower motorboats that evoke the traditional johnboat river experience. Traditional, family-oriented recreation would also be emphasized, including activities such as guided float trips, gravel bar camping, and fishing. Motorized forms of recreation would be deemphasized.	A manageable mix of traditional recreational activities, such as floating, boating, and horseback riding, would still be provided. Also, a variety of guided and self-guided activities would be offered to help visitors discover the array of natural and cultural resource-based opportunities available and increase visitor awareness of the NPS Riverways' many special resources and values.	Visitors would have opportunities to experience a diverse range of motorized and nonmotorized recreational activities in a variety of outdoor settings. Visitors would encounter more intensive management to ensure that greater levels and types of visitor use do not cause excessive impacts on National Riverways resources or diminish public safety. Visitors would experience higher levels of social interaction, especially during the peak season. Opportunities for community and family gatherings would be emphasized.
Nonmotorized watercraft	All sections of the riverways would continue to be open to nonmotorized watercraft year-round. Management would continue to provide for visitor opportunities and experiences that result in high-density canoe use in the upper Current River. The frequency of river access points along this stretch would continue to allow for float trips of one day or less.	All sections of the riverways would continue to be open to nonmotorized watercraft year-round. The percentage of the rivers zoned for nonmotorized recreation would increase, including specific areas for low-density nonmotorized use, even during the peak-use season. Concession dropoff and pickup locations for visitors using nonmotorized watercraft would be redistributed to reduce peak-season crowding effects.		All sections of the riverways would continue to be open to nonmotorized watercraft year-round. Concession dropoff and pickup locations for visitors using nonmotorized watercraft would be redistributed to reduce peak-season crowding effects.
Code of Federal Regulations *motorboat horsepower limits*	Management would continue to allow boats to use 60/40 horsepower motors on certain portions of the Current and Jacks Fork rivers. It is recognized that continuation of this approach is in violation with the existing regulation. The no-action alternative is characterized this way to provide a baseline for comparison in evaluating the changes and impacts of the other alternatives. The 1989 river use management zones that set horsepower limits on motorboats and maximum numbers for canoes within the National Riverways would continue. See table 4 for motorboat horsepower limits by alternative.	Existing regulation that prohibits the use of motors that are rated higher than 40 horsepower by the manufacturer on certain portions of the Current and Jacks Fork rivers would be enforced. Enforcement of this regulation would prohibit 60/40 horsepower motors. See table 4 for motorboat horsepower limits by alternative.	The National Park Service would pursue a rule-making to change the existing regulation to allow 60/40 horsepower motors on certain portions of the Current and Jacks Fork rivers. See table 4 for motorboat horsepower limits by alternative.	
Motorboat horsepower limits	See table 4 for motorboat horsepower limits by alternative.			

Table 13. Summary of Key Differences Among the Alternatives (continued)

Topic	No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Concession floating	Concessioners would continue to be required to limit nonmotorized watercraft rentals to adhere to the 1989 river management plan.	Concession dropoff and pickup locations for visitors using nonmotorized watercraft would be redistributed to reduce peak-season crowding effects. This would require closure and restoration of about 20 access points. Some new access may be needed; however, total designated access points would decrease.	Concession dropoff and pickup locations for visitors using nonmotorized watercraft would be redistributed to reduce peak-season crowding effects. This would require closure and restoration of about 20 access points and the careful design and opening of about 20 new designated access points. Total designated access points would remain constant or decrease.	
Fishing/ gigging	The NPS Riverways would continue to be available for fishing and gigging activities, consistent with applicable restrictions set forth by the park unit or state. For example, fishing from motorized boats would be allowable in areas zoned by the park unit for motorized boating. The National Park Service would continue to partner with the state to enhance healthy, native game fish populations.			
Hiking trails	Designated trails totaling 49 miles and ranging in length from less than a mile to over 13 miles would continue to be provided.	The location of primitive and natural zoning would increase the amount of hiking trails compared to the no-action alternative. About 15 miles of roads in primitive zones would be removed and replaced with hiking trails.	The location of primitive and natural zoning would increase the amount of hiking trail access compared to the no-action alternative. About 10 miles of roads in primitive zones would be removed and replaced with hiking trails. When needed, trails would be developed to access some discovery sites. Some of these trails may link to the Ozark Trail.	Additional walking and hiking trails would be opened over time. And about 5 miles of roads in primitive zones would be removed and replaced with hiking trails.
Accessible trails	Some developed area paved trails would continue to be accessible and two campgrounds would continue to provide accessible campsites.	One additional mile of accessible trails would be opened.		
Mountain bike trails	All trails would continue to be off limits to mountain bikes.	Mountain biking may become an allowable trail use, but only on designated trails. Mountain biking would not be allowed in primitive zones.		
Horse riding and camping	The current horse trail system of 23 miles of designated horse trails would continue to be provided, with seven designated stream crossings for horse riders. At least 90 miles of undesignated horse trails, with 24 undesignated stream crossings used by horse riders and 38 undesignated access points would continue to be unmanaged. Horse camping would continue to not be allowed.	A recreational horse use and trail management plan would be prepared. Approximately 25 miles of additional, designated horse trails would be provided, but no new stream crossings. Approximately 65 miles of undesignated horse trails would be closed and restored. Design of the existing, approximately 23-mile-long horse trail system would be improved to discourage creation of social trails; decrease the impact of horses on sensitive areas, including streams and riparian areas; reduce conflicts with other users; and reduce trail damage, erosion, and manure pollution. A permitting system would be established, as necessary, to manage impacts of horse use. Horse camping would not be allowed.	A recreational horse use and trail management plan would be prepared. Approximately 35 miles of additional, designated horse trails would be provided, including some new stream crossings. Approximately 25-campsite horse campground may be established. Approximately 65 miles of undesignated horse trails would be closed and restored. Design of the existing, approximately 23-mile-long horse trail system would be improved to discourage creation of social trails; decrease the impact of horses on sensitive areas, including streams and riparian areas; reduce conflicts with other users; and reduce trail damage, erosion, and manure pollution. A permitting system would be established, as necessary, to manage impacts of horse use. Horse camping may be allowed in designated sites.	A recreational horse use and trail management plan would be prepared. Approximately 45 miles of additional designated horse trails would be provided to allow for longer distance riding, including some new stream crossings. Approximately 25 campsite horse campground along the Jacks Fork may be established. Approximately 65 miles of undesignated horse trails would be closed and restored. Design of the existing, approximately 23-mile-long horse trail system would be improved to discourage creation of social trails; decrease the impact of horses on sensitive areas, including streams and riparian areas; reduce conflicts with other users; and reduce trail damage, erosion, and manure pollution. A permitting system would be established, as necessary, to manage impacts of horse use.
Developed camping	Six developed fee campgrounds with recreational vehicle hookups at Big Spring, Powder Mill, Two Rivers, Alley Spring, Round Spring, and Pulltite would continue to provide a total of 450 sites.		Two additional developed campgrounds may be provided at existing day use areas: Upper Current River (Akers) and Upper Jacks Fork (Blue Spring).	
Gravel bar access	Vehicular access to gravel bars for day use and overnight camping would continue to be allowed.	Vehicular access to all gravel bars would be eliminated. Gravel bar access would be by boat or walk-in only.	The number of gravel bars accessible to vehicles would be designated and reduced.	Vehicular access to designated sites on gravel bars for day use and overnight camping would continue to be allowed.
Gravel bar camping	Campers would continue to be allowed to locate their own campsites on gravel bars.	Camping on gravel bars would be allowed in designated campsites only.		
Backcountry camping	Backcountry campsites would continue to be provided throughout the NPS Riverways and would require a fee. Backcountry sites may have some basic amenities (restrooms, tables, fire rings, and/or lantern posts).	Backcountry campsites would continue to be provided in designated areas throughout the NPS Riverways and would require a fee. Backcountry campsites would be removed from primitive zones. Backcountry sites may have some basic amenities (restrooms, tables, fire rings, and/or lantern posts).		Backcountry campsites would continue to be provided in designated areas throughout the NPS Riverways and would require a fee. The total number of backcountry campsites may be increased, but backcountry campsites would be removed from the primitive zones. Backcountry sites may have some basic amenities (restrooms, tables, fire rings, and/or lantern posts).
Primitive camping	Primitive campsites would continue to be provided throughout the NPS Riverways and would not require a fee. Primitive sites would have no amenities. Some primitive sites are accessible by vehicles.	Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. Roads to primitive campsites would be removed. Primitive campsites would have no amenities.		Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. The total number of primitive campsites may be increased, but roads to primitive campsites would be removed. Primitive campsites would have no amenities.
Caving	Guided cave tours at Round Spring would continue to be provided.			

Table 13. Summary of Key Differences Among the Alternatives (continued)

Topic	No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Visitor services & facilities	Visitor orientation and information services would continue to be available at NPS headquarters in Van Buren, at the multiagency visitor center in Salem, and at a few contact points and ranger stations throughout the National Riverways. Major recreation sites would continue to be found at Akers, Pulltite, Round Spring, Alley Spring, Two Rivers, Powder Mill, and Big Spring. These areas would include visitor facilities for day use and overnight camping. Existing visitor services would also continue, which include equipment rentals, restrooms, and in some cases concession stores and food services. Rental cabins would also continue to be available at Big Spring. Smaller recreation sites with facilities for day and overnight use would continue to include Cedargrove, Jerktail, Blue Spring, Log Yard, and Gooseneck. River access, primitive camping, restrooms, and parking would continue to be provided at various sites along the rivers. There are approximately 350 miles of roads in the National Riverways—50 miles are paved, 120 miles are graded, and 150 miles are two-track dirt roads. There are 72 miles of trails designated for hiking and/or horseback riding. Different segments of the road and trail networks would continue to be managed by the National Park Service or state or county agencies.	Only a network of designated roads, trails, and river crossings would be retained to provide access for specific recreational activities and administrative purposes. Management would close roads and trails that have been illegally developed. Native vegetation impacted by these unauthorized routes may be rehabilitated. Commercial services may be limited or modified along different portions of the rivers to achieve desired visitor experiences and resource conditions.	Additional trails (some with universal accessibility) would be developed for visitors to access a network of "discovery sites." A small learning center at Powder Mill, with educational and interpretive programs and exhibits, would be developed to better orient and inform visitors. This facility may include classrooms and may provide some limited quarters for visiting experts.	Additional facilities would be necessary to accommodate higher levels and different types of visitor use. There would be more types of designated camping opportunities, including primitive, semiprimitive, semideveloped, and developed sites. There would also be more boat ramps and trails for hiking and horseback riding.
Visitor entry & information	The following visitor entry services and information would continue: • No entrance station or entrance fees • No traditional NPS year-round visitor center • Website and printed materials • 1 year-round visitor contact in park HQ lobby • 5 seasonal visitor contact locations • 1 off-site, multiagency information facility in Salem, MO			
Additional contact locations	No additional contact locations would be provided.		One additional visitor contact location may be provided as part of the learning center at Powder Mill.	The sizes of current visitor contact locations at some sites may be expanded based on demand. One or two additional visitor contact locations may be provided.
NPS roads and river access points	NPS roads and river access points that are currently open and accessible would continue to be managed and patrolled.	NPS roads and river access points would be managed by zoning prescriptions. The National Park Service would seek to establish a partnership with the counties regarding road management, including closures. Law enforcement would be increased for compliance.	NPS roads and river access points would be managed by zoning prescriptions. The National Park Service would seek to establish a partnership with the counties regarding road management, including closures. For some discovery sites, old access roads would be reopened to provide vehicular access. Law enforcement would be increased for compliance.	NPS roads and river access points would be managed by zoning prescriptions. The National Park Service would seek to establish a partnership with the counties regarding road management, including closures. Law enforcement would be increased for compliance.
Undesignated NPS roads, traces, crossings, and river access points	The National Park Service would continue to strive for closure of NPS roads, traces, crossings, and river access points that are not part of the NPS designated system.	Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 50 miles of roads. Law enforcement for compliance would be increased.	Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 45 miles of roads. Law enforcement for compliance would be increased.	Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 40 miles of roads. Law enforcement for compliance would be increased.
Concessions	There are currently 23 concession contracts that provide services to visitors. These businesses would continue to operate under their existing contracts to provide visitor support and river recreational services (canoe, tube, and raft rentals and shuttle services), cabin rentals and a restaurant at Big Spring, and five camp stores near the campgrounds.	There would be potential opportunities for new concessions for overnight river activities such as guided float trips and guided (hike-in) backcountry trips in the natural and primitive zones. New concessions would require a feasibility study.	There would be potential opportunities for new concessions for shuttle services for visitors using nonmotorized watercraft and overnight river activities such as guided float trips and guided (hike-in) backcountry trips in the natural and primitive zones. New concessions would require a feasibility study. New campgrounds and higher concentrations of visitors in developed zones may create the need for an additional camp store.	

Table 13. Summary of Key Differences Among the Alternatives (continued)

Topic	No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Interpretation and education	A variety of interpretive and educational programs would continue to be provided for visitors. The goal of these programs is to ensure that visitors have all the information needed to fully enjoy and experience the National Riverways through (1) promoting individual awareness about the facilities, features, and activities available to them, (2) interpreting the cultural and natural features of the area, and (3) educating visitors on the safe and proper use of National Riverways resources.	Interpretation and education would strive to enhance visitor awareness of the continuum of people's cultural connections to the area that spans thousands of years. Living history programs would be emphasized to provide visitors with a better understanding of traditional, subsistence ways of life in the Ozarks. For example, an interpretive "float camp" would be developed to let visitors experience what river recreation was like in the past.	Self-guided interpretive opportunities would provide visitors with a sense of being the first to discover remote, hard-to-find places, such as an old cabin or a secluded spring. Guided opportunities would include ranger-led tours of special features, such as old settlements, springs, and river environments. This would help reach visitors who are looking for different or additional activities to the traditional float trip. Resource management staff would develop opportunities for visitors and volunteers to engage in hands-on resource management projects. Learning center programs could provide more structured environmental education opportunities, especially for school groups. A learning center would be established at Powder Mill and a school curriculum would be developed. Learning center programs could provide more structured environmental education opportunities, especially for school groups.	Interpretive and educational opportunities would expand for visitors to connect with the natural and cultural resources while improving their outdoor recreation skills. The goal of such programs would be to encourage resource stewardship and low-impact recreational uses. Example activities could include boating safety, safe hunting and fishing practices, and traditional Ozark lifeway skills. An Ozark Highlands Folkways Institute would be established and a Living History farm would be developed.
Natural resource management	Natural resource management would continue to preserve and protect the natural resources, processes, systems, and values of the National Riverways in accordance with NPS policies. In particular, programs would emphasize protection of outstanding natural features, including sites that encompass geological, scientific, and ecological characteristics that warrant special protection. Examples include caves, springs, and other rare habitats that support threatened and endangered species. Ongoing programs also would include the administration of scenic easements on privately owned tracts, collaborative management efforts on state-owned lands, and management of agricultural leases to preserve certain pastoral landscapes within the National Riverways' boundary.	Natural resources would be maintained or restored to more natural conditions that lack signs of substantial development or use. The emphasis would be on restoring degraded biological communities and improving the overall natural setting. Undesignated NPS roads, traces, crossings, and river access points would be closed. Natural conditions would be restored to approximately 50 miles of roads. The National Park Service would seek to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge. The National Park Service would seek to partner with communities about waste systems to improve water quality.	Natural resources would be maintained or restored to more natural conditions that lack signs of substantial development or use. Restoring degraded biological communities and improving the overall natural setting would be emphasized. A focused program of resource monitoring, research, and preservation projects would actively support and strengthen management capabilities and ensure accurate visitor information. Undesignated NPS roads, traces, crossings, and river access points would be closed. Effects of visitor use on river/karst habitats would be investigated. The National Park Service would seek to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge. The National Park Service would seek to partner with communities about waste systems to improve water quality.	Natural resources would be managed to provide high-quality scenery. There would be a higher tolerance for resource impacts in more heavily used areas. Impacted environments would be stabilized or restored to retain the natural settings. Monitoring efforts would be emphasized to track natural resource conditions so that unacceptable impacts from recreational activities do not occur. Undesignated NPS roads, traces, crossings, and river access points would be closed. The National Park Service would seek to partner with the county and state to replace Cedar Grove low-water bridge with a high-water bridge. The National Park Service would seek to partner with communities about waste systems to improve water quality.
Cultural resource management	Cultural resource management would continue to include efforts to preserve historic structures, archeological resources, and cultural landscapes in accordance with NPS policies. Cultural resource programs would also include adaptive reuse of some historic structures; management of some historic cemeteries (that is, provide appropriate access); the study of Ozark folklife; and the preservation and cataloging of historic objects, documents, and other collections.	The protection and preservation of archeological resources, historic structures, and cultural landscapes, including the restoration of selected open fields to preserve pastoral scenes, would be emphasized. Management would seek to partner with volunteers and others to accomplish cultural resource stewardship projects.	Management actions would protect and preserve archeological resources, historic structures, and cultural landscapes. Selected structures and sites may receive special management attention to support Ozark heritage educational programs. A focused program of resource monitoring, research, and preservation projects would actively support and strengthen management capabilities and ensure accurate visitor information. An oral history program would be restarted. The archive/collections program would be enhanced. Efforts to coordinate cultural resource education, interpretation, and protection activities across management divisions would be enhanced. Management would ensure that cultural resource information is accurately conveyed to the public. Partnerships with volunteers and others would be sought to accomplish cultural resource stewardship projects.	Management actions would protect and preserve archeological resources, historic structures, and cultural landscapes. Opportunities would be expanded for visitors to access and experience historic structures and cultural landscapes throughout the National Riverways. To accommodate more visitors, some historic structures and sites may require more intensive management actions to protect resource integrity. Efforts to track cultural resource conditions would be emphasized so that unacceptable conditions do not occur.

Table 13. Summary of Key Differences Among the Alternatives (continued)

Topic	No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Historic structures	The 249 structures on the List of Classified Structures would continue to be stabilized and maintained; many of these are listed in or eligible for listing in the National Register of Historic Places. Some of these structures have been restored and are available as interpretive exhibits. Others would continue to be adaptively used for other park operations and maintenance uses.	Additional historic structures would be restored and made available to the public as interpretive exhibits. These additional structures and associated landscapes would complete the historic representation of the continuum of Ozark cultural history in this region.		
Cemeteries	Cemeteries would continue to be maintained.	Five additional cemeteries would be restored.		
Archeological sites	The NPS Riverways' more than 400 known archeological sites would continue to be monitored.	The NPS Riverways' more than 400 known archeological sites would continue to be monitored. Appropriate protection measures, such as riverbank stabilization or trail rerouting would be taken where archeological sites are threatened by erosion, visitor use, or other impacts.		
Cultural landscapes	A cultural affiliation landscape plan for pastoral areas would be completed and implemented. This would increase areas managed as meadows and agricultural sites that were once part of Ozark farms and settlement areas.	A cultural affiliation landscape plan for pastoral areas would be completed and implemented according to the management zones. This would increase areas managed as meadows and agricultural sites that were once part of Ozark farms and settlement areas.		
Curatorial facility	The National Riverways' certified curatorial facility would continue to be managed for park resource collections only.		The National Riverways' curatorial facility would be expanded to provide additional archeological storage space for smaller national park units in the region. The National Riverways would become a regional curatorial hub.	The National Riverways' certified curatorial facility would continue to be managed for park resource collections only.
Wilderness	The National Park Service would continue to maintain the Big Spring tract's primitive, natural character to maintain its wilderness eligibility. See chapter 3 for details about the wilderness study and proposed zoning, management of structures, roads, and utilities within the Big Spring tract.	Under this alternative, 3,424 out of 3,434 acres within the Big Spring Wilderness Study Area would be recommended for wilderness designation. This amount is 99% of the total wilderness study area. Ten acres would be excluded as a small developed area and its narrow access corridor from the proposed wilderness designation to allow for continued administrative use of the access roads, barn, NPS training range, and utility corridor. Most of the wilderness study area would be zoned primitive with the exception of the access road, barn, NPS training range, and utility corridor. These areas would be zoned natural. The fire tower, incinerator, barn, NPS training range, and Civilian Conservation Corps-era camp would be retained. The barn and NPS training range would be excluded (approximately 6 acres) from the recommended wilderness designation and would continue to be maintained for administrative use. Motorized vehicle use of the access road to the fire tower would be prohibited. This road may be restored to a Civilian Conservation Corps-era condition. The access road to the barn and NPS training range would be excluded from the proposed wilderness designation and maintained for administrative access. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be excluded from the proposed wilderness designation (approximately 4 acres) and maintained.	Under this alternative, 3,430 out of 3,434 acres within the Big Spring Wilderness Study Area would be recommended for wilderness designation. The entire Big Spring Wilderness Study Area would be zoned primitive. The fire tower, incinerator, barn, and Civilian Conservation-era camp would be retained. The NPS training range would be removed and the area restored. Motorized vehicle use of the access roads to the fire tower, NPS training range, and barn would be prohibited. The roads would be evaluated to determine the feasibility of restoring them to a Civilian Conservation Corps-era condition. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be proposed as potential wilderness addition and would remain in use until it failed, or until another utility route outside the wilderness was designated. Once decommissioned, it would be evaluated to determine the feasibility of restoring the area. Once the nonconforming use was extinguished, the utility corridor would be administratively converted to wilderness.	Under this alternative, 1,779 acres of the Big Spring Wilderness Study Area, consisting of the area south of Chilton Creek, would be recommended for wilderness designation. This amount is 52% of the total wilderness study area. The area recommended for wilderness designation would be zoned primitive. The remaining area would be zoned natural. The fire tower, incinerator, barn, NPS training range, and Civilian Conservation Corps-era camp would be outside the wilderness study area and would continue to be retained. The fire tower, barn, and NPS training range would continue to be used for administrative purposes. The access roads to the fire tower, barn, and NPS training range would continue to be maintained for administrative uses. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be maintained.
Park operations	Park maintenance operations would continue to be managed out of current facilities, including several Civilian Conservation Corps structures that do not meet health or safety requirements. Twenty two staff housing units would continue to be provided throughout the waterways. Twenty water systems and 23 waste water systems would continue to be provided within the waterways.	Three multioperational facilities would be constructed, one for each management district (4,500 square feet each). Maintenance and field staff offices would be consolidated into these facilities and removed from Civilian Conservation Corps structures. Approximately ten obsolete structures that are part of the deferred maintenance backlog and pose health and safety concerns would be removed and sites would be restored. Approximately four new housing duplex units to support the additional need for seasonal or term staff would be provided. No additional water systems are proposed.	One multioperational facility would be constructed. Maintenance and field staff offices would be consolidated into this facility and removed from Civilian Conservation Corps structures. Approximately ten obsolete structures that are part of the deferred maintenance backlog and pose health and safety concerns would be removed and sites would be restored. Two sustainable (current technology) sanitary systems would be installed at Akers and Pulltite to improve water quality.	Three multioperational facilities would be constructed, one for each management district (4,500 square feet each). Maintenance and field staff offices would be consolidated into these facilities and removed from Civilian Conservation Corps structures. Approximately ten obsolete structures that are part of the deferred maintenance backlog and pose health and safety concerns would be removed and sites would be restored. Approximately four new housing duplex units to support additional need for seasonal or term staff would be provided. No additional water systems are proposed.

Table 13. Summary of Key Differences Among the Alternatives (continued)

Topic	No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Partnerships	Currently, there are few partnerships. Unlike most National Park units, the park unit does not have a friends group, and efforts would not be make to develop such a group. The park unit would continue to share office space at the Van Buren headquarters with other federal and state agencies. Eastern National Association would continue to provide bookstore services at park visitor contact facilities, such as the Van Buren headquarters, Round Spring, and Alley Mill.	The National Park Service would seek to develop a friends group. The park unit would continue to share office space at the Van Buren headquarters with other federal and state agencies. Eastern National Association would continue to provide bookstore services at park visitor contact facilities, such as the Van Buren headquarters, Round Spring, and Alley Mill. When the Big Spring contact facility is opened, Eastern National Association may also provide services there. The National Park Service would pursue partnerships with • volunteers and others to accomplish cultural resource stewardship projects • the counties regarding road management, including closures • the county and state to replace Cedar Grove low-water bridge with a high-water bridge • communities about waste systems to improve water quality The National Park Service would continue to partner with the state to enhance healthy native game fish populations.		

TABLE 14. SUMMARY OF THE IMPACTS OF THE ALTERNATIVES
(see Chapter 5: Environmental Consequences for details)

		No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Natural resources	*Geologic resources & soils*	Long-term, moderate, adverse, and localized to regional impacts.	Long-term, minor to moderate, beneficial, localized to regional impacts; and long-term, minor, adverse, and localized impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and short- to long-term, minor to moderate, adverse, and localized adverse impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and short- to long-term, minor to moderate, adverse, and localized to regional impacts.
	Water resources	Long-term, minor to moderate, adverse, and regional impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and short- to long-term, moderate, adverse, and localized impacts.	Long-term, minor to moderate, beneficial, and localized to regional beneficial impacts; and short- to long-term, moderate, adverse, and localized to regional impacts.
	Vegetation	Long-term, moderate, adverse, and regional impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and long-term, minor, adverse, and localized impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and short- to long-term, minor to moderate, adverse, and localized impacts.	long-term, minor to moderate, beneficial, and localized to regional impacts; and short- to long-term, minor to moderate, adverse, and localized to regional impacts.
	Fish & wildlife habitat	Long-term, moderate, adverse local to regional impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and long-term, minor to moderate, adverse, and localized to regional impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and short- to long-term, minor to moderate, adverse, and localized to regional impacts.	Long-term, minor to moderate, beneficial, and localized to regional impacts; and short- to long-term, minor to moderate, adverse, and localized to regional impacts.
	Natural soundscapes	Long-term, moderate, adverse, and localized impacts.	Long-term, moderate, beneficial, and localized impacts.	Long-term, moderate, beneficial, and localized impacts.	Long-term, moderate, beneficial, and localized impacts.
Cultural resources	*Archeological resources*	Long-term or permanent, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts.	Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.	Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.	Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.
	Historic buildings, structures, & cultural landscapes	Long-term, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts.	Long-term, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.	Long-term, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.	Long-term, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.
	Ethnographic resources	Long-term or permanent, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts.	Long-term or permanent, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.	Long-term or permanent, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.	Long-term or permanent, negligible to minor, beneficial, and localized impacts; and Long-term or permanent, negligible to minor, adverse, and localized impacts. Section 106 summary: no adverse effect.
	Museum collections	Long-term, beneficial, and localized impacts.	Long-term, beneficial, and localized impacts.	Long-term, beneficial, and localized impacts.	Long-term, beneficial, and localized impacts.
Visitor use & experience		Long-term, minor to moderate, adverse, and localized impacts.	Long-term, minor to moderate, beneficial, and localized impacts.	Long-term, minor to moderate, beneficial, and localized impacts.	Long-term, minor to moderate, beneficial, and localized impacts; and Long-term, minor to moderate, adverse, and localized impacts.
Park operations		Long-term, minor to moderate, adverse, and localized impacts.	Long-term, moderate, beneficial, and localized impacts.	Long-term, minor, beneficial, and localized impacts.	Long-term, minor, beneficial, and localized impacts.
Socioeconomic environment		Long-term, moderate, beneficial, and localized to regional impacts.	Long-term, minor, beneficial, and localized to regional impacts; and long-term, minor to moderate, adverse, and localized to regional impacts.	Long-term, negligible, beneficial, and localized to regional impacts; and short- to long-term, negligible to minor, adverse, and localized to regional impacts.	Long-term, negligible to moderate, beneficial, and localized to regional impacts.

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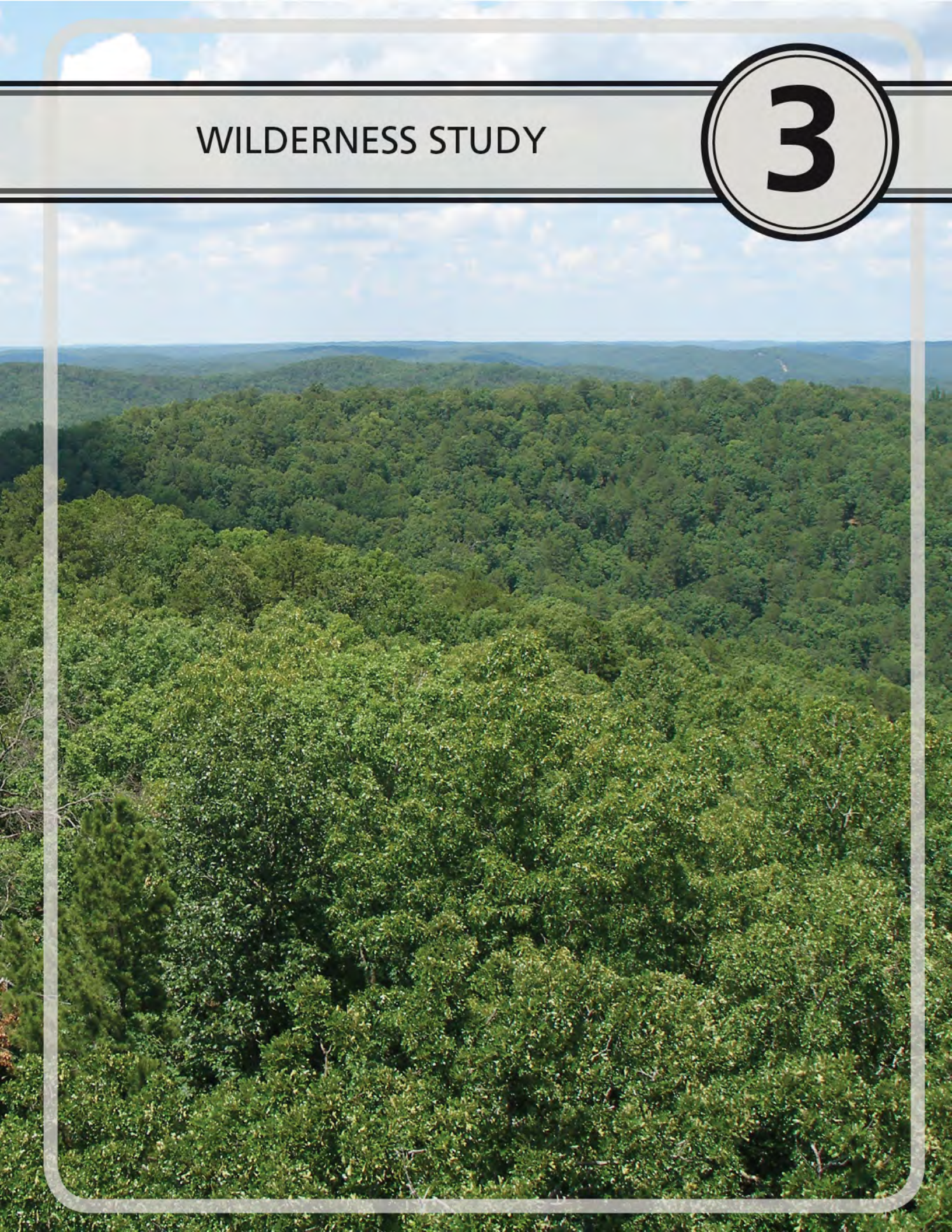
WILDERNESS STUDY

3



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INTRODUCTION

The purpose of wilderness designation, which is accomplished solely through congressional action, is to preserve wilderness characteristics and protect lands in their natural condition in order to provide opportunities for solitude or an unconfined form of recreation. With passage of the 1964 Wilderness Act (16 USC 1131 et seq.), Congress declared that it is national policy to secure for present and future generations the benefits of an enduring wilderness resource. This eligibility assessment and wilderness study may lead to a wilderness proposal from the NPS director to the Secretary of the Interior, who may then make a recommendation to the president and finally Congress. Only Congress has the authority to designate federal land as wilderness.

The 1984 general management plan for the NPS Riverways identified three areas (Cardareva, Upper Jacks Fork, and Big Spring) within the park unit for assessment of their suitability as wilderness. All three areas were determined to have wilderness characteristics, but land ownership and nonconforming conditions made these areas unsuitable for wilderness designation at that time. The Big Spring tract contained an actively used road and a fire tower used for radio communication. Conditions at Cardareva and the Upper Jacks Fork continue to preclude these areas from being studied for wilderness, but the nonconforming conditions at Big Spring have been resolved, so the Big Spring tract is being reconsidered for its potential management as wilderness. As stated before, the National Park Service would review the other areas for designation when and if the current nonconforming conditions are resolved.

The 1984 general management plan committed the National Riverways to conducting a formal study if the nonconforming conditions changed such that the area became suitable for wilderness designation. Because the fire tower is no longer used for communications equipment and the road is no longer needed for maintaining the equipment, this new eligibility assessment and wilderness study are part of this general management plan.

This analysis combines a wilderness eligibility assessment with a wilderness study. The first step is to determine which lands within the park unit are eligible for wilderness based on their characteristics and values, and then to study those lands to determine if they are suitable for inclusion in the national wilderness preservation system. If determined to be suitable, those lands would be proposed for wilderness designation, including alternative treatments for nonconforming uses within the study area.

WILDERNESS DEFINITION

The Wilderness Act of 1964 (Public Law 88-577) describes and defines a wilderness area as follows:

> A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in the Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which
>
> - generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable

- has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition
- may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value

DESCRIPTION OF THE STUDY AREA

The wilderness study area is shown in wilderness study area map. It consists of approximately 3,434 acres of hilly, largely undisturbed land within the Big Spring tract of Ozark National Scenic Riverways. The Big Spring Wilderness Study Area is located southwest of the Town of Van Buren in Carter County, Missouri.

The landscape of the Ozarks, characterized by steep slopes and narrow valleys, thick forests, and meandering streams, is replicated here at Big Spring. The terrain is rugged with forested ridges sharply rising above a maze of deeply cut narrow valleys.

The Missouri Natural Area Committee designated Big Spring Pines Natural Area, which is included in the study area. Big Spring Pines is one of the most outstanding mature pine-oak forests in the lower Ozarks section. Shortleaf pine and scarlet and white oaks dominate the canopy, while sassafras, black cherry, flowering dogwood, and black gum occur in the mid-canopy. The forest floor is rich with sedges, grasses, and wildflowers. Several small springs in Chubb Hollow maintain the rare heart-leaf plantain and petaltail stonefly.

The study area lies adjacent to, but does not include the Current River. Most of the river's water supply comes from hundreds of springs that discharge continuously. The largest of these is Big Spring, which supplies the Current River with an average of 276 million gallons a day.

Chilton Creek, which is on the list of Missouri Aquatic Conservation Opportunity Areas (ACOA), flows through the study area. ACOA designation is applied to areas deemed desirable to conserve as prime representative segments of the Missouri riverine ecosystem.

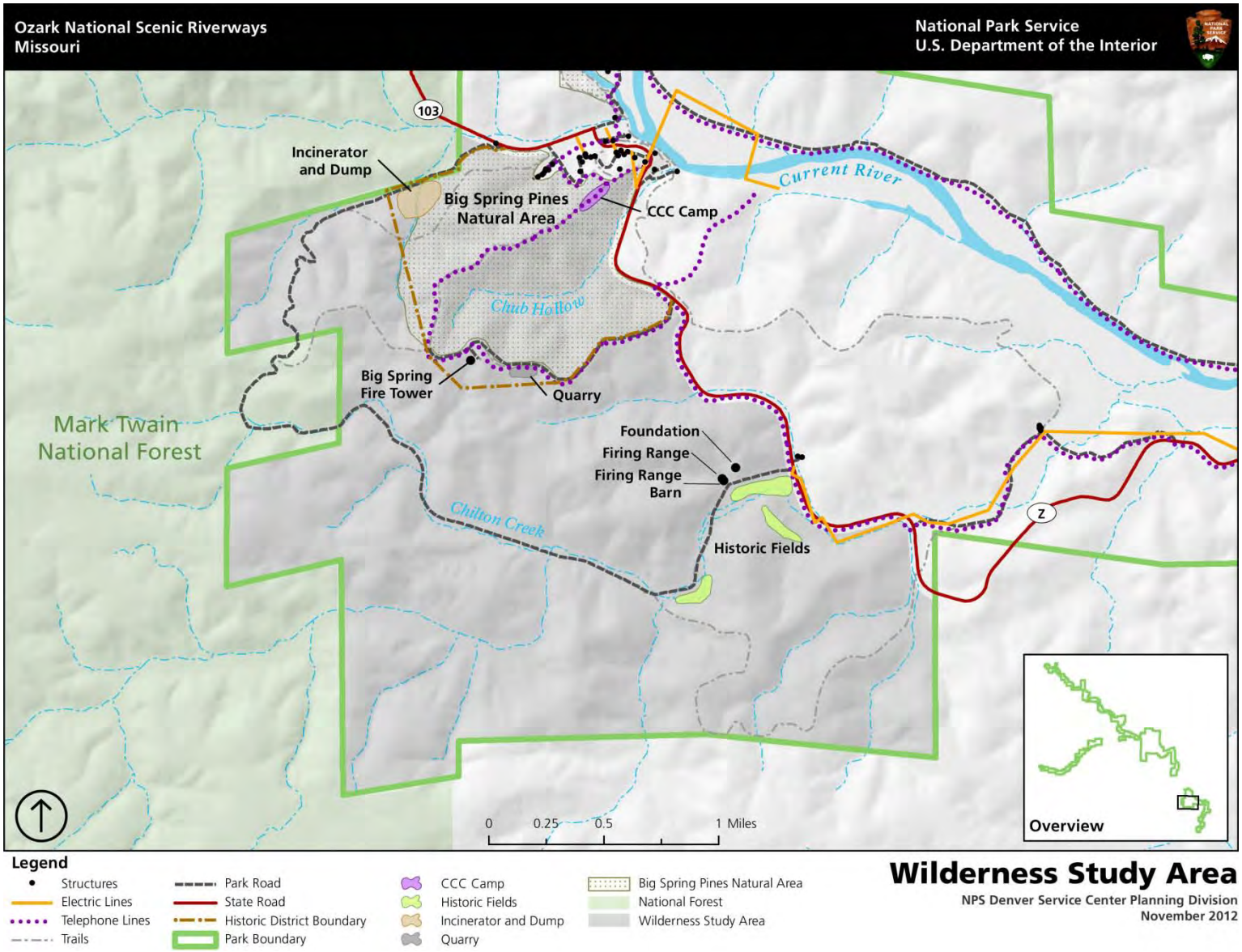
The study area is within the state's original Big Spring Wildlife Refuge. It has been managed as a no-hunting zone since before the creation of the NPS Riverways when it was a state park.

The Big Spring Historic District (315 acres) was listed in the National Register of Historic Places on March 17, 1981, at a state level of significance. It is an excellent example of naturalistic style landscape design and the architectural rustic architectural style that is associated with Civilian Conservation Corps-era park construction. The area, originally designated as a historic district, was incorporated into the Big Spring State Park in 1925, and was eventually acquired by the National Park Service in 1972. The historic district included the dining lodge, recreational cabins, picnic shelters, and foot trails.

A 2009 Cultural Landscape Inventory determined the established historic district did not sufficiently include all of the significant contributing features historically associated with the Civilian Conservation Corps and suggested that the boundary be expanded to an area of 3,456 acres in order to include additional features such as the Big Spring Fire Tower, the Camp ruins (stone and mortar incinerator and large-scale limestone quarry), and an extensive network of hiking trails. A determination of eligibility (DOE) issued by the Missouri State Historic Preservation Office (SHPO) concurred with the findings of the Cultural Landscape Inventory. Approximately 554.7 acres of the Big Spring Historic District overlap with the wilderness study area.

The study area includes several nonconforming uses: a utility right-of-way consisting of a buried telephone line serving the Big Spring cabins and residents further down the line; a barn and NPS training range NPS training range (see figure 8); a state park-era road leading to the barn, NPS training range, and a fire tower (see figure 9) and access road identified in the 1984 general management plan.

The adjacent Big Spring parcel of the Mark Twain National Forest is not a designated wilderness area. However, the U.S. Forest Service currently manages it for nonmotorized, semiprimitive, dispersed recreation (Management Prescription 6.1 as described in the 2005 Mark Twain National Forest Plan).



Wilderness Study Area

NPS Denver Service Center Planning Division
November 2012

FIGURE 8. BARN AND NPS TRAINING RANGE

FIGURE 9. FIRE TOWER

WILDERNESS STUDY

WILDERNESS ELIGIBILITY

Eligibility refers to an objective assessment of the qualities of wilderness character that make an area of federal land eligible for inclusion in the national wilderness preservation system.

The first phase of a wilderness study is to conduct an initial determination of wilderness eligibility, which is a factual determination of whether a park contains lands that possess wilderness character. The Wilderness Act, departmental regulations at 43 CFR 19, secretarial orders, and NPS management policies prescribe the criteria that are used to make an objective determination of whether wilderness-eligible lands exist in the subject area. In general, roadless areas exhibiting characteristics described in the Wilderness Act and that are at least 5,000 acres in size (or of sufficient size to make management as wilderness practicable) are considered eligible for wilderness.

Using these criteria, an evaluation of the study area was conducted by the National Park Service. The evaluation concludes that approximately 3,434 acres of National Park Service land within the study area are eligible for inclusion in the national wilderness preservation system.

The Big Spring Study Area possesses wilderness characteristics, where:

- The earth and its community of life are untrammeled by humans, where humans are visitors and do not remain.
- The area is undeveloped and retains its primeval character and influence without permanent improvements or human habitations.
- The area generally appears to have been affected primarily by the forces of nature, with the imprint of humans' work substantially unnoticeable.
- The area is protected and managed so as to preserve its natural conditions.
- The area offers outstanding opportunities for solitude or a primitive and unconfined type of recreation.

A wilderness area may also contain significant ecological, geological, or other features of scientific, educational, scenic, or historical value; although it does not need these things to be considered eligible for wilderness designation.

The Wilderness Act of 1964 and NPS policies affirm that "NPS lands will be considered eligible for wilderness if they are at least 5,000 acres or of sufficient size to make practicable their preservation and use in an unimpaired condition" (NPS *Management Policies 2006*). Although the Big Spring Study Area is smaller than 5,000 acres, it satisfies the criteria for wilderness eligibility and practicability.

WILDERNESS STUDY

A wilderness study refers to a process whereby a determination is made if eligible federal lands are suitable for inclusion in the national wilderness preservation system. While the Secretary of the Interior makes this determination, staff members completed the following assessment for his consideration.

The study area is adjacent to, and contiguous with, 3,518 acres of the Mark Twain National Forest. In 2005, the U.S. Forest Service completed a plan which did not include proposing wilderness for the Mark Twain National Forest's Big Spring parcel. The U.S. Forest Service currently manages this area in a way that is compatible with wilderness designation of the Big Spring Study Area.

The study area includes several nonconforming uses, including two roads, a utility right-of-way, a barn, the NPS training range, a maintenance facility, and a fire tower.

The Big Spring Historic overlaps the study area. Included in the study area are several miles of trails and roads constructed by the Civilian Conservation Corps, the quarry they mined for limestone blocks, the ruins of a camp they occupied, and a fire tower. Also included in the district, but outside the wilderness study area, are several features associated with the Civilian Conservation Corps-era construction and state park, including rental cabins, a lodge, infrastructure associated with the former state park recreation facilities, and the home of the refuge manager who managed the reintroduction of deer into the region.

The camp ruins, quarry, and trails are substantially unnoticed within the context of the natural landscape, and contribute to the integrity of the historic landscape and district, some of which is outside the study area. The natural landscape appears to be affected primarily by the forces of nature with humans as visitors who do not remain.

Considering these Civilian Conservation Corps-era features, the area is generally undeveloped and provides an opportunity for solitude and unconfined recreation, while supporting the greater context of the historic landscape within and outside the study area. These features of historic value enhance the wilderness character of the area by providing a modest representation of the historic period of development within the context of natural surroundings.

The fire tower and road are also associated with the Civilian Conservation Corps-era camp and developments, and are within the study area. While the fire tower is historic like the other Civilian Conservation Corps-era features, unlike the other features, its stature over the landscape makes the structure a more noticeable development, which conflicts somewhat with the undeveloped quality of wilderness. The viewshed from which the fire tower is visible is shown on the Big Spring Pines Fire Tower viewshed map. The fire tower is no longer used or equipped for radio communications, and the access road is closed to the public and is no longer needed to maintain radio equipment. The fire tower itself does not prohibit the area from being eligible for designation as wilderness. It does, however, bring into question the balance between preservation of historic resources and protection of wilderness character, specifically the undeveloped quality.

The historic Civilian Conservation Corps projects at Big Spring reflect a trend toward providing recreational facilities in a pastoral, naturalistic environment. The types of facilities reflect the active recreation uses that brought the visitor in contact with nature. The buildings (outside the study area) were designed to fit within the natural landscape, instead of simply imposing upon it.

As a Civilian Conservation Corps project and campsite, Big Spring Historic District represents historically important federal policies and periods of public works, has a direct association with events that promoted the betterment of society, and is associated with national trends in the development of outdoor recreation. By October 1936, over 2,000 camps were established, with 346 of them occupied in state parks such as Big Spring (NPS 1991a).

Wilderness designation today would represent a continuum connecting federal policies of the past with a modern interpretation of wilderness in the present concerning recreation in the environment, environmental protection, and the experience of wilderness character. The Historic District and Civilian Conservation Corps-era camp are enhancing qualities in the Big Spring study area, affording the opportunity to embrace the historic values of the study area rather than simply tolerate them. The Wilderness Act, when describing a

wilderness area, includes the passage: *may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value*. In the case of the Big Spring study area, these historic features are recognized as part of the wilderness character to be managed and preserved.

Within the study area, 3,434 acres of land are found to possess the characteristics and values of wilderness as defined in the Act of 1964, and are considered suitable for inclusion in the national wilderness preservation system because the area is, or appears to be; untrammeled, without long-term human occupation, undeveloped, without permanent improvements; natural and physical processes occur without contemporary human manipulation, the area is federally owned so that resources are protected, and there are opportunities for solitude, with primitive and unconfined forms of recreation.

Nonconforming Uses

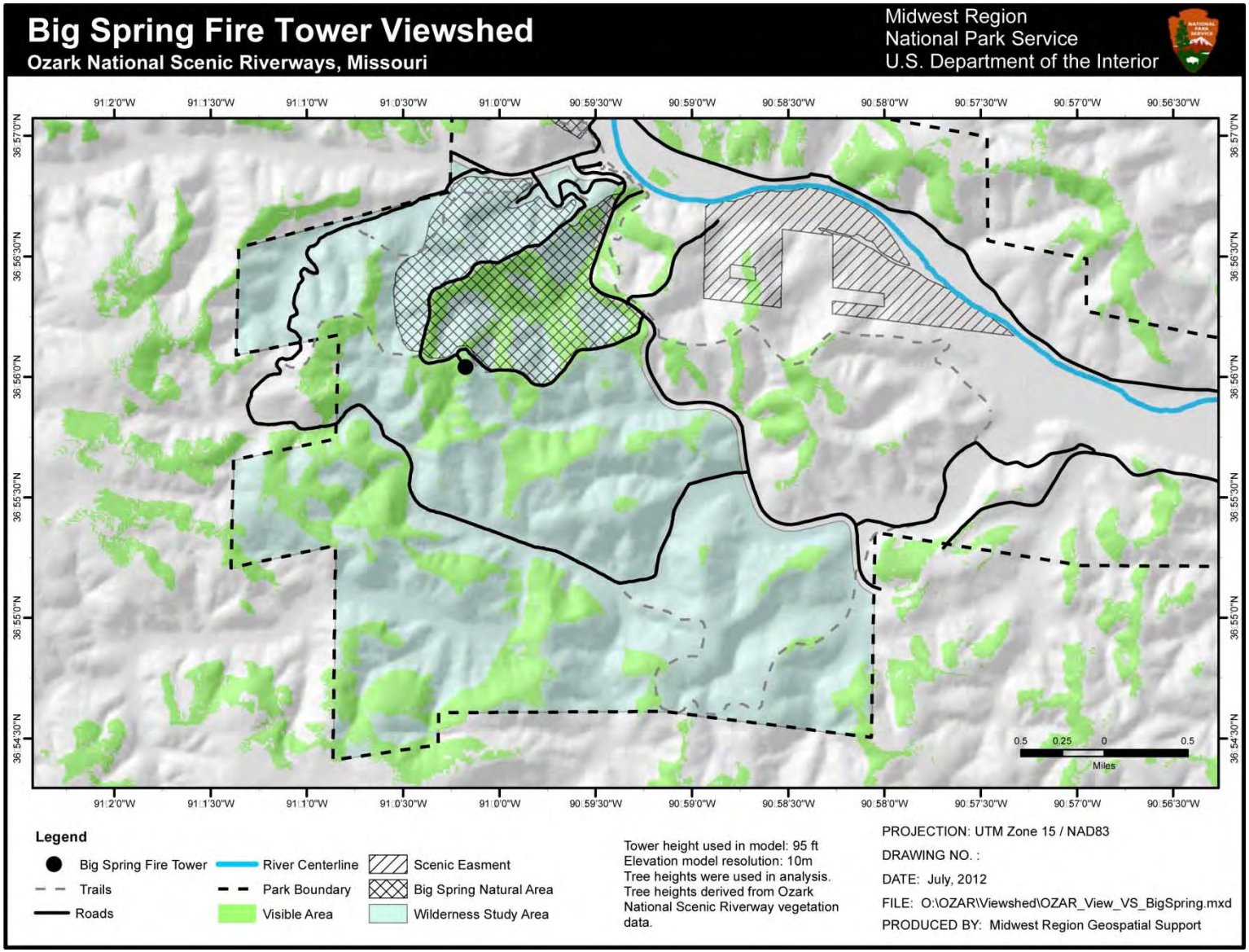
The Big Spring barn, NPS training range, maintenance area, and associated roads are located together as one site. The barn is presumed to have been built in the 1930s or 1940s and is known to have existed in 1950.

Because of its age and potential association with Big Spring State Park operations, the barn, shown in figure 8, may be eligible for listing in the National Register of Historic Places. NPS cultural resource specialists intend to evaluate it for such eligibility. National register status influences, but is not the sole criterion for deciding, whether cultural resources in wilderness are actively preserved. If it is determined to be eligible, the park may elect to actively preserve it in a way consistent with wilderness character preservation, and historic preservation treatments would be carried out in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. The barn could also be recorded and dismantled and the area restored to a more natural condition. Proposed actions affecting the structure would be carried out in consultation with the state historic preservation officer and others in accordance with section 106 requirements.

As a constructed feature, the barn somewhat conflicts with the undeveloped quality of wilderness character. The barn is potentially associated with the gamekeeper who raised and reintroduced deer into the area, and may have been used to store hay grown on the adjacent open fields. The barn and fields do not preclude the area from being proposed as wilderness, though a balance must be struck along the spectrum of historic resource management and wilderness character preservation.

An NPS training range is located adjacent to the barn, as shown in figure 8. The NPS training range is used periodically by the park's law enforcement staff to fulfill requirements for firearms training and qualification. Park rangers would cease using the NPS training range and would consolidate use at one of the two other ranges. The site would be rehabilitated and lead contamination mitigated.

There is a gated service road within the wilderness study area that links the barn and NPS training range to Highway 103. This road is minimally maintained by the National Riverways, but can still accommodate automobiles as far as the barn. If the area were proposed as wilderness, the road would cease to be maintained.


Big Spring Fire Tower Viewshed
Ozark National Scenic Riverways, Missouri
Midwest Region
National Park Service
U.S. Department of the Interior
91:2'0"W
91:1'30"W
91:1'0"W
91:0'30"W
91:0'0"W
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0.5 0.25 0 0.5
Miles
Legend
Big Spring Fire Tower
Trails
Roads
River Centerline
Park Boundary
Visible Area
Scenic Easment
Big Spring Natural Area
Wilderness Study Area
Tower height used in model: 95 ft
Elevation model resolution: 10m
Tree heights were used in analysis.
Tree heights derived from Ozark National Scenic Riverway vegetation data.
PROJECTION: UTM Zone 15 / NAD83
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PRODUCED BY: Midwest Region Geospatial Support

An NPS-administered utility easement including, a buried telephone line serving the Big Spring cabins concession and residents located further down the line, is located in the northeast section of the study area. If the area were proposed as wilderness, the National Park Service would seek to vacate the utility easement, close off the telephone lines, and rehabilitate and restore to natural conditions the surface of the easement. The utility corridor would be proposed as a potential wilderness addition until such time as the utility right of way was extinguished and the area rehabilitated.

A fire tower and road identified in the 1984 general management plan are found at the southern edge of the Big Spring Historic District. The fire tower, which is shown in figure 9, is a Civilian Conservation Corps-era structure that has received a determination of eligibility from the Missouri State Historic Preservation Office at a state level of significance.

Wilderness Alternatives

Options for wilderness were created by the planning team and aligned with each alternative using the overall vision for each action alternative and public comment. Each wilderness alternative is included as part of one of the action alternatives discussed in "Chapter 2: Alternatives, Including the Preferred Alternative."

The options for wilderness that are associated with each alternative are described below and summarized in table 15. The consequences of these alternatives are analyzed in "Chapter 5: Environmental Consequences."

No-action Alternative

Under the no-action alternative (see no-action map in chapter 2), the National Park Service would continue to manage the Big Spring study area's primitive, natural character to maintain its wilderness eligibility.

Zoning. There are no proposed management zones for the no-action alternative.

Structures. The fire tower, incinerator, barn, NPS training range, and Civilian Conservation Corps-era camp would be retained. The fire tower, barn, and NPS training range would continue to be used for administrative purposes.

Roads. The access roads to the fire tower, barn, and NPS training range would continue to be maintained for administrative use.

Utilities. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be maintained.

Alternative A

The proposed wilderness under alternative A is depicted on the alternative A proposed wilderness map. Under this alternative, 3,424 out of 3,434 acres within the Big Spring Wilderness Study Area would be recommended for wilderness designation. This amount is 99% of the total wilderness study area. Ten acres would be excluded in a cherry-stem configuration from the proposed wilderness designation to allow for continued administrative use of the access roads, barn, NPS training range, and utility corridor.

Zoning. Most of the wilderness study area would be zoned primitive. The access road, barn, NPS training range, and utility corridor areas would be zoned natural.

Roads. Motorized vehicle use of the access road to the fire tower would be prohibited.

This road may be restored to a Civilian Conservation Corps-era condition. The access road to the barn and NPS training range would be excluded from the proposed wilderness designation and maintained for administrative access.

Utilities. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be excluded from the proposed wilderness designation (approximately 4 acres) and maintained.

Alternative B (NPS Preferred)

The proposed wilderness under alternative B is depicted on the alternative B proposed wilderness map. Under this alternative, 3,430 out of 3,434 acres within the Big Spring Wilderness Study Area would be recommended for wilderness designation.

Zoning. The entire Big Spring Wilderness Study Area would be zoned primitive.

Structures. The fire tower, incinerator, barn, and Civilian Conservation Corps-era camp would be retained. The NPS training range would be removed and the area restored.

Roads. This alternative would prohibit motorized vehicle use of the access roads to the fire tower, NPS training range, storage area, and barn. The roads would be evaluated to determine the feasibility of restoring them to a Civilian Conservation Corps-era condition, allowing them to melt away or eliminating them altogether.

TABLE 15. WILDERNESS ALTERNATIVES SUMMARY

Feature	No-action alternative	Alternative A	Alternative B (NPS preferred)	Alternative C
Proposal	No wilderness designation	3,424 acres recommended for wilderness designation, 10 acres excluded in a cherry-stem configuration	3,430 acres recommended for wilderness designation	1,779 acres recommended for wilderness designation (south of Chilton Creek)
Management zoning	No zones—continue managing for primitive character under 1984 general management plan	Most would be zoned primitive with some areas zoned natural	The entire area would be zoned primitive	The area south of Chilton Creek would be zoned primitive; the remaining area would be zoned natural
Fire tower plus road (5 acres)	Retain	Retain tower and restore road to Civilian Conservation Corps-era facilities	Retain tower, rehabilitate road	Outside study area
Barn plus road (5 acres)	Retain	Retain in a cherry-stem configuration	Retain barn and road	Outside study area
Utility cable (4 acres)	Retain	Retain in a cherry-stem configuration	Potential wilderness addition	Outside study area
NPS training range (1 acre)	Retain	Retain in a cherry-stem configuration	Remove	Outside study area
Civilian Conservation Corps camp	Retain	Retain	Retain	Outside study area

Utilities. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be proposed as potential wilderness addition and would remain in use until it fails, or until another utility route outside the wilderness was designated. Once decommissioned, it would be evaluated to determine the feasibility of removing the cable and restoring the area. Once the nonconforming use was extinguished, the utility corridor would be administratively converted to wilderness.

Alternative C

The proposed wilderness under alternative C is depicted on the alternative C proposed wilderness map. Under this alternative, 1,779 acres of the Big Spring Wilderness Study Area, south of Chilton Creek, would be recommended for wilderness designation. This amount is 52% of the total wilderness study area.

Zoning. The area recommended for wilderness designation, located south of Chilton Creek, would be zoned primitive. The remaining area would be zoned natural.

Structures. The fire tower, incinerator, barn, NPS training range, and Civilian Conservation Corps-era camp would be outside the area proposed for wilderness designation and would be retained. The fire tower, barn, and NPS training range would continue to be used for administrative purposes.

Roads. The access roads to the fire tower, barn, and NPS training range would continue to be maintained for administrative uses.

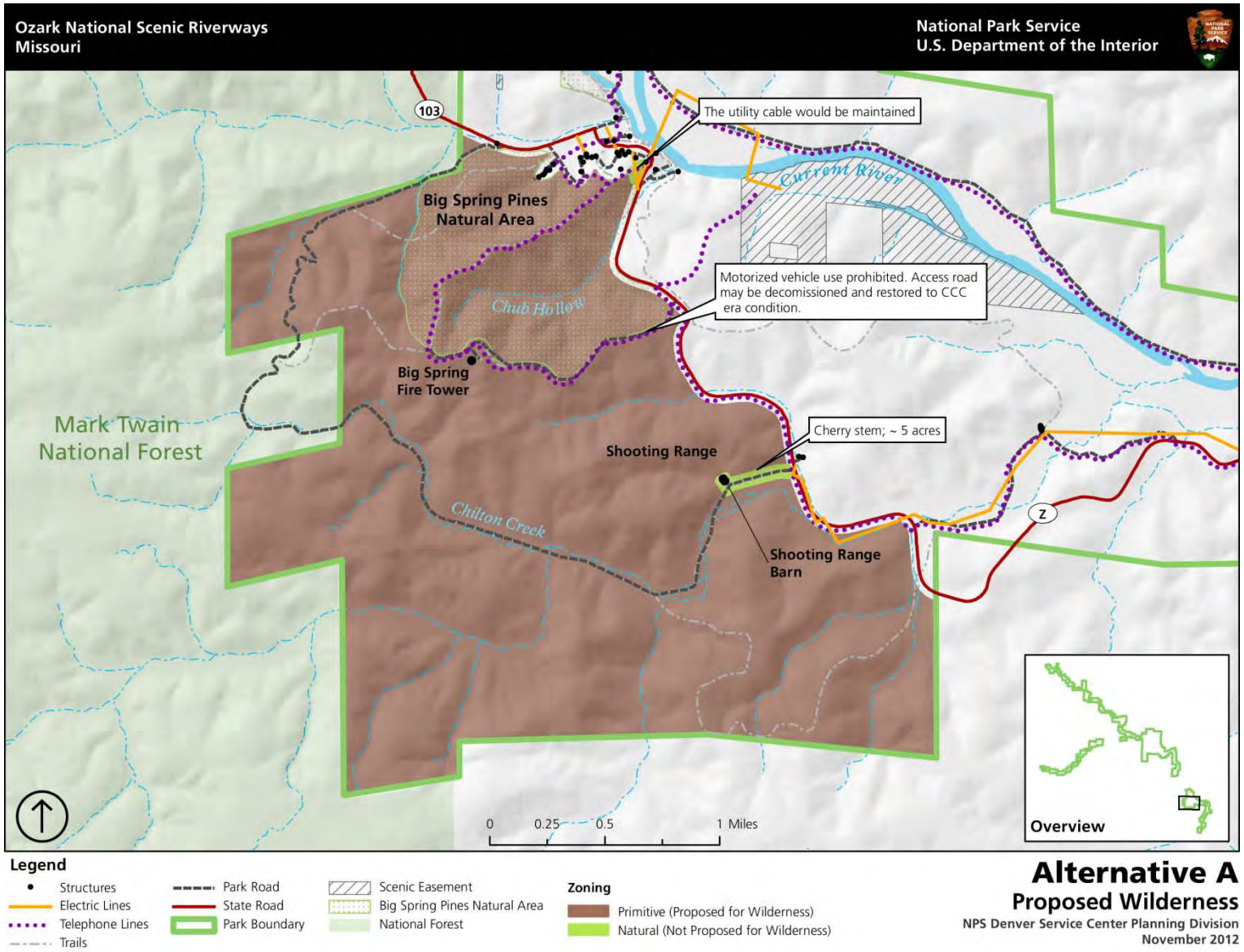
Utilities. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be maintained.

PUBLIC INVOLVEMENT REGARDING BIG SPRING WILDERNESS

In summer 2006, the National Park Service distributed Newsletter #1, which informed the public that the NPS Riverways was beginning a general management plan and wilderness study. The newsletter requested public input on a comment form contained in the newsletter, by internet, and at public meetings.

Newsletter 3, issued in spring/summer 2009, presented four preliminary alternatives for management that were developed with public input and represented different ways to manage the NPS Riverways. Two of these management alternatives included proposing 3,434 acres of the Big Spring tract for wilderness designation. The remaining two alternatives would continue to protect the area as primitive, but not as wilderness.

Public comments from meetings and written submissions were fairly evenly divided between those that favored wilderness designation for the Big Spring tract and those that were opposed to such designation. For example, responses both supported wilderness designation to increase and preserve roadless areas and opposed such designation as being too restrictive, or favored a roadless area that is not designated as wilderness. Most comments were in favor of an area where motorized vehicles are prohibited, but were not necessarily in favor of a wilderness designation to achieve that condition. The public will have another opportunity for further input during the wilderness study formal public hearing process held in conjunction with the environmental impact statement public meetings. The times, dates and location of the public meetings will be announced in the media following release of this document.



Legend

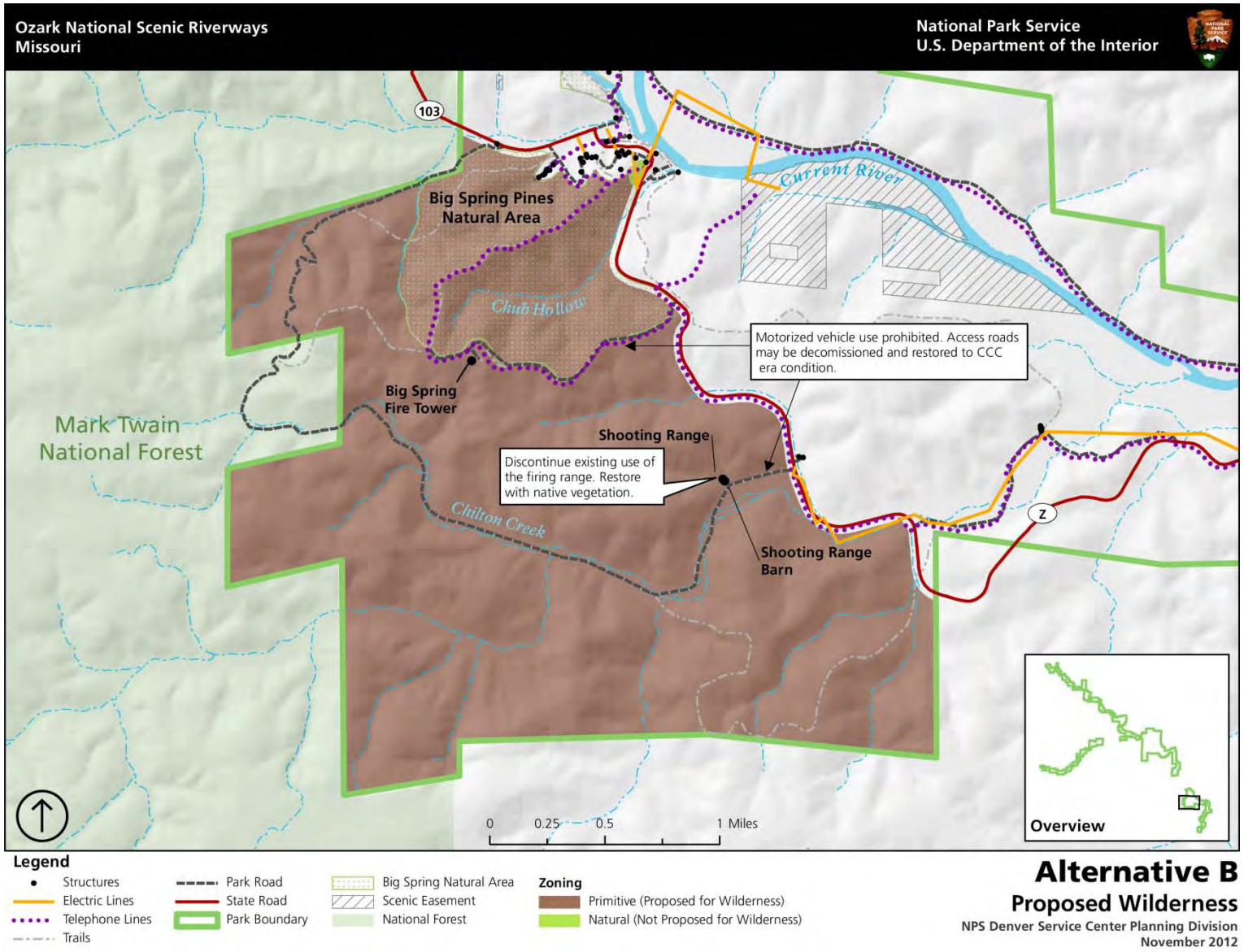
- Structures
- Electric Lines
- Telephone Lines
- Trails
- Park Road
- State Road
- Park Boundary
- Scenic Easement
- Big Spring Pines Natural Area
- National Forest

Zoning

- Primitive (Proposed for Wilderness)
- Natural (Not Proposed for Wilderness)

Alternative A
Proposed Wilderness

NPS Denver Service Center Planning Division
November 2012



Legend

- Structures
- Electric Lines
- Telephone Lines
- Trails
- Park Road
- State Road
- Park Boundary
- Big Spring Natural Area
- Scenic Easement
- National Forest

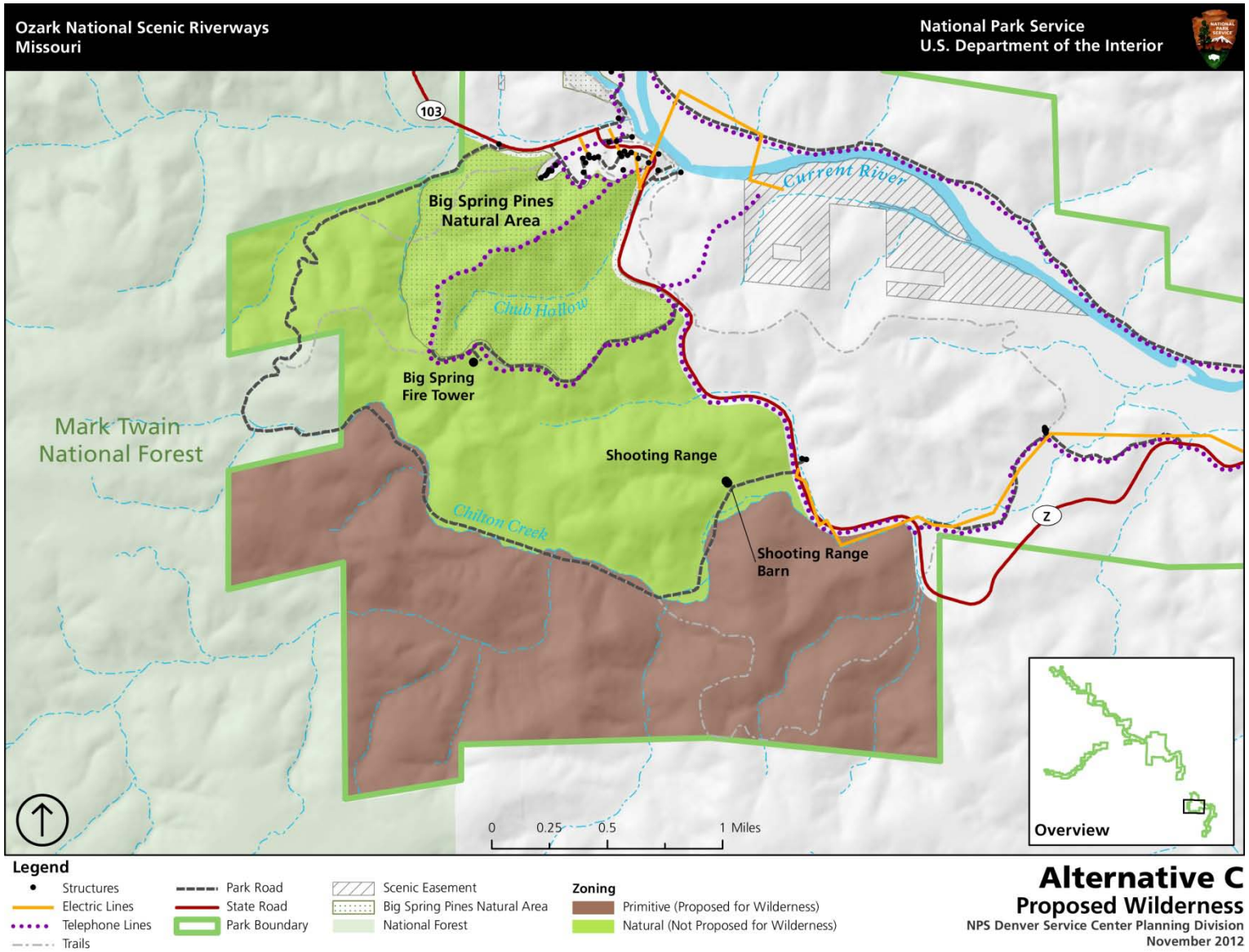
Zoning

- Primitive (Proposed for Wilderness)
- Natural (Not Proposed for Wilderness)

Alternative B

Proposed Wilderness

NPS Denver Service Center Planning Division
November 2012


Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
103
Current River
Big Spring Pines
Natural Area
Club Hollow
Big Spring
Fire Tower
Mark Twain
National Forest
Shooting Range
Chilton Creek
Shooting Range
Barn
Z
0
0.25
0.5
1 Miles
Overview
Legend
Structures
Electric Lines
Telephone Lines
Trails
Park Road
State Road
Park Boundary
Scenic Easement
Big Spring Pines Natural Area
National Forest
Zoning
Primitive (Proposed for Wilderness)
Natural (Not Proposed for Wilderness)
Alternative C
Proposed Wilderness
NPS Denver Service Center Planning Division
November 2012

WILDERNESS PROPOSAL

A wilderness proposal may include two categories: (1) lands proposed for immediate wilderness designation and (2) potential wilderness additions. The former are lands that are wholly federally owned and are fully qualified to become wilderness. The latter are lands that are surrounded by or adjacent to lands proposed for wilderness designation, but that do not qualify for immediate designation due to temporary, nonconforming, or incompatible conditions. Potential wilderness additions, if so authorized by Congress, will become designated wilderness upon the Secretary of the Interior's determination that the nonconforming use has ended.

This study recommends that approximately 3,434 acres of the Big Spring study area within Ozark National Scenic Riverways be proposed for wilderness designation, including 4 acres of potential wilderness additions.

WILDERNESS STUDY REVIEW PROCESS

The findings and conclusions of this wilderness study will be forwarded to the director of the National Park Service. If the director concurs, the proposal will be sent to the Secretary of the Interior. The secretary will then review the proposal and may forward his recommendation to the president. The president then formally transmits his recommendation to both houses of Congress for action. It is up to Congress to enact the legislation necessary to designate the area as wilderness.

The final study could also recommend that certain nonconforming uses be recommended as potential wilderness additions, because of current, temporary conditions that are not compatible with wilderness. The wilderness study may recommend lands as potential wilderness, because of certain temporary conditions that are not compatible with immediate wilderness designation. In this circumstance, the National Park Service would have the responsibility to remove or rectify those noncompatible conditions and convert the area to wilderness as soon as practicable.

IMPLICATIONS OF MANAGING LANDS PROPOSED FOR WILDERNESS

PLANNING AND MANAGEMENT

If wilderness is designated, a wilderness stewardship plan would be developed to guide preservation, management, and use of NPS wilderness areas. Such a plan is developed with public involvement and contains specific, measurable objectives for preservation of wilderness characteristics and values as specified in the Wilderness Act and NPS management policies. Wilderness stewardship plans integrate wilderness planning, management, and monitoring and articulate management actions that preserve or enhance wilderness character.

Management decisions affecting wilderness would be consistent with the "minimum requirements" concept. Parks are to complete this documented process to determine whether administrative activities affecting wilderness resources or visitor experiences are necessary in wilderness, and if so, how to minimize impacts from such activities.

Where practical alternatives do not exist, maintenance or other park activities may occasionally be accomplished through the use of motorized equipment. The use of motorized equipment should be based on the minimum requirements concept. Motorized equipment need not be allowed for park operations that can reasonably be accomplished using nonmotorized means, and exceptions are never for ease or comfort, but for the purpose of administering wilderness for the purpose of the act.

PRIVATE RIGHTS

Wilderness designation does not extinguish valid existing private rights, such as land or right-of-way ownership or valid mineral interests. Valid private rights in wilderness are administered in keeping with the specific terms and conditions of each right. At the NPS Riverways, the utility company has an easement allowing access to its buried cables for inspection and maintenance. Designation as wilderness would not extinguish this right.

RECREATIONAL USE

Recreational uses of NPS wilderness areas are to be of a type and nature that enable the areas to retain their undeveloped 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. Public use of motorized equipment or any form of mechanical transport is not allowed, except as provided for in specific legislation. Operating a motor vehicle or possessing a bicycle in wilderness is not allowed. The use of a wheelchair, as defined by the Americans with Disabilities Act of 1990, is allowed in wilderness.

EMERGENCY SERVICES

In emergency situations involving the health and safety of persons, the use of aircraft and other motorized or mechanical equipment is allowed. Wildfires would be controlled as necessary to prevent loss of life, damage to property, the spread of wildfire to lands outside wilderness, or unacceptable loss of wilderness values. The minimum requirements concept would be followed for all emergency activities in wilderness.

RESOURCE MANAGEMENT AND RESEARCH

Wilderness designation does not prevent the National Park Service from actively managing natural, cultural, physical, or experiential resources, or protecting and maintaining historic and prehistoric resources located within wilderness areas. Using the minimum

requirements concept, these resources would be protected and maintained according to the pertinent laws and policies. Resource management activities would generally be undertaken to provide information that better informs the management and protection of wilderness resources, or that addresses the impacts of past and current use or influences on wilderness character. Natural processes would be allowed, insofar as possible, to shape and control wilderness ecosystems.

Scientific activities are appropriate in wilderness. Even scientific activities that involve a potential impact to wilderness resources or character are allowed when the benefits of what can be learned outweigh the impacts on wilderness character, resources, or values. However, all such activities must be evaluated using the minimum requirements concept, keeping in mind that the impacting activity must be for the purpose of wilderness.

CULTURAL RESOURCES MANAGEMENT

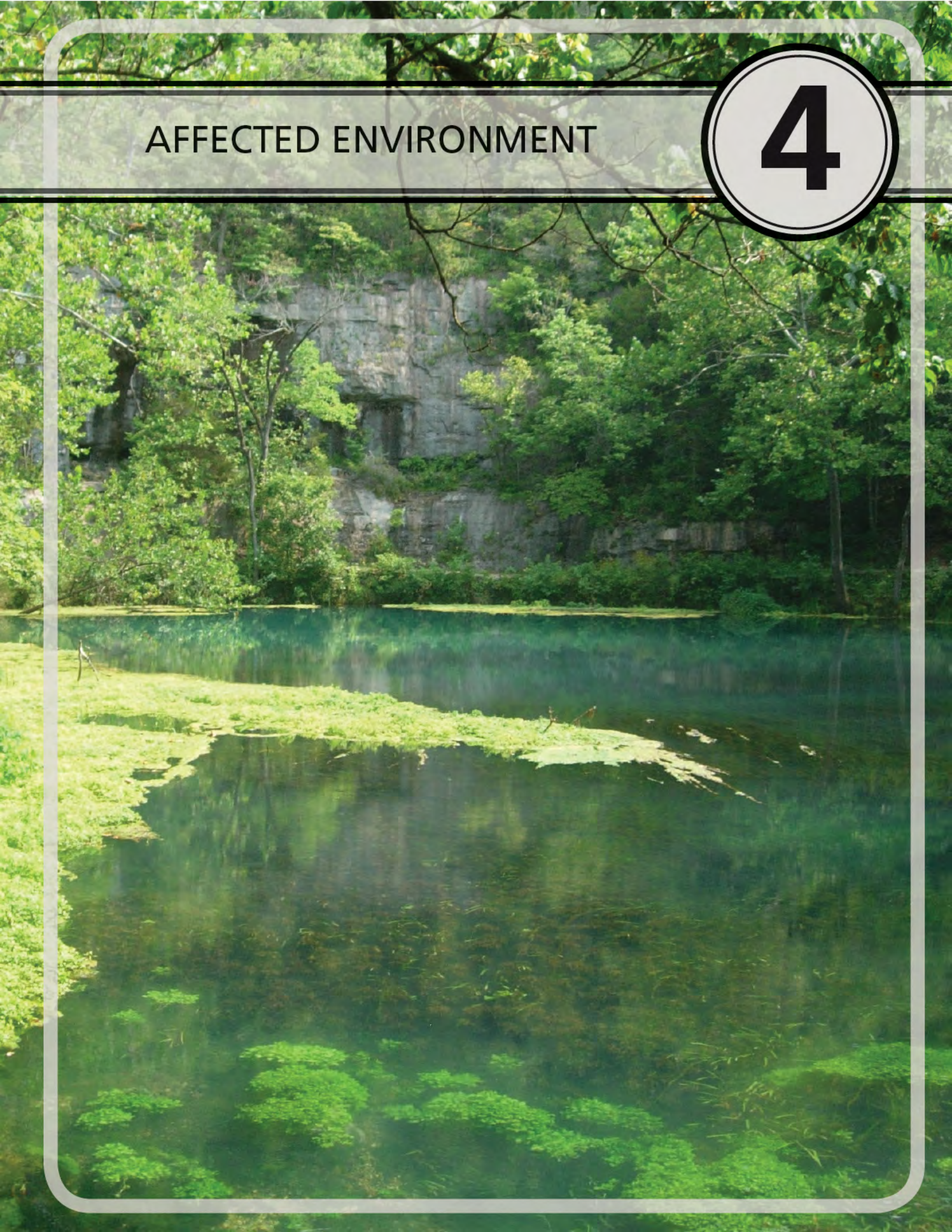
As noted above, proposed wilderness designation of the Big Spring study area would not alter the National Park Service's responsibility to manage and protect cultural resources located in this area. Under the NPS preferred alternative, the Civilian Conservation Corps-constructed fire lookout tower and associated cultural landscape features; a wood frame barn; and the site of Civilian Conservation Corps camp 1710 would be preserved. The fire tower and Civilian Conservation Corps camp have been determined eligible for listing in the National Register of Historic Places, although the eligibility of the barn has not yet been formally assessed. Consistent with NPS *Management Policies 2006* (6.3.8) and *Director's Order #41* (6.9), these and other potential cultural resources in the study area would continue to be managed in accordance with the laws pertaining to the preservation of the nation's cultural heritage (e.g., National Historic Preservation Act, Archaeological Resources Protection Act). *The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* would continue to provide guidance for the protection and treatment of historic properties. Although these laws and policies remain applicable within wilderness, preservation treatments and other management actions would employ the "minimum requirements" concept to ensure that techniques, tools, and equipment do not adversely affect or diminish wilderness character and values.

CONCLUSION

Approximately 3,434 acres of Ozark National Scenic Riverways, in the Big Spring study area are determined suitable for inclusion in the national wilderness preservation system because they possess wilderness characteristics and values. Of the wilderness-suitable land, all are proposed for wilderness in the NPS preferred alternative. This includes 3,430 acres (99%) proposed for immediate wilderness designation, and 4 acres (1%) proposed for potential wilderness addition.

AFFECTED ENVIRONMENT

4



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INTRODUCTION

IN GENERAL

This chapter describes the existing environment of Ozark National Scenic Riverways and the surrounding region. It is focused on key natural and cultural resources, visitor uses and experiences, soundscapes, park operations, and socioeconomic characteristics that have the potential to be affected if any of the alternatives were implemented. Some features, such as threatened and endangered species, are discussed because they provide context or must be considered in an environmental impact statement.

This chapter does not provide an exhaustive description of these resources; but rather enough detail to understand the impacts of implementing the alternatives. These impact topics were selected on the basis of federal law, regulations, executive orders, NPS expertise, and concerns expressed by other agencies or members of the public during project scoping. The conditions described in this chapter establish the baseline for "Chapter 5: Environmental Consequences."

During scoping, the planning team conducted preliminary analysis of resources to determine the context, duration, and intensity of effects that the alternatives may have on the NPS Riverways' environment. If the magnitude of effects was determined to be negligible or minor, then there would be no potential for substantial impact and further impact analysis is unnecessary. Therefore, the resource was dismissed as an impact topic. However, if resource effects could be greater than a minor level of intensity, then the impact topic was retained for detailed analysis. This chapter discusses the impact topics that have been retained and analyzed in detail.

Please refer to the impact topics section at the end of chapter 1 for a summary of impact topics retained or dismissed and an explanation for why certain impact topics were eliminated from detailed analysis. For additional information on Ozark National Scenic Riverways, see the official website (http://www.nps.gov/ozar).

The effects of climate change on the NPS Riverways environment are also included as part of the introduction of this chapter.

CLIMATE CHANGE

To understand future trends in the condition of the NPS Riverways environment, a summary of projected regional climate changes and their potential influences on the NPS Riverways' resources and visitor experience are provided. Rather than incorporate these potential effects throughout the various impact topics discussed in this chapter, the following provides a synopsis.

According to a report prepared for the National Park Service on historic and projected climate trends for Ozark National Scenic Riverways, climate of the Midwest Region of the United States is anticipated to become warmer and slightly wetter, resulting in a wide range of impacts on plants, wildlife, water flow regimes, and people over the next century. Climate models indicate the Midwest states, including Missouri, will likely experience great variability in precipitation. Overall, annual precipitation may increase slightly due to warmer and wetter winters, but rain is projected to decrease during the summers with longer periods in between rain events (Fisichelli 2013).

Models indicate average temperatures in the Midwestern U.S. are expected to rise roughly 4.1 to 5.3 degrees Fahrenheit by mid-century, based on carbon dioxide emission levels from the A2 scenarios published by the Intergovernmental Panel on Climate Change (IPCC) in 2007 (Fisichelli 2013). The number of very hot days (above 95 degrees

Fahrenheit) and the number of days above freezing during the winter are both expected to increase. More variability is also likely, resulting in extreme weather events and more frequent droughts (IPCC 2007).

These types of projected changes are important because climate is a dominant factor affecting the physical and ecological processes of the Ozark National Scenic Riverways and the Midwest region as a whole. For example, the NPS Riverways is home to some of the largest freshwater springs in the country and the world. These springs are a major driver of the terrestrial and aquatic systems of the area. The magnitude, duration, and timing of precipitation changes could affect the groundwater recharge regime that powers these springs.

Changes to the frequency and degree of weather patterns, temperature ranges, extreme events, and other climate-related variables may alter one or several components of the park unit's ecological system. Given the direct ecological connectivity of hydrology, plant communities, wildlife, and other building blocks of a healthy ecological system, even a small change in one or two of these components could potentially have "domino effects" through the overall system. Surface water and groundwater flow quantities and water quality and plant and animal species composition (e.g., biodiversity) are just two examples of park unit resources that may change as a result of climate change.

Long-term patterns in temperature and precipitation are some of the primary climate variables that affect ecosystem structure and function. However, secondary climate variables such as the frequency, duration, and intensity of weather events and seasonal variability (such as first and last frosts), can also have profound effects on soil-water relationships, plant development processes, the reproductive success of wildlife, nutrient cycling, natural disturbance regimes (such as wildfires), nonnative species infestations, and the spread of pathogens. As a result, small changes in climate can affect the overall health and resilience of entire ecosystems. And once again, given the ecological connectivity between the NPS Riverways' hydrology and its natural communities, small changes can reverberate through the Riverways' entire ecological system.

With surface and subsurface water being such a key component of the NPS Riverways' natural system, climate change also brings serious concerns for changes in water quality and water quantity. For example, severe droughts (in duration, intensity, or both) would decrease stream flows and groundwater recharge into the NPS Riverways' karst subsurface geology. This would have profound effects on the regions plant and animal communities. In addition, low water flows in streams and groundwater, compounded with higher temperatures, could also lead to water quality degradation. Conversely, the increased frequency and intensity of flash flooding (brought on by extreme weather events) would result in more runoff that would increase soil erosion and river water turbidity and would wash pesticides, fertilizers, and other toxins into the Riverways' rivers and streams.

Since many of the NPS Riverways' sensitive wildlife species are dependent on high water quality and sustained surface flows for reproduction and foraging, increases in the frequency, intensity, and duration of floods and droughts could also have detrimental effects on some already imperiled species such as the Ozark hellbender. It is not yet known how such species will respond when the existing effects of regional land use and human activities are compounded by additional ecological stressors from climate change.

Likewise, at a larger scale, climate change also has the potential to cause considerable shifts in the overall ranges and distributions of many plant and animal species due to rising temperatures and changes in precipitation patterns. For example, as average

temperatures increase, species are expected to move northward or seek higher elevations in search of cooler climates. Over time, considerable changes to the NPS Riverways' forests, and the wildlife species that inhabit them, would likely occur. In addition, invasive plants and animal species that currently thrive in warmer climates to the south could eventually pose new threats to the NPS Riverways' ecology.

Climate change is also anticipated to have an overall adverse effect on the park unit's cultural resources, primarily as a result of the increased intensity and frequency of severe storm activity contributing to damaging winds and erosion. Periodically heavy, prolonged, and/or frequent rainstorms could result in rising river levels and swifter currents. Increased storm activity, punctuated by periods of drought, could destabilize the riverbank terraces resulting in the potential erosion of buried archeological sites (Fisichelli 2013). Archeological sites and resources exposed by erosion would be at risk of further disturbance by illegal collection or looting. Many archeological sites also retain ethnographic importance for traditionally associated tribes and other groups. Site disturbances could diminish the cultural connections that many have for traditional use areas and sites, and possibly impede their ability to access these areas.

Historic buildings, structures, and cultural landscape features may also be adversely impacted by increased storm-related weathering, high winds, drought, and fire that could result in the loss or damage of historic fabric and other character-defining features. Wide temperature and humidity fluctuations would present preservation challenges as predominantly wood and other historic building materials deteriorate at accelerated rates. The cultural landscapes associated with historic farms and other sites may be affected by climate-related changes to the distribution and composition of vegetation, along with potential alteration of land forms and other features that existed during the periods of historical significance.

By altering natural and cultural resources, climate change also poses potential impacts to visitor use and experience at the NPS Riverways. The majority of visitors come to the area to float the rivers, but others come to camp, hike, tour historic sites, examine springs, horseback ride, and fish or hunt, amongst other activities. Potential fluctuations or reductions in river flows may cause temporary closures of various river sections limiting motorized and nonmotorized watercraft access at certain times. Lower river flows are also causing more river users to utilize downstream sections of the Current and Jacks Fork Rivers for river-based recreational activities. If low flows continue or worsen, the migration of upstream river users to downstream areas may increase crowding and conflicts amongst user groups. Potential destabilization of riverbanks from increased erosion could cause deterioration of certain river access points, river-trail crossings, and campsites adjacent to the river affecting visitors' ability to use these sites. Impacts to historic sites from climate change may limit visitors' abilities to explore and learn about these sites.

The full extent of climate change impacts on resource conditions is unknown, and new information is continually being collected and relapsed. Potential management strategies for the NPS Riverways are outlined in the "Management Strategies to Address Climate Change," in chapter 2.

NATURAL RESOURCES

The natural resource sections describe the natural resource components of the National Riverways' environment that could be affected by the management alternatives. It does not provide an exhaustive explanation of these resources; rather, only enough detail is provided to understand the effects of the alternatives. These descriptions are concise summaries organized by the resource topics listed below, which match the impact topics analyzed in "Chapter 5, Environmental Consequences":

- geologic resources and soils
- water resources
- vegetation
- fish and wildlife (including federally and state-listed species)

A brief overview of the National Riverways' physiography and climate is also provided.

PHYSIOGRAPHY

Ozark National Scenic Riverways is located in the Ozark Plateau's physiographic province in southeastern Missouri. The underlying geology consists of a large, igneous dome that covers an area of approximately 40,000 square miles and includes parts of four states. Sedimentary rocks dip away from the center of the dome and form three distinct physiographic sections: the Springfield Plateau, the Salem Plateau, and the Boston Mountains.

The National Riverways is located on the Salem Plateau, which is a dissected karst terrain consisting of rolling uplands and rugged hills with deeply entrenched stream valleys. The rivers and streams in this subprovince follow a dendritic (tree-like) pattern and there are abundant sinkholes, caves, springs, and losing streams (NPS 2007).

Elevations of the National Riverways vary from about 510 feet above mean sea level on the Current River to 1,273 feet on Wildcat Mountain. The channel gradient on the Current River ranges from 8.3 feet per mile in the upper reaches to 3.2 feet per mile near the downstream end of the park unit. The upper Jacks Fork has a slightly steeper gradient of 8.6 feet per mile and falls to 5.6 feet per mile near its confluence with the Current River (Fenneman 1938).

CLIMATE

South-central Missouri has a temperate climate due to its mid-latitude, interior-continental location. Long summers and relatively short winters are characteristic for the area. January is the coldest month with mean minimum and maximum temperatures of 19 degrees Fahrenheit (°F) and 44°F, respectively. July is the warmest month with mean minimum temperatures of 65°F and mean maximum temperatures of 92°F.

Annual precipitation in the Current River basin is approximately 42 to 47 inches. March is the wettest month, with approximately 5 inches of precipitation, and January and February are the driest with less than 3 inches. March through June is the wettest period of the year (MDC 1982).

GEOLOGIC RESOURCES AND SOILS

The Ozark National Scenic Riverways is situated in a geologically complex area along the Current and Jacks Fork rivers. The geology of these two watersheds is primarily composed of soluble dolomite rock formations of Upper Cambrian and Lower Ordovician age, dating back 520 million years. In addition to dolomite, other predominant rock components of the NPS Riverways are sandstone, rhyolite, and chert. Exposures of older rock are mainly from erosion and down-cutting associated with the

major stream valleys. The bedrock is Precambrian, dating back 1.5 billion years, which consists of igneous rocks with some granite.

The dolomite rock formations in the NPS Riverways may be as thick as 1,800 feet and often contain chert, sandstone, and orthoquartzite. This sedimentary carbonate rock, in combination with over 40 inches of annual precipitation, dissolves to form an intricate karst landscape of losing streams, sinkholes, springs, caves, and subterranean passages, all of which are prevalent throughout the NPS Riverways.

The geology of the area is a major contributing factor to the National Riverways' high biological diversity. It is perhaps the oldest continuously exposed land mass in North America, providing refuge for plants and animals for the last 230 million years. In particular, none of the four major continental glaciations of the past two million years have extended into the Ozarks. The resulting biodiversity of plants and animals is described in detail in the vegetation and wildlife sections.

Today, the karst landscape and its associated hydrogeologic processes are fundamental to maintaining the ecological health and biodiversity of the NPS Riverways. In particular, caves and springs are the most visible expressions of the karst landscape and, as such, are good indicators of changing environmental conditions. They are also highly susceptible to human impact and require a high degree of management attention. Because infiltration into groundwater is rapid in karst terrain, the National Riverways and its spring systems are more sensitive to land use practices than other geologic regions. Chemicals and waste products deposited on the land can wash rapidly into losing streams, sinkholes, and other conduits, polluting springs and rivers in the park unit (NPS 2007). These hydrologic features and processes are described in greater detail under the water resources section below.

Caves and Subterranean Passages

There are 402 known caves within the Ozark National Scenic Riverways boundaries. This is the highest density of caves in the national park system, and second only to the Grand Canyon in total number of caves in a park unit. Of these, 60 caves have perennial streams, 33 caves have intermittent water sources, and seven caves have lakes. The largest of these lakes is in Devils Well Cave. This is one of the largest cave lakes known in the United States, and it is about 400 feet long, up to 50 feet wide, and up to 200 feet deep. Round Spring Cave, Jam Up Cave, and Meeting House Cave are other equally impressive karst features of the National Riverways and are popular visitor attractions. Many of the caves within the National Riverways also provide important habitat for rare and endemic species.

Subterranean aquatic karst passages are more typical at Ozark National Scenic Riverways than emergent cave passages. This is reflected in a greater diversity of aquatic cave fauna (46 total species) than terrestrial cave fauna (31 total species) in the region. The distribution patterns of these animal species are related more to subsurface bedrock and aquifer patterns than to surface topography. The hydrological and biological aspects of caves and karst passages are further described under the water resources, wildlife, and federally and state-listed species sections.

Soils

The Ozark National Scenic Riverways is located within the Current River Hills Subsection of the Ozark Highlands. Soils in this area are derived from the geologic formations and associated landforms described above. As such, they are rocky and formed mainly from carbonate and sandstone bedrock. Most of the soils are classified as either alfisols or ultisols soil orders. These orders are characteristic of forested mineral soils with a horizon of clays or sodium. Alfisols have greater base saturation and are

generally more fertile than the more weathered ultisols (NRCS 2003).

Upland soils are moderate to well drained, dominated by gravelly silt overlying gravelly clay. Depth of these soils ranges from very deep (>60 inches) to very shallow (<10 inches). Soils found on river terraces range from poor to well-drained, loamy alluvium. Floodplain soils are dominated by sandy and gravelly alluvium and range from well- to excessively well-drained (NPS 2007). The following four major soil types are found within the National Riverways (NPS 1991b).

Poynor Cherty Silt Loam. The Poynor soils consist of deep, well-drained, moderately permeable soils of the uplands. These soils are found on narrow ridge tops and steep-sided slopes. They exhibit medium to rapid runoff. More than half of these soils underlie second-growth forests of oak, hickory, ash, maple, dogwood, and pine within the National Riverways. Glades are found on about 25% of these soils.

Clarksville Very Cherty Silt Loam and Clarksville Stony Silt Loam. The Clarksville soils consist of deep, excessively well-drained soils on steep-sided slopes and narrow ridge tops. Runoff is medium to rapid with moderately rapid permeability. Most of these soils are located within native forest of black oak, white oak, blackjack oak, post oak, hickory, ash, sugar maple, and dogwood.

Wideman Fine Sandy Loam. The Wideman soils consist of deep, excessively drained, moderately permeable soils formed in sandy alluvium. These soils are on floodplains and natural levees along streams that flood occasionally. Most of these soils are used for pasture. Native trees found within this soil type include eastern cottonwood, American sycamore, sweetgum, and other bottomland hardwoods.

Gladden Loam. This soil type consists of deep, well-drained soils formed in acidic alluvium in the floodplains of narrow upland valleys. Permeability is moderate in the upper part of these valleys and rapid or very rapid in the lower part. Runoff is slow and, as a result, this type of soil is subject to occasional flooding. This soil is commonly used in the region for cultivated crops, such as corn, small grains, and hay. Native vegetation consists of mixed hardwoods and shortleaf pine.

WATER RESOURCES

Ozark National Scenic Riverways contains 134 miles of exceptionally clear, free-flowing rivers. This remarkable water clarity is primarily because most of the water that flows into the Jacks Fork and Current Rivers is filtered through the karst groundwater system.

Interactions between surface water and groundwater processes are greatly enhanced in karst terrain due to a complex network of surface and subterranean features, including losing streams, sinkholes, springs, and seeps. Losing streams represent one of the ways that surface water is transported or lost to the groundwater system in karst landscapes. This occurs when a stream's surface water flows through permeable geologic materials into an underground aquifer or conduit, causing it to lose water as it flows downstream. Sinkholes provide another point for surface water to enter the groundwater system. Sinkholes are natural depressions or holes in the surface topography caused by the removal of soil or bedrock by water runoff. In contrast, springs and seeps are the naturally occurring outlets of groundwater systems.

Another karstic feature of the National Riverways is that its surface watershed boundary does not match with its subsurface watershed. In fact, its subsurface watershed (1.43 million acres) adds 23 % to the size of its surface watershed (1.1 million acres). To explain, rainfall or snowmelt that occurs

within the surface watershed (or drainage basin) will either: (1) flow along the surface via tributaries and eventually drain into the Jacks Fork and Current Rivers, or (2) recharge the groundwater by flowing into the subsurface watershed via losing streams, sinkholes, or filtering though soil strata in wetlands. Given the karst geology, once surface water enters the groundwater system, it may flow underground well beyond the surface drainage basin on the surface and in often unpredictable routes. This makes for interesting natural phenomena, such as water entering the ground at one location and then discharging from multiple springs that are miles apart from one another (NPS 2007). Conversely, springs and seeps located within the Current and Jacks Fork surface watersheds may actually be discharging water that originated from well beyond the boundary of the two respective surface watersheds of these rivers. The National Park Service Inventory and Monitoring Program has conducted "vital signs" monitoring of fish and large springs within the NPS Riverways in recent years. Some preliminary indications based on the initial monitoring years suggest the following conditions:

- The high numbers of fish species and sensitive taxa, high Index of Biotic Integrity scores, and low occurrences of tolerant taxa indicate a highly diverse and healthy fish community.
- The invertebrate fauna occurring in all of the large springs was dominated by environmentally sensitive taxa—the dominance of intolerant taxa, and mainly representatives of the caddisfly genus, Lepidostoma, occurring in the springs indicates their respective water quality conditions are good.

Plant community structure in the springs has changed little since Steyermark studied them in the 1940s, although some species were not observed while others were documented for the first time.

Subterranean Passages and Springs

The hydrogeologic processes of the NPS Riverways' karst landscape have created a complex, subterranean aquatic system with a dendritic (tree-like) drainage network that resembles surface stream systems. The flow of water through this ancient groundwater system is generally concentrated in large conduits that discharge through several major springs at high flow rates. Big Spring, located in the lower portion of the National Riverways, produces an average flow of approximately 287 million gallons of water per day and has a measured peak flow of 800 million gallons per day. Big Spring is the largest freshwater spring in the national park system.

The National Riverways also has an unusually high density of springs. Within the Current River watershed, more than 400 springs have been identified, with combined discharges that account for up to 90 % of the combined flow of the Current and Jacks Fork rivers (Mugel et al. 2009).

Another interesting aspect of the springs in the National Riverways is that they have a uniform water temperature that is equal to the mean annual air temperature of the region. Springs maintain a water temperature in a narrower, year-round range than that of runoff-based streams. As a result, relict species may have used these constant conditions to survive periods of extreme climatic change. Springs also cause localized changes in water temperature, flow regime, and substrate where they enter the river channels, further diversifying the aquatic habitat of the National Riverways. As a result, a number of specialized aquatic species have adapted to these conditions. The use of these springs as refugia may once again increase as recent and projected climate change restricts species to the cool waters and consistent flows near springs within the National Riverways.

Rivers and Streams

Much of the aquatic biodiversity of rivers and streams in the Ozark National Scenic Riverways has resulted from the complex stream channel conditions. A mosaic of aquatic habitats have established from various combinations of channel depth, stream velocity, substrate types, and cover, which are typified by the variety of pool, edge-water, and riffle habitats throughout the park unit. This variety of habitats is reflected in the diversity of aquatic species. For instance, 125 fish species have been documented within the National Riverways, almost one-half of all fish species that occur in the entire Mississippi River basin.

The Current and Jacks Fork rivers are also ideal for recreation, because their gradients are steeper than other Missouri rivers, which allows for leisurely float trips. The rivers have large spring inflows to maintain stable flows and keep the water cool, even during the hottest, driest months of the year.

August through October is considered to be the normal flow season of the National Riverways, with average flows of about 1,000 cubic feet per second on the Current River. From November through April, average flows increase from about 1,700 to 3,400 cubic feet per second. They then gradually decease from May through July, dropping to about 1,300 cubic feet per second. The average river flow at Van Buren is approximately 2,000 cubic feet per second. The highest recorded flow at this site was 72,000 cubic feet per second on November 15, 1993, and the lowest was 476 cubic feet per second on October 8, 1956 (NPS 2007).

With soils rich in chert, the historic changes in land use, such as logging booms, clearing of riparian forests, and grazing, may have allowed large amounts of chert gravel to erode into the river channels (NPS 2007). This past disturbance is still having an effect on channel instability within the National Riverways. Today, these chert gravels are slowly moving downstream, infilling pools and riffle habitat. This causes stream channels to become more uniform, reducing their structural complexity and biological productivity. Currently, this wave of gravel is primarily in the middle portion of rivers and streams in the park unit. The upper sections are recovering and lower sections of the Current River are in the early stages of being impacted.

Wetlands

The Ozark National Scenic Riverways include a variety of different wetland types, including seeps, fens, sinkholes, and seasonally flooded riparian areas. Seeps are numerous and most common along the base of hillsides in the Ozarks. Seeps formed from alkaline groundwater are known as fens, and they are relatively rare. Because of their cool and wet microclimate, fens often contain plants typical of more northern states, many of which are rare or endangered in Missouri.

Riparian areas are some of the most diverse, dynamic, and complex habitats in the National Riverways. They are also some of the most disturbed ecosystems in the park unit due to historic land uses, such as logging. The accelerated rate of channel movement and deposition that resulted from clearing bottomland forests caused excessive bank erosion and channel migration. These disturbed sites have substantially lower species composition and richness compared to undisturbed areas (NPS 2007).

Today, wetlands exist throughout the riparian forests and bottomlands along the rivers, but little is known about their current species composition or condition. Wetland maps of the NPS Riverways are available online through the U.S. Fish and Wildlife Service's National Wetlands Inventory at http://www.fws.gov/wetlands/data/Mapper.html. This broad-level analysis has classified wetlands along the Current and Jacks Fork rivers into two major types: riverine and palustrine. Riverine wetlands are contained within a channel that periodically

or continuously contains moving water. Palustrine wetlands include inland marshes, swamps, bogs, and small ponds that lack flowing water. This wetland type occurs along the outer fringes of the river channel in the adjacent riparian area of the floodplain. Riverine wetlands are further classified by the permanence of water and the substrate composition of the river bottom and shoreline. Based on this classification system, the riverine wetlands of the National Riverways are defined as lower perennial (some water flows throughout the year) with an unconsolidated bottom and shoreline of cobble, gravel, sand, mud, and organic material.

Palustrine wetlands in the National Riverways are further subdivided into three types, based on dominant vegetation. They include scrub-shrub and forested wetlands. Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall, such as true shrubs and young trees. Scrub-shrub wetlands may also represent a successional stage that eventually leads to a forested wetland. Forested wetlands of the area are dominated by broad-leaved deciduous trees.

The riverine and palustrine wetland types described above can be further classified by their water regimes, which depend on the duration and timing of surface inundation and fluctuations in groundwater levels. Wetlands found along the rivers are considered to be either temporarily, seasonally, intermittently, or permanently flooded, depending on minor variations in topography, rainfall patterns, vegetation composition, and other local environmental conditions.

Because the wetland mapping data are based on high-altitude photography, the National Wetlands Inventory tends to overlook smaller wetlands with forest cover, such as oxbows and sloughs that are known to occur within the National Riverways. Additional inventory and monitoring data are needed to more accurately determine the type, size, and distribution of riparian wetlands in the park unit. To provide a general idea of the extent of wetlands found within the vicinity of the National Riverways, the Missouri natural heritage database identifies 30 fens, seven oxbows and sloughs, two deep muck fens, and one pond marsh within the Current River and Jacks Fork watersheds (NPS 2007).

Floodplains

Floodplains and associated riparian areas are the most diverse, dynamic, and complex terrestrial environments in the National Riverways. This is due in part to the high frequency of flooding, which is an important force in shaping the physical and biological features of the park unit. Flooding also represents a hazard, and past flooding in the National Riverways has damaged park infrastructure and threatened the lives of visitors.

The Current and Jacks Fork rivers typically rise 6 to 10 feet above the average low-water mark during the rainy season, from March to May. These rivers can be expected to rise 19 feet once every 10 years and over 30 feet during a 100-year flood event. Because many of the NPS Riverways' popular recreation areas and facilities are in flat, low-lying areas, this large increase in river height during flood events places many of these facilities and high use areas in the floodplain risk zone. The frequency of flooding and the rapid rise that occurs during flash flood events have prompted the NPS Riverways to relocate certain facilities and establish closures based on river levels.

Water Quality

The Jacks Fork and Current Rivers within the Ozark National Scenic Riverways are designated as Outstanding National Resource Waters because of their exceptional water quality. This designation has national, recreational, and ecological significance. Both rivers are also classified as Tier Three Waters by the State of Missouri. These

stringent federal and state standards are designed to protect against any degradation in the water quality of these rivers.

The National Riverways' water resources are of exceptional quality; however, they are also highly susceptible to pollution. This is because karst terrain does not allow for effective filtration and absorption of pollutants from surface water as it travels into the groundwater system. Also, faster travel rates provide less time for bacteria and viruses to die. Polluted water that may have been on the surface yesterday could be in the groundwater system today and then discharged into the rivers from one of the major springs within a week. In fact, groundwater can travel up to 3 miles per day in the Current River watershed.

Because the karst system of the Ozark National Scenic Riverways extends well beyond the boundary of the park unit, adjacent land use practices can directly affect its water quality. For example, animal and human waste can be rapidly washed into sinkholes and conduits, and then quickly pollute springs and rivers downstream. The flow regime of the rivers in the park unit can also be altered by adjacent land use practices and infrastructure. Bridges, culverts, river access points, and bank hardening can alter the hydrologic regime downstream, as well as cause scouring, sedimentation, and bank instability.

Gravel mining in the Current River watershed and Jacks Fork watershed can alter channel structure and influence the volumes and timing of flow patterns. Gravel mining operations can increase stream gradient, relocate channels, and cause scouring and bank erosion. Removal of larger-sized gravel can also release fine sediments into the stream system, which degrade the habitat for species requiring a variety of substrate particle sizes. As of 2003, the Missouri Department of Conservation (MDC) tracked 41 active mines in the Current River basin. All but one of these active mines were sand and gravel operations (MDC 2003, MDC 2011d). Much of the permitted sand and gravel removal activity has occurred on the lower Current River below Doniphan and on Big Creek. Since 1998, there have been four permitted gravel removal operations in the Jacks Fork watershed (MDC 2011a).

Urban encroachment, larger-scale industrial or agricultural development, and new mining operations are other examples of land uses that can potentially threaten karst landscapes. One of the greatest issues facing park resource management is dealing with the threat of adjacent mineral development and its potential effects on the karst system of the National Riverways. The world's largest lead-zinc mining district, the Viburnum Trend, extends into the Current River watershed, and exploration for similar mineral deposits has also occurred on the southeastern edge of the river basin in the Mark Twain National Forest. In 2000, the Ozark National Scenic Riverways was listed as one of the top ten most endangered parks by the National Parks and Conservation Association, because of concerns about lead mining.

Other adjacent land uses that have the potential to threaten the water quality and clarity of the streams and rivers in the National Riverways include the following:

- poor agricultural and forestry practices
- faulty sewage disposal facilities, including municipal treatment plants
- garbage dumps, and salvage yards
- industrial runoff sites
- transportation routes, including new road building and maintenance
- pipelines
- petroleum and other chemical storage sites

Recreation activities also have the potential to threaten the water quality of the Ozark National Scenic Riverways if they are not

managed properly. For example, manure from horses and petroleum byproducts from gas-powered motorboats can contaminate river water. In their 2006 study, Davis and Barr reported elevated bacteria levels within the lower Jacks Fork River that exceeded the existing Missouri single sample standard, and was attributed to horses and other land uses. More recently, the Missouri bacteria standard was changed, eliminating the single sample limit, and utilizing the seasonal mean (Davis & Barr 2006).

Monitoring data suggests that water quality has declined over the years in certain areas of the NPS Riverways. Statistical analyses of water quality data collected from 1973 to 1998 determined the following trends:

- Nutrient levels are generally low throughout the park unit. However, springs generally have higher total nitrogen levels when compared to rivers and tributaries. In addition, the upper Current River showed higher levels of total nitrogen than other river stretches.
- Total phosphorus is generally at low levels throughout the National Riverways and there was no evidence of an increasing trend at any monitoring site. An analysis of nitrogen to phosphorus ratios suggests that phosphorus is probably the limiting nutrient for algal growth.
- Alkalinity, pH, and specific conductance (ability of water to conduct an electrical current) increased in the downstream direction.
- Bacteria densities were generally below the state criterion for swimmable waters. The highest bacteria densities were consistently observed in the lower Jacks Fork.

VEGETATION

Major Vegetation Communities

The Ozark National Scenic Riverways lies within the oak/hickory forest region of the eastern deciduous forest. Four major vegetation communities with 12 vegetation associations are found within the National Riverways. These vegetation communities, which are described below, and associations are composed predominately of forest, except for some open areas and cultivated sites.

Upland Plant Community

The upland plant community is found on the NPS Riverways' upper slopes and ridges. This community type contains four different climax forests and two distinct types of open upland sites (NPS 1991b).

The most common upland association in the park unit is the oak/hickory forest, found on dryer upper slopes and ridges. This association includes black, white, and red oak; Ozark pignut; and shagbark and mockernut hickory. Understory plants include high and low-bush huckleberry, smooth sumac, sassafras, cinquefoil, and dwarf iris.

The sugar maple / white oak association dominates west- and south-facing slopes due to intense solar radiation. On the wetter east- and north-facing slopes, this association also includes northern red oak and red ash. Understory species include paw-paw, bladdernut, flowering dogwood, and wild geranium.

The oak/pine association is found on narrower ridges with acidic soils, derived from sandstone, chert, and felsite. Understory vegetation is dominated by low-bush huckleberry and farkleberry.

In upper slopes of hills and ravines, the white oak / red maple association is found. This

association also includes winged elm and mockernut hickory.

The rock ledge association is one of two open upland plant associations found scattered throughout the park unit. Common species include red cedar, blue ash, chinquapin oak, poison ivy, and golden current.

The open glades or "barrens" association is found on felsite rock exposures and ridges. Characteristic species include hairy lip fern, spikemoss, early saxifrage, pine weed, and woodrush.

Streambank Community (riparian areas)

The streambank community is one of the most diverse, dynamic, and complex terrestrial habitats in the park unit. These riparian areas are divided into three vegetation associations, including silver maple / cottonwood, American elm / green ash, and sugar maple / bitternut hickory.

The silver maple / cottonwood association occurs on stabilized gravel bars with deeper alluvial deposits. It supports a number of herbaceous species, such as clearweed, greenheaded cone flower, and leatherwood.

The American elm / green ash association is found on richer soils that receive less frequent flooding. Understory plants include trumpet creeper, spice bush, blackbrush, poison ivy, and blue phlox.

The sugar maple / bitternut hickory association is the climax forest of the streambank community. Herbaceous species consist of wild ginger, bloodroot, wood nettle, and maidenhair fern.

Flooding is an important factor in the formation and maintenance of the National Riverways' riparian environments. Not only does it shape the physical landscape, but flooding can also aid in the dispersal and propagation of plant seeds and distribute nutrients. In turn, riparian areas perform a range of important ecological functions, such as stabilizing streambanks, regulating stream temperatures, filtering pollutants, retaining nutrients, and providing habitat for numerous wildlife species.

In addition to the streambank vegetation communities described above, riparian areas of the NPS Riverways are also classified based on variations in physical landform characteristics. These include active channels, active low floodplains, stable floodplains, and terraces.

- Active channels are characterized by proximity to the river where frequent flooding occurs. Vegetation development is limited and coarse materials such as gravel and sand are common.
- Active low floodplains are slightly elevated above active channels and typically receive several seasonal floods each year. Soils are relatively sandy and vegetation is characteristic of frequently flooded riverfront forests of sycamore, elm, ash, and hackberry.
- Stable floodplains are higher in elevation and are subject to only occasional flooding by the highest seasonal floods. Flood disturbance is minimal, resulting in more developed, silty soils that support less flood-tolerant plant species such as oaks, maple, and hickory.
- Terraces are remnants of former floodplains and rarely flood except during the most extreme storm events. Soils are well-developed, loamy and silty alfisols that support flood-intolerant species, such as mesic forest shrubs and herbs. Most terraces in the National Riverways have been cleared in the past for agricultural use (USGS and MDC 2000).

Gravel Bar Community

The gravel bar community consists of the Ward's willow / witch-hazel association, which is commonly found with alder and sycamore trees. These trees help to stabilize gravel bars and allow other plants to become established, such as swamp dogwood, water willow, and chairmaker's rush.

Agricultural Land

The last vegetation community of the park unit is made up of cultivated agricultural lands. Approximately 2,800 acres of these open areas are maintained through a long-standing agricultural special use permit program administered by the National Park Service to preserve certain pastoral scenes and improve wildlife habitat. These areas are maintained by local farmers through haying operations. When left uncultivated for extended periods of time, honey locust, bitterweed, dwarf fleabane, yarrow, crabgrass, and horseweed typically become established.

Rare Natural Communities

In addition to the broad vegetation communities described above, a number of rare natural communities occur within the Ozark National Scenic Riverways. These rare communities are interrelated assemblages of unique plants, animals, and other living organisms that are shaped by their physical surroundings, climate, and other natural processes. These natural communities provide essential habitat for a number of federally and state-listed species found within the National Riverways.

The Missouri Natural Heritage Program, which is managed by the Missouri Department of Conservation, has ranked these community types based primarily on the number of occurrences found within the state. Other factors considered for state ranking include total acres, distribution, number of protected sites, and degree of threats. This same classification system is used to determine species of conservation concern listed in the federally and state-listed species section below. The following paragraphs describe the state rankings established for the natural communities that occur within the National Riverways. Table 16 lists the rare natural communities of the park unit and their associated state rank (MDC 2009a).

S2: Imperiled. Imperiled in the nation or state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the nation or state. Typically 6 to 20 occurrences are remaining.

S3: Vulnerable. Vulnerable in the nation or state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences are remaining.

S4: Apparently Secure. Uncommon, but not rare and usually widespread in the nation or state. Possibly cause of long-term concern. Usually more than 100 occurrences are remaining.

S5: Secure. Common, widespread, and abundant in the nation or state. Essentially ineradicable under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.

Information about these rare natural communities can be found on the Missouri Department of Conservation's online library at http://mdc4.mdc.mo.gov/applications/MDCLibrary/MDCLibrary2.aspx?NodeID=169

Global rarity rankings are not used by the Missouri Department of Conservation due to the difficulty in reconciling Missouri's state ranking system with this more widely used classification system. One rare community type not specifically mentioned on the state ranking is canebrakes. These dense thickets of giant cane (*Arundinaria gigantea)* form in the alluvial floodplains of the Current and Jacks Fork rivers. Canebrakes are considered critically endangered habitats that have been reduced to less than 2 % of their former range. This substantial reduction in habitat

TABLE 16. RARE NATURAL COMMUNITIES

Community type	State rank
Forests	
Mesic bottomland forest	S2
Dry-mesic chert forest	S4
Mesic limestone/dolomite forest	S3
Riverfront forest	S4
Woodlands	
Dry igneous woodland	S4
Dry-mesic chert woodland	S4
Dry-mesic igneous woodland	S4
Dry chert woodland	S4
Glades	
Dolomite glade	S3
Igneous glade	S3
Wetlands	
Ozark fen	S2
Stream Edge	
Gravel wash	S3
Caves	
Cave	S4
Cave spring	S4
Springs and spring branches	S4
Cliffs	
Dry igneous cliff	S4
Moist limestone/dolomite cliff	S4
Dry limestone/dolomite cliff	S5

primarily resulted from overuse of the giant cane for livestock feed by early European settlers. Canebrakes provide important habitat for a number of rare species, including the Swainson's warbler, which is a Missouri state listed endangered species. Canebrakes are also important habitat for black bears, spotted skunks, golden mice, swamp rabbits, white-tailed deer, and gray squirrels.

FISH AND WILDLIFE

The National Riverways' widely varied aquatic, terrestrial, and subterranean habitats support a diversity of animals, including endemic species (species that exist nowhere else in the world). This is due in part to its location in the south-central part of the continent, which served a refuge for species escaping major continental glacial and geologic events.

The Ozark Plateau is perhaps the oldest continuously exposed land mass in North America and one of the oldest on earth, dating back 230 million years. At various times in the past, the mid-continental location of this uplifted region placed it at a crossroads of boreal, prairie, desert, deciduous forest, and alluvial floodplain ecosystems. Continental climate fluctuations then encouraged species movements to and from the surrounding regions. Simultaneously, the lack of glaciation or inundation of the plateau allowed the region to serve as lasting refuge for species colonization and adaptation. During this time, the soluble geologic material of the plateau was developing the complex karst terrain of springs, losing streams, caves, and seeps, which further diversified habitats available to animals. In particular, the National Riverways' numerous caves and springs likely provided stable environments for species to survive during these climatic events (Nature Conservancy 2003).

The influx of plants and animals from different regions, combined with the sustained remnant populations of native plants and animals in this ancient landscape, allowed for the evolution of new species, making the Ozark Plateau a unique and

important region of North America. Combined with the high quality of the Current River watershed, the Ozark National Scenic Riverways continues to provide an important center for conservation of the ecological systems and processes that are unique to the Ozark Plateau.

This combination of factors has created an interconnected system of aquatic, terrestrial, and subterranean habitats that contribute to the National Riverways' high biological diversity. The following describes the broad range of animals associated with these major ecosystems of the park unit (NPS 1979).

Aquatic Species

The Current and Jacks Fork rivers support a diversity of aquatic fauna, including 125 of the approximately 260 fish species that are found in the entire Mississippi River valley. This diversity results from a unique combination of aquatic habitat conditions characteristic of upland, lowland, and large rivers.

Upland stream fish species are the most common and include minnows, shiners, suckers, sunfish, and darters. Of these, six species are endemic to the Ozark Uplands. They include the bleeding shiner, wedgespot shiner, Ozark shiner, checkered madtom, Ozark madtom, and Arkansas saddled darter.

The large, sustained flows of the Current River provide habitat suitable for fish species normally found in much larger rivers. This is due to the abundance of large springs that provide 90% of the flow of the river. Such species include paddlefish, shovelnose sturgeon, American eel, gar, skipjack herring, and blue sucker. The Current River and adjacent drainages also support fish species that are widely separated from the remainder of their species' populations, providing evidence of changes in fish distribution caused by the last ice age. These species include the least brook lamprey, Ozark chub, whitetail shiner, southern cavefish, and barred fantail darter.

Sport fishing is popular in the Ozark National Scenic Riverways and smallmouth bass is the most commonly sought-after species by anglers. Rock bass, largemouth bass, green sunfish, longear sunfish, spotted bass, bluegill, catfish, and walleye are also part of the hook-and-line catch. Suckers are another important part of the fishery, and they are mostly caught by gigging, which is a traditional method of night fishing with spears, called "gigs," used during the fall season in the Ozarks.

Rainbow and brown trout, nonnative species to Missouri, is present in the upper Current River and is periodically stocked by the Missouri Department of Conservation. The stretch of river between Baptist and Cedar Grove is designated by the state as a blue ribbon trout area and the stretch between Cedar Grove and Akers Ferry is designated as a white ribbon trout area (MDC 2009b).

The National Riverways' aquatic habitats also support a variety of nonfish species, such as amphibians, mussels, snails, crayfish, and insects. Many of these are species of conservation concern. One is the Ozark hellbender, the largest salamander in North America. It lives exclusively in the water of the Black and White River drainages in Arkansas and Missouri, including the Ozark National Scenic Riverways. It is believed to be declining throughout its range and no populations appear to be stable. The U.S. Fish and Wildlife Service recently listed the Ozark hellbender as endangered under the Endangered Species Act.

A total of 43 species and subspecies of mussels occur in the Current River and Jacks Fork River within the park. Of these, the Curtis pearlymussel and pink mucket are federally and state-listed as endangered. An additional eight species are listed as species of conservation concern. Nineteen species of mussel occur in the Jacks Fork watershed,

including a number of species of conservation concern.

Fourteen species of crayfish occur in the Current River watershed and five are in the Jacks Fork watershed. Of these, the Salem cave crayfish is listed as a species of conservation concern. The nonnative northern crayfish (*Orconectes virilis*) has also been found in the upper Current River. The Black River drainage, which includes the Jacks Fork and Current Rivers, is listed as one of the top conservation priorities in the Ozark Plateau because of the taxonomic richness and diverse habitat requirements of its crayfish species.

The National Riverways' numerous springs provide important aquatic habitat for crenobionts (species confined to springs). The constant environmental conditions of these waters have allowed many of these species to occur far outside their normal geographic ranges. At least 38 animal species are found only in Ozark springs and subterranean waters (NPS 2007).

Terrestrial and Avian Species

The terrestrial and avian species of the NPS Riverways is characteristic of the Ozarks and contains animals common to both eastern deciduous forests and prairies to the west. Common wildlife observed in the National Riverways includes the white-tailed deer, gray and fox squirrel, eastern chipmunk, muskrat, beaver, cottontail rabbit, raccoon, coyote, striped skunk, and wild turkey. Less conspicuous mammals include black bears, river otters, mountain lions, shrews, weasels, bats, and mice. Also, an elk reintroduction program was initiated by the Missouri Department of Conservation in the spring of 2011. The initial reintroduction effort took place in Peck Ranch Conservation Area, state land that abuts the National Riverways southeast of Eminence. In addition, amphibian and reptile species include 30 snakes, eight lizards, 18 turtles, 16 salamanders and newts, and 15 frogs and toads. Of the snakes recorded in the park unit, four are pit vipers, with the copperhead being relatively common.

Numerous bird species are frequently seen along the riverways, such as the belted kingfisher, great blue heron, Louisiana waterthrush, red-eyed vireo, red-tailed hawk, and red-bellied woodpecker. Resident birds of prey include six species of hawks and six species of owls. Many species of songbirds migrate through the area, including warblers, sparrow, grosbeaks, and finches. Other noteworthy bird species include the pileated woodpecker, osprey, and bald eagle.

Hunting and trapping are allowed within the National Riverways and are popular activities, especially amongst local residents in the region. Common game species include the white-tailed deer, squirrel, fox, raccoon, coyote, mink, skunk, bobcat, opossum, beaver, and muskrat. Gamebirds that include turkey, various species of waterfowl, doves, and quail are hunted within the park unit during various open seasons.

A number of mammals and birds were historically present in the area of the National Riverways but have been extirpated. They include bison, elk, red and gray wolves, Carolina parakeet, passenger pigeon, ivory-billed woodpecker, red-cockaded woodpecker, and ruffed grouse. Of these, the Carolina parakeet and passenger pigeon are now extinct.

At least nine nonnative animal species have been introduced by humans into the park unit. These include the house sparrow, European starling, Norway rat, feral hog, and horse. These species compete with native wildlife for food resources and nesting sites, and they can damage vegetation and other natural resources.

Subterranean Species

Many of the caves and subterranean passages within the National Riverways provide

important habitat for rare and endemic aquatic species, including troglobitic crayfish, cavefish, and various invertebrates. Two federally endangered bat species, the gray bat and Indiana bat, also reside in numerous caves in the park unit. The rare grotto salamander, also known as the Ozark blind salamander, is found in several of the NPS Riverways' caves that contain streams or pools. This salamander is listed as a species of conservation concern in Missouri.

Subterranean aquatic karst passages are more typical at Ozark National Scenic Riverways than emergent cave passages. This is reflected in a greater diversity of aquatic cave fauna (46 total species) than terrestrial cave fauna (31 total species) in the region. The distribution patterns of these animal species are related more so to subsurface bedrock and aquifer patterns than to surface topography.

Federally and State -listed Species

The Endangered Species Act of 1973, as amended, requires that federal agencies consult with the U.S. Fish and Wildlife Service before taking any action that could jeopardize the continued existence of any federally listed threatened or endangered plant or animal species. As a result, the National Park Service must consider potential effects that any proposed action may have on these species. NPS policy also requires the protection of all federal candidate species, as well as state listed special status species.

In a letter dated March 22, 2011, the U.S. Fish and Wildlife Service provided information about federally listed species that may potentially exist in the National Riverways. The Missouri Department of Conservation, through the state's Natural Heritage Program, was also consulted regarding state listed species that may occur within the park unit. In a letter dated January 26, 2011, the department provided a list of special status species that may occur in this area. Both letters are included in appendix E.

Table F-1 in appendix F includes a full list of federally and state-listed species that may exist in Ozark National Scenic Riverways, based on the above-referenced information provided by the U.S. Fish and Wildlife Service and the Missouri Department of Conservation. These determinations are also based on the NPS' certified species list from the Integration of Resource Management Applications program (2009a).

Table F-2 in appendix F includes federally and state-listed species that historically occurred with the Ozark National Scenic Riverways vicinity, but have since been extirpated. This information is based on Missouri Natural Heritage database of historic listings. These species are not included in the impact analysis (chapter 5), because they no longer occur within the National Riverways, and they would not be affected by the management alternatives. However, they are included as part of this chapter to document their historic presence.

The narrative discussions of special status species in this chapter focus on species that are federally and state-listed as *endangered* (there are no state or federal *threatened* species in the park unit). Table 17 identifies this subset of species found in the park unit that are federally or state listed as being threatened or endangered.

The U.S. Fish and Wildlife Service use the following categories to determine the federal status of species that are included in table 17.

E: Endangered. A species that is in danger of extinction throughout all, or a significant portion, of its range.

The Missouri Department of Conservation uses the following categories to determine the state status and rank of species that are included in table 17.

E: Endangered. A species that is in danger of extinction within the State of Missouri.

TABLE 17. FEDERALLY AND STATE-LISTED SPECIES KNOWN TO BE PRESENT WITHIN OZARK NATIONAL SCENIC RIVERWAYS

Common name	Scientific name	Federal status	State status	State rank
Mammals				
Gray bat	*Myotis grisescens*	E	E	S3
Indiana bat	*Myotis sodalis*	E	E	S1
Plains spotted skunk	*Spilogale putorius interrupta*		E	S1
Birds				
Northern harrier	*Circus cyaneus*		E	S2
Swainson's warbler	*Limnothlypis swainsonii*		E	S2
Amphibians				
Ozark hellbender	*Cryptobranchus alleganiensis bishopi*	E	E	S1

S1: Critically Imperiled. Critically imperiled in the nation or state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1,000).

S2: Imperiled. Imperiled in the nation or state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the nation or state. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000).

S3: Vulnerable. Vulnerable in the nation or state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

The following narratives provide brief descriptions of each state and federal listed endangered species that could occur in the National Riverways. A detailed description and regulatory profile of all federal listed species can be found at http://www.fws.gov/species/#endangered. Information about Missouri state listed species can be found at http://mdc.mo.gov/nathis/heritage/, which provides summaries for species of conservation concern by county.

Gray Bat. The gray bat's range is generally limited to the limestone karst areas of the southeastern United States. Gray bats usually live in caves year-round. In summer, they typically roost in caves near streams or rivers. During this time, they forage for flying insects above streams, riparian vegetation, and lakes. In winter, they hibernate in deep, vertical caves. Gray bats are listed as endangered at a state and federal level largely because they live in very large numbers in a very limited number of caves, which makes them highly vulnerable to human disturbance. In hibernacula, human disturbance causes the bats to use vital fat reserves, their only source of energy throughout winter. In maternity caves, pregnant females may abort unborn young or panicked mothers may drop babies to their deaths if they are forced to flee from intruders. Severe or repeated disturbance may cause reproductive failure of an entire colony.

Gray bats have been recorded in the National Riverways and are known to forage along streams, rivers, and reservoirs in this part of Missouri. While loss of habitat and suitable trees are threats to this species, current National Riverways practices of protecting

riparian areas, not cutting hazard trees during certain times of year, and inspecting trees that might be used by these bats are important for the protection of gray bats. A fungus called white-nose syndrome is an ongoing potential threat to the population of gray bats in the park unit.

Indiana Bat. Indiana bats are small, migratory bats that roost together in large groups in caves and mines, typically in the vicinity of water sources. Each fall, these bats migrate to the caves and mines in their home territory to hibernate in large clusters. Only seven hibernacula locations have been identified in the United States. Through spring and summer, most males use caves to roost, while females and young often roost under loose bark and in tree hollows of hickory and oak in riparian areas. The Indiana bat is nocturnal, primarily feeding on flies, moths, and other insects flying above streams and riparian trees.

Indiana bat populations were first surveyed in the late 1950s. More recent surveys concluded that while many Missouri hibernacula populations have decreased, Indiana bats occur in or within a half-mile of the NPS Riverways. They have been found hibernating during the winter in the southern half of Missouri, and are found during the summer months primarily north of the Missouri River, roosting and raising their young.

Indiana bats are highly vulnerable to disturbance, habitat change, and environmental contamination, and are at particular risk because of their very concentrated and very limited hibernation sites. While loss of habitat and suitable trees are threats to the Indiana bat, current park practices of protecting riparian areas, not cutting hazard trees during certain times of year, and inspecting trees that might be used by these bats are important for the protection of Indiana bats. As with the gray bat, white-nose syndrome is an ongoing potential threat to the population of Indiana bats in the National Riverways.

Plains Spotted Skunk. The plains spotted skunk historically lived throughout the plains states of the United States, and could be found most commonly in open grasslands, brushy areas, and cultivated land. They have a smaller, more slender body than striped skunks and a distinct white triangular patch on the forehead with four to six broken white stripes along their back.

These skunks build their dens underground in grassy banks and rocky crevices as well as aboveground in woodpiles, hollow logs, or trees and brush heads. The skunks mate in late winter and the litters that are born in spring usually contain five young. Plains spotted skunks are nocturnal and omnivorous, feeding on insects, mice, rats, some birds, and vegetables. The skunk's diet contributes to the natural control of insects and rodents.

The plains spotted skunk was formerly most common in western Missouri, but their population began declining in the mid-1900s. The decrease was possibly related to changes in agricultural practices that eliminated skunk habitat and the increased use in pesticides. Surveys date the last sighting of a plains spotted skunk within a half-mile of the NPS Riverways to 1982. Current park practices of limiting the use of pesticides and herbicides and avoiding burning of downed logs and trees in areas where skunks may be present would continue to protect the plains spotted skunk should they occur in the National Riverways (MDC 2000a).

Northern Harrier. Northern harriers are a rare breeding species in Missouri, and currently are listed as endangered by the State of Missouri. Typically, they arrive in Missouri in March to April to breed, when cold weather prompts migration from the upper Midwest and Canada. Northern harriers are medium-sized hawks with

slender, rounded wings, white rumps, with feathers on their faces arranged like those of owls. These feathers form dishes that catch sounds made by their prey of mice and other small mammals. They nest often in loose colonies fairly late in the season on dry ground in undisturbed marshes, prairies, and pastures, or on elevated ground in low shrubby vegetation or tall weeds. The number of northern harriers declined as a result of wetland drainage, conversion of native prairies to agriculture, and reforestation of grasslands. During the mid-1900s, northern harrier populations suffered great losses due to pesticide-related egg shell thinning and losses of wetland nesting habitat.

It is uncertain whether any northern harriers are present in the National Riverways. Current park practices of protecting nesting areas of wetlands and tall, densely vegetated grasslands, particularly during breeding season, and limiting the use of pesticides would continue to aid the northern harrier should they occur in the National Riverways (MDC 2011b) (Dechant et al. 2002).

Swainson's Warbler. Swainson's warblers are secretive, neotropical migrant songbirds that nest in the southeastern United States and winter in Belize and on Caribbean islands. The warbler primarily breeds in wooded swamplands and bottomland forests with a dense understory of giant cane, building cup-like nests with moss, pine needles, and grass. As a carnivore, the Swainson's warbler feeds primarily on insects that they find among leaf litter.

There are no records indicating Swainson's warblers were ever common in Missouri. However, large-scale timber harvest and conversion of bottomland forests to agriculture and reservoirs has likely caused dramatic declines in populations. In particular, cane removal eliminates preferred breeding habitat for these migratory birds. The warbler may still be found in the southeastern part of the state, as well as in favorable habitat along the southern border, though it is state designated as endangered. Surveys have identified the warbler last seen in the NPS Riverways area in 2004. Due to their very narrow habitat requirements, park practices of erosion and sediment control, maintaining tall dense stands of cane and overstory canopy habitat, and human avoidance of wetland habitat during breeding season are important (Meanley 1971; MDC 2000b and 2011c.

Ozark Hellbender. The Ozark hellbender is a species of rare salamander found only in southern Missouri and northern Arkansas. The species is permanently aquatic and restricted to the Ozark Plateau in rivers that drain into the Missouri-Mississippi river systems. The Ozark hellbender's well-being depends on high-quality water systems with constant levels of dissolved oxygen, temperature, and flow.

These salamanders are solitary in nature and make their homes under flat rocks in large, permanent streams and rivers. They have a broad, flat head with very small, lidless eyes. They range in color from reddish-brown to dull gray-brown. Hellbenders breed from late September to November, and their 200 to 700 eggs are fertilized externally and laid in depressions under flat rocks in rivers. Larvae hatch four to six weeks later. Hellbenders feed mainly on crayfish and other aquatic animals.

The Ozark hellbender is listed as endangered at both the state and federal level, by the State of Missouri and the U.S. Fish and Wildlife Service, respectively.

Because hellbenders remain active throughout the year and maintain their home territories year-round, it is important to minimize activities that change physical characteristics of rivers and streams and alter the flow and quality of water for long periods of time. Current park practices of avoiding riparian corridor and channel alterations and implementing erosion and sediment control

would continue to protect these salamanders (MDC 2000c; USFS 2003; USFWS 2011).

Future changes to the river flow-regime due to climate change may necessitate additional management actions to protect the hellbender and other endangered species.

NATURAL SOUNDSCAPE

The natural soundscape is an inherent component of "the scenery and the natural and historic objects and the wild life" protected by the Organic Act of 1916. NPS *Management Policies 2006* (section 4.9) require the National Park Service to preserve the park unit's natural soundscape and restore the degraded soundscape to the natural condition wherever possible. Additionally, the National Park Service is required to prevent or minimize degradation of the natural soundscape from noise (that is, inappropriate or undesirable human-caused sound).

Although the NPS' management policies currently refer to the term soundscape as the aggregate of all natural sounds that occur in a park unit, the NPS Natural Sounds and Night Skies Division aims to update this terminology. Because the National Park Service works to protect and enhance park resources and visitor experiences, the Natural Sounds and Night Skies Division differentiates between the physical sound sources and human perceptions of those sounds. Currently, the Natural Sounds and Night Skies Division refers to the physical sound resources, such as wildlife, waterfalls, wind, rain, and cultural or historic sounds, regardless of audibility, at a particular location as the acoustical environment, while the human perception of that acoustical environment is defined as the soundscape. The Natural Sounds and Night Skies Division would like to move away from using soundscape as a blanket definition for both the physical sounds and the human perception of those sounds. Making this distinction will allow managers to create objectives for safeguarding both the acoustical environment and the visitor experience.

Characteristics of Sound

Sound is perceived as an auditory sensation created by pressure variations that move through a medium such as water or air and is measured in terms of amplitude and frequency (Templeton and Sacre 1997; Harris 1998). Noise, essentially the negative evaluation of sound, is defined as extraneous or undesired sound (Morfey 2001). Sound pressure level is measured in decibels (dB). The decibel is a logarithmic scale unit that is commonly used to relate sound pressures to some common reference level, thus producing a smaller, more manageable range of numbers. The loudness of a sound as heard by the human ear is estimated by an A-weighted decibel scale, where the A-weighting provides a formula for discounting sounds at low (<1 kilohertz) and high (>6 kilohertz) frequencies. This adjustment for human hearing is expressed as dB(A). For this discussion, A-weighted values are used to describe potential effects on the National Riverways' acoustical environment and soundscape. Table 18 provides examples of A-weighted sound levels.

TABLE 18. EXAMPLES OF SOUND LEVELS

Reference sound	dB(A) Level
Normal breathing	10
Leaves rustling	20
Crickets (at 16 feet)	40
Normal conversation (at 5 feet)	60
Two-stroke snowmobile (30 miles per hour at 50 feet)	70
Helicopter landing (at 200 feet)	80
Heavy truck or motorcycle (at 25 feet)	90
Thunder	100
Military jet (at 110 feet)	120
Shotgun firing	130

Wildlife

The protection of the National Riverways' acoustical environment is vitally important to ecosystem health. Sound plays a critical role in intra-species communication, courtship and mating, predation and predator avoidance, and effective use of habitat. Additionally, studies have shown that wildlife can be adversely affected by sounds and sound characteristics that intrude on their habitats. While the severity of the impacts varies depending on the species being studied and other conditions, research strongly supports the fact that wildlife can suffer adverse behavioral and physiological changes from intrusive sounds (noise) and other human disturbances. Documented responses of wildlife to noise include increased heart rate, startle responses, flight, disruption of behavior, and separation of mothers and young (Selye 1956; Clough 1982; USFS 1992; Anderssen et al. 1993, NPS 1994; and Barber et al. 2010).

When noise elevates ambient sound levels, signals that might otherwise have been detected and recognized are missed. The noise is said to mask these signals. Masking degrades an animal's auditory awareness of its environment and fundamentally alters interactions among predators and prey. There are many animal species that rely almost exclusively on sounds to locate their prey, including owls and gleaning bats.

Masking also affects communication. Animals have been shown to alter their calling behavior and shift their vocalizations in response to noise (Brumm and Slabbekoorn 2005; Patricelli and Blickley 2006; Warren et al. 2006; Slabbekoorn and Ripmeester 2008; and Barber et al. 2010). These shifts have been documented in a variety of signal types:

- begging calls of bird chicks (Leonard and Horn 2008)
- alarm signals in ground squirrels (Rabin et al. 2006)
- echolocation cries of bats (Gillam and McCracken 2007)
- sexual communication signals in frogs and birds (Brumm and Slabbekoorn 2005; Patricelli and Blickley 2006; Warren et al. 2006; Slabbekoorn and Ripmeester 2008; and Parris et al. 2009)

Vocal adjustment likely comes at a cost to both energy balance and information transfer; however, no study has addressed receivers. Some species are unable to adjust the structure of their sounds to cope with noise even within the same group of organisms (Lengagne 2008). These differences in vocal adaptability could partially explain why some species respond more negatively than others in loud environments (Patricelli and Blickley 2006; Slabbekoorn and Ripmeester 2008).

Visitor Experience

The opportunity to experience an unimpaired acoustical environment is also a key element of visitor experience and enjoyment at Ozark. Although many aspects of visitor experience are discussed in the "Visitor Use and Experience" sections, natural soundscape is a natural resource so its effects on visitor experience are included within analysis of natural resources.

A visitor's ability to see is a powerful tool for experiencing our national parks, but natural sound adds additional richness. In many cases, hearing is the only option for experiencing certain aspects of our environment. Natural sounds often present the best opportunities to find wildlife because animals, such as birds, can be heard at much greater distances than they can be seen. Many natural sounds such as bird songs or the rustling of leaves can have a calming and relaxing effect. Other sounds such as the chirp of crickets or a gentle breeze can trigger memories of pleasant past experiences.

Visitors to national parks often indicate that an important reason for visiting the parks is to enjoy the relative quiet that parks can offer. In a 1998 survey of the American public, 72% of people identified opportunities to experience natural quiet and the sounds of nature as an important reason for having national parks (Haas and Wakefield, 1998). Additionally, 91% of NPS visitors "consider enjoyment of natural quiet and the sounds of nature as compelling reasons for visiting national parks" (McDonald et al. 1995). In studies of general visitor preferences, respondents consistently rate many natural sounds such as birds, animals, wind, and water as very pleasing (Newman et al. 2005).

The presence of unwanted, uncharacteristic, or inappropriate sounds can interfere with or alter the soundscape and degrade the visitors' experience. Uncharacteristic sounds or sound levels affect visitors' perceptions of solitude and tranquility and can generate high levels of annoyance. Visitor evaluations of annoyance are affected by many factors, including the setting in which the sounds occur, the visitors' recreational activities, and their expectations of quiet and solitude. Characteristics of the sound also contribute to levels of annoyance. Annoyance is related to rate of occurrence, duration, loudness, and sporadic nature of sounds (Newman et al. 2005).

Acoustical Conditions in Ozark National Scenic Riverways

During July and August 2010, the Natural Sounds and Night Skies Division conducted acoustical monitoring at three Ozark National Scenic Riverways sites (NPS, 2011a). The monitoring locations, at Sinking Creek, Rymer's Landing, and Raft Yard, are shown on the acoustic monitoring sites map. These sites were selected to provide information on the noise associated with a range of recreational activities throughout the National Riverways.

In addition, the acoustical monitoring effort provided information on natural and existing ambient sound levels and the types of sound sources that can be heard in the National Riverways. Natural ambient sound level refers to the acoustical conditions that exist in the absence of human-caused noise. Existing ambient sound level refers to the current sound intensity of an area, including both natural and human-caused sounds. Natural ambient sound levels measured at the three sites ranged from 39 to 49 dBA during the day and 49 to 53 dBA at night (table 19). Louder levels during the nighttime hours resulted from increased cicada and other insect activity.

TABLE 19. NATURAL AND EXISTING AMBIENT SOUND LEVELS FOR OZARK NATIONAL SCENIC RIVERWAYS

Site	Existing ambient [1]		Natural ambient	
	Day [2]	Night	Day	Night
OZAR001: Sinking Creek	54.6	54.4	48.5	52.6
OZAR002: Rymer's Landing	42.2	50.4	36.7	48.8
OZAR003: Raft Yard	46.0	51.6	38.8	50.2

[1] For comparison, nighttime sound level in a typical residential area is about 40 dBA.
[2] Day hours are 8 a.m. to 4 p.m.; night hours are 4 p.m. to 8 a.m.

Existing ambient sound levels at the three sites ranged from 42 to 55 dBA during the day and 50 to 54 dBA at night. Of the three sites, Rymer's landing was the quietest, with a daytime natural ambient sound level of 37 dBA and a daytime existing ambient sound level of 42 dBA.

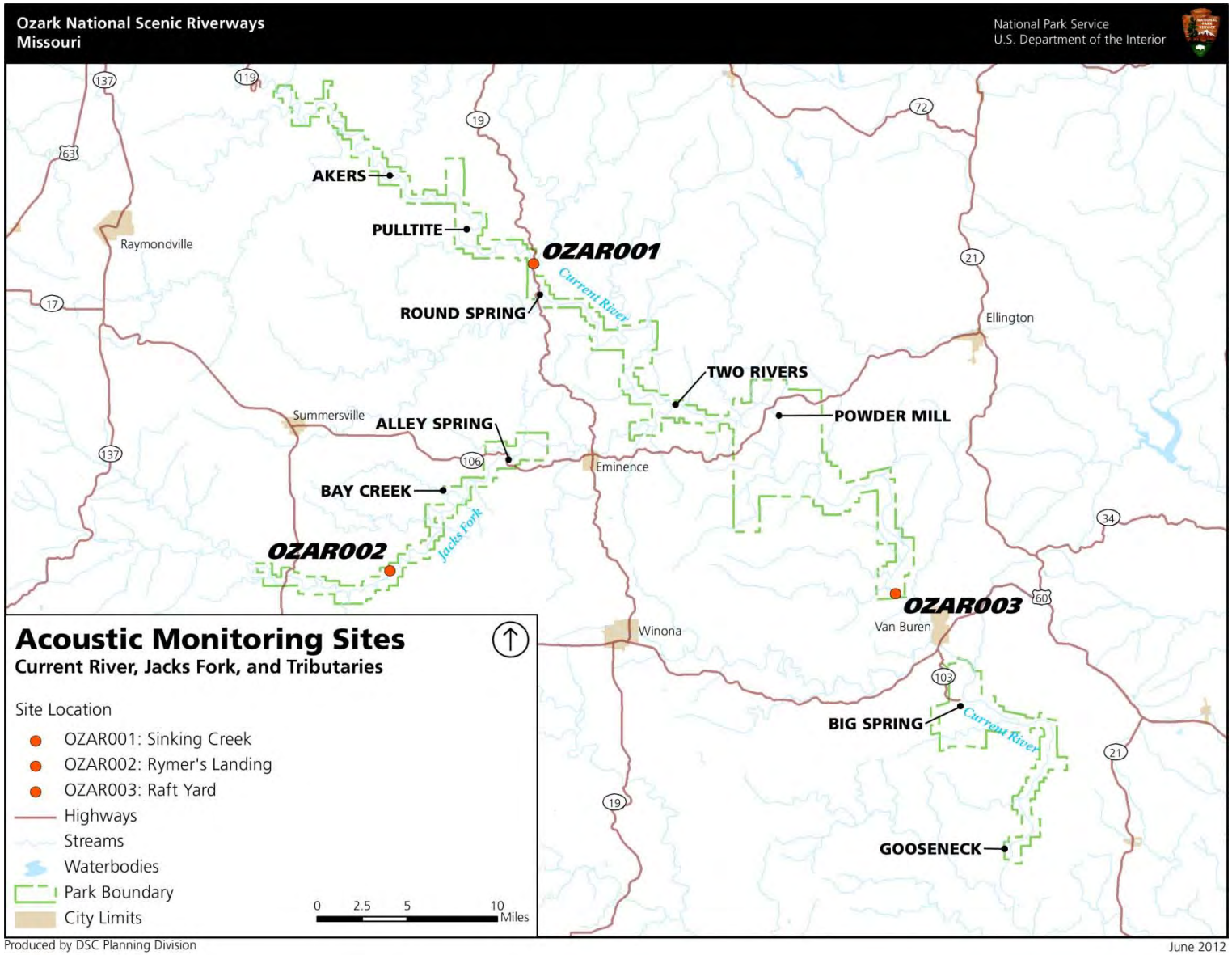
In addition to the ambient measurements discussed above, the Natural Sounds and Night Skies Division also collected data on pass-by noise from typical jet boats at Big Spring and jet boats, canoes, and kayaks at Jerktail. At Big Spring, jet boats had a maximum sound level ranging from 67 to 83

dBA (at a distance of 40 to 60 meters). At Jerktail, jet boats had a maximum sound level ranging from 78 to 88 dBA (at a distance of approximately 20 meters). The noise from canoeists or kayakers voices, oar splashes, and oar bangs had a maximum sound level ranging from 39 to 67 dBA (NPS 2011c).
The Natural Sounds and Night Skies Division also calculated the percentage of time that human cause (extrinsic) sounds were heard at the three monitoring sites. Overall, extrinsic sounds were audible 79 % of the time at Sinking Creek, 71 % at Rymer's Landing, and 74 % at Raft Yard. The average noise free interval between noise events was 20 minutes at Sinking Creek, 75 minutes at Rymer's Landing, and 51 minutes at Raft Yard.
Throughout the National Riverways, wildlife sounds as eastern screech owls, eastern whip-poor-wills, barred owls, bullfrogs, deer, squirrels, and raccoons could be heard. Birds were heard at all sites throughout the day and early dawn (24.3% to 37.5% of a 24 hour day). Another common sound heard at all areas of the park unit was cicadas. Specifically, insects could be heard 92.5% to 98.7% of a 24-hour day. Other natural sounds that can be heard throughout the National Riverways include amphibians, small mammals, thunderstorms, rain, and flowing water.

Examples of human-caused sounds commonly heard in Ozark National Scenic Riverways include vehicle traffic, commercial jets, human voices, and motorboats. Specifically, a person visiting Sinking Creek during the day would hear commercial jets, motorboats, vehicle traffic, radios, and human voices.
Over the entire day (24-hour period), the most commonly heard human sound at Sinking Creek was vehicle traffic (49.1% time audible). At night, campers near Sinking Creek would still hear a low hum of vehicle traffic along with natural sounds like cicadas.

At Rymer's Landing a visitor would mostly hear commercial jets, vehicle traffic, and human voices. Over the entire day (24-hour period), the most pervasive human sound at Rymer's Landing was vehicles (44.1% time audible). At night, vehicle traffic became even more prominent, since other human sounds decreased.

A visitor to Raft Yard would hear commercial jets, vehicle traffic, motorboats, radios, and human voices. Over the entire day, the most common human sound was motorboats (28.9% time audible). Similar to Sinking Creek, visitors near Raft Yard would continue to hear a low hum of vehicle traffic at night, along with cicadas. In total, human-caused sounds could be heard at all three sites 71.3% to 78.6% of a 24-hour day (NPS 2011b).


Ozark National Scenic Riverways
Missouri
National Park Service
U.S. Department of the Interior
AKERS
PULLTITE
OZAR001
ROUND SPRING
Current River
TWO RIVERS
POWDER MILL
ALLEY SPRING
BAY CREEK
Jacks Fork
OZAR002
OZAR003
BIG SPRING
GOOSENECK
Raymondville
Summersville
Eminence
Winona
Van Buren
Ellington
Acoustic Monitoring Sites
Current River, Jacks Fork, and Tributaries
Site Location
OZAR001: Sinking Creek
OZAR002: Rymer's Landing
OZAR003: Raft Yard
Highways
Streams
Waterbodies
Park Boundary
City Limits
0 2.5 5 10 Miles
Produced by DSC Planning Division
June 2012

CULTURAL RESOURCES

HISTORIC OVERVIEW

Prehistory

For thousands of years, American Indians have used the Current and Jacks Fork rivers as transportation corridors, settled along the river terraces, and utilized the region's abundant resources for subsistence. As a tributary of the Black River (which in turn flows into the White River in northeast Arkansas), the Current River is part of the river system linking the large springs and karst topography of the eastern Ozark Mountains with the western lowlands of the Mississippi River alluvial valley. The river system facilitated cultural exchange and expanded the range of resources that could be procured by groups traveling or trading between these regions (Finney 2006).

From approximately 12,000 to 8000 BC, at the close of the last Ice Age, small bands of Paleo-Indian hunters and gatherers pursued large Pleistocene megafauna, such as mammoths and other now-extinct species of bison, horse, and camel, across North America. The Clovis culture, associated with the early Paleo-Indian stage, is most clearly distinguished in the archeological record by fluted, lanceolate-shaped projectile points. Three well-documented early Paleo-Indian sites have been recorded in Missouri, each with Clovis points among the artifact assemblages. Within the boundary of Ozark National Scenic Riverways, Clovis points have been identified from the Partney Farm, Sinking Creek, and Two Rivers sites (Finney 2006).

The Dalton cultural period (approximately 8500 to 7000 BC) marked a transition between the late Paleo-Indian and early Archaic periods in the Ozarks and throughout the Midwest and Southeast United States. The settlement and social patterns of Dalton period peoples were similar in many respects to those of the earlier Paleo-Indian period, although Dalton sites exhibit an adaptation to hunting smaller game, such as deer, rabbits, and squirrels, and a greater dependence on wild fruits, nuts, and vegetables. Small nomadic bands of hunters and foragers from this period are believed to have moved frequently between the Ozark uplands and the Mississippi alluvial valley. Dalton period sites have been recorded in the NPS Riverways at Akers Ferry, Powder Mill Visitor Center, Alley Spring, Jerktail Landing and other locations (NPS 1991a; Finney 2006).

The Archaic period followed next, divided into Early, Middle and Late stages. The period was characterized by more specialized foraging strategies and more complicated patterns of social organization. During the Early Archaic stage (ca. 7,000 to 5,000 BC), seminomadic groups adapted to the warmer and dryer climatic conditions and traveled between selected base camps to hunt, fish, and gather plant foods. A wide variety of tool types and projectile point styles emerged during the Early Archaic stage that reflected adaptations to changing subsistence activities. Sites in the NPS Riverways associated with Early Archaic period occupation and activities have been recorded at Gnat Alley Woods, Johnson Farm, Two Rivers, Alley Mill, and several other locations (NPS 1991a; Finney 2006).

The Middle Archaic stage (ca. 5,000 to 3,000 BC) was marked by adaptations to increasingly dryer climatic conditions and occasional periods of prolonged drought in the Ozarks. These factors influenced Middle Archaic people to modify their territorial organization to improve their access to resources. Populations became more concentrated along the stream valleys of the Ozark Highlands. The Current River shrank considerably during this time, and Middle Archaic people commonly used the first terrace level above the floodplain for habitation areas. Small side-notched projectile points, grooved axes, and twined-

fiber fabrics are among the items of material culture associated with the period. Several sites in the National Riverways have Middle Archaic components, including Gnat Alley Woods, Cherty Branch, Two Rivers, Akers Ferry, and other locations (NPS 1991a; Finney 2006).

During the Late Archaic stage (ca. 3,000 to 500 BC) populations increased in the Ozarks and settlement patterns reflected intensive use of both upland and floodplain environments. A large number of sites have been identified from the period, including large seasonal and/or semisedentary base camps and other specialized camps (for example, rockshelters, lithic workshops, ridge top camps, and fishing sites). Late Archaic artifacts include a wide variety of diagnostic projectile points and an abundance of specialized lithic tools associated with increased utilization and processing of plant foods. Long-distance trade networks appeared during this time, with copper, galena, and marine shells among the more commonly exchanged items. Late Archaic stage site components have been recorded at Owls Bend, Pulltite, Two Rivers, Alley Mill and several other locations within the NPS Riverways (NPS 1991a; Finney 2006).

The Woodland cultural tradition followed the Archaic period, divided into Early, Middle and Late Woodland substages. The Woodland period broadly extends from ca. 1,000 BC to AD 1000 in eastern North America and is characterized by the development of ceramics, plant cultivation and domestication, burial mound and earthwork construction, increasing long-distance trade networks, and the establishment of sedentary villages. In the Ozarks, the Early Woodland substage (ca. 500 to 0 BC) likely represented a continuation of Late Archaic period cultural trends. Sand-tempered *Tchula* ceramics are diagnostic of the stage in the eastern Ozarks and the Mississippi alluvial valley. Few Early Woodland site components have been identified in the National Riverways (NPS 1991a; Finney 2006).

The Middle Woodland substage (ca. AD 0 to 400) coincides with the Hopewell cultural tradition in the Midwest. The period is noted for the development in some areas of complex mortuary practices and the construction of large ceremonial earthen mounds. Grave offerings associated with the mounds and other objects were often fashioned from nonlocal, nonnative materials (for example, copper, obsidian, and shells) procured from places as distant as the Rocky Mountains and the Gulf of Mexico. These materials were delivered along extensive trade networks to the cultural centers. However, the Ozark Highlands were only peripherally linked to the dominant Hopewell culture of western Illinois and the lower Mississippi valley. Isolated occurrences of trade goods, ceramic artifacts, small burial mounds, and possible evidence of small-scale village agriculture point to the limited or sporadic influence of the Middle Woodland substage in the eastern Ozarks (NPS 1991a; Finney 2006).

The Late Woodland substage (ca. AD 400 to 700) witnessed the emergence of more distinct local cultures as the preceding Middle Woodland culture declined along with the extensive, long-distance trade networks. In the Ozarks, villages grew larger and more isolated. Although horticultural activities increased to support growing populations, hunting and gathering remained the primary means of subsistence in the Ozarks. Limestone-tempered ceramics diagnostic of the Late Woodland stage have been found in association with several sites along the Current and Jacks Fork rivers, including Campbell Farm, Culpepper, Alley Mill, and Owls Bend (NPS 1991a; Finney 2006).

The late prehistoric or Mississippian cultural stage followed the Woodland period, broadly extending from ca. AD 1000 to 1600. The Emergent Mississippian substage (AD 700 to 1000) is characterized in the eastern Ozarks

by shell-tempered ceramics and small, short-stemmed arrow points. Although the Mississippian period is most notably associated with large ceremonial temple mounds (such as that at Cahokia–St. Louis), reflecting a rigid socio-political and religious order, no known earthen mounds have been identified within the NPS Riverways. An Emergent Mississippian mound, however, exists at a site in the Eleven Point River drainage in the eastern Ozarks. Emergent Mississippian sites along the Current River typically represent ceremonial centers, small villages, and temporary campsites. Sedentary or semisedentary populations occupied the village sites along the river terraces. Small village sites, some with evidence of habitation structures, have been recorded at Shawnee Creek, Round Spring, Isaac Kelly, Owls Bend, and Gooseneck within the NPS Riverways. Numerous other Emergent Mississippian sites have been recorded in the NPS Riverways (NPS 1991a; Finney 2006).The Early Mississippian stage (ca. AD 1000 to 1450) is not well-represented in the National Riverways, although a small site at Shawnee Creek provided evidence of 11th century occupation with a wall trench structure and other pit features. Triangular arrow points and an increased focus on corn for agricultural subsistence are characteristic of the stage. Small artifact scatters are often the only evidence for Early Mississippian activities in the NPS Riverways (Finney 2006).

The Middle (Powers Phase) of the Mississippian stage began ca. AD 1300. There is evidence that populations from the eastern Ozarks moved during this time into the western lowlands of the Mississippi alluvial valley, where they concentrated in large villages centered around mound structures and utilized smaller habitation sites for specialized activities. Although the Mississippian culture grew and thrived in the central Mississippi alluvial valley between ca. AD 1275 and 1400, there is little archeological evidence for Mississippian people in the vicinity of the Current River after AD 1250, and the culture largely disappeared from the region by AD 1350 (NPS 1991a; Finney 2006).

Historic Period

American Indian Settlement. The Ozark uplands continued to be sparsely settled from the Mississippian stage through the initial contact period with European explorers in the early 16th century. The expedition of Spanish explorer Hernando de Soto (1540–1543) marks the beginning of the Historic period as documented accounts of European and American Indian encounters began to enter the written record. The de Soto expedition crossed the Mississippi River in 1541 and entered the area of present-day northern Arkansas and southeast Missouri.

By about 1700 (the beginning of the Historic period in the Missouri Ozarks), the Osage nation dominated much of the area south of the Missouri River. Three Osage tribal groups (the Great Osage, the Little Osage, and the Arkansas Osage) occupied permanent villages and undertook far-ranging hunting trips that frequently entered the eastern Ozarks.

The Osage were often in conflict with outlying tribes such as the Sac and Fox, the Pawnee, and the Caddo. These conflicts intensified following the Louisiana Purchase of 1803, a consequence of the mounting cultural pressures and dislocations that accompanied the movement of large numbers of European American pioneers west of the Mississippi. Although often hostile as well to white settlers, the Osage grew increasingly dependent on the trade goods supplied initially by the French and Spanish and later by the goods and annuities provided by the American government.

Tribal impoverishment and the loss of independence led the Osage to eventually relinquish the area of present-day Ozark National Scenic Riverways in 1808. By the Treaty of 1825, the tribe ceded the remainder of their lands (some 45,000 square miles in

Missouri and Arkansas) to the United States (NPS 1991a; Finney 2006).

Following their departure from Missouri, the Osage moved west to present-day Kansas and Oklahoma. In turn, other displaced eastern tribes, such as the Delawares, Shawnees, Cherokees, and Choctaws, moved into southeast Missouri. During the 1780s, in efforts to buffer their colonial settlements from the hostile Osage and other western tribes, the Spanish government awarded land grants in the Missouri Ozarks to large numbers of Shawnees and Delawares. These tribes established farming villages and also became part of the lucrative trade network that persisted in the Ozarks until about 1830.

The tensions that arose during the War of 1812 between American settlers and the Shawnee and Delaware led the tribes to relocate again. Some Delaware established villages on the Jacks Fork near present-day Eminence that existed briefly from about 1815 to 1822. Most of the Delaware and Shawnee left the Ozarks by the 1830s. The land and structural improvements they left behind would later benefit Euro-American settlers. The brief presence of the Delawares and Shawnees in the area is reflected in place names and historical accounts. Archeological investigations have uncovered limited evidence of their village sites, although research has identified a probable village location near Alley Spring (NPS 1991a; Finney 2006).

European American Settlement. After the War of 1812, increasing numbers of European American settlers, predominantly native-born Americans of Scots-Irish ancestry, moved into Missouri. They initially located along the Mississippi River and Missouri River valleys and in the fertile farming region around Springfield. The Ozark uplands were largely bypassed by the early wave of immigration, although groups of pioneers eventually established farmsteads and rural communities in the region that were commonly organized along close kinship ties. In many respects, the incoming settlers replicated the settlement pattern that had prevailed along the Current River since prehistoric times, using the river terraces and broad level areas at the river bends for habitation and crop cultivation. They used the rocky higher elevations for livestock grazing and foraging; cattle and hogs were typically allowed to roam freely in the woods. Hunting wild game and gathering plant foods and herbs remained important subsistence activities. Extractive industries such as fur trapping and mining for lead, copper, and saltpeter also drew settlers to the Ozarks and led to the development of support communities. Although never completely isolated, the early settlers adapted to the rugged terrain of the Ozarks. The individualism and self-sufficiency of these settlers became enduring hallmarks of their frontier culture (NPS 1991a).

Notable among the early 19th century pioneers who settled along the Current River were Isaac Kelley, Zimri Carter, and Thomas Boggs Chilton. They established farms on the river terraces, traded with the Indians in the area, and became successful commercial and political leaders. Their descendants and other families also established farms along the river.

Small clusters of dispersed homes and buildings began to proliferate and grow into villages between 1820 and 1840. The village of Van Buren was founded in 1833 as the seat of Ripley County with a store, grist mill, and log courthouse. County reorganization in the 1850s led to Van Buren becoming the county seat of Carter County in 1859.

Other settlements emerged along the upper Current River, concentrated between Owls Bend and Round Spring, and west along the Jacks Fork at Alley Spring and other locations. The first site of Eminence, the seat of Shannon County, was founded in 1841 across the river from Round Spring. Social interaction among the settlements was facilitated to some extent by the network of trails and roads that typically followed the creeks and rivers and connected the

settlements and family farmsteads (NPS 1991a).

Several grist mills developed along the Current River to grind corn, primarily for home consumption. Some of the community mill sites developed into small hamlets. Sawmills also were established to provide mostly pine lumber for local use, although some commercial mills supplied lumber for regional markets. The mill sites also served as social gathering centers for the settlers and places where other goods could be traded (NPS 1991a).

Two regional types of economic subsistence emerged along the Current River during the 19th century that reflected, with some exceptions, the geographic contrast between the upper and lower stretches of the river valley. Large commercial farms and plantations (such as those of Zimri Carter and Isaac Kelly) developed along the lower valley below Van Buren where wider and more fertile lands were better suited to large-scale agriculture. The lower Current River was also navigable throughout most of the year for small boats and barges, which enabled the transport of produce to outside markets. The upper Current watershed, which is characterized by more rugged terrain, narrow valleys, and less available tillable land, supported a more generalist economic strategy centered largely on noncommercial farming, livestock raising and hunting (NPS 1991a).

Changes to the early 19th century pattern of settlement in the Ozarks occurred prior to the Civil War in response to new federal land policies and legislation, extractive industries, and the rapid growth of railroads and other internal improvements. The Graduation Act of 1854 allowed the federal government to sell public lands at significantly reduced rates based on the length of time these lands had been available on the market. As a consequence of the act, Missouri experienced a state-wide land boom that attracted squatters, new settlers, and speculators. A dramatic increase in the number of land entries filed in the Ozark uplands occurred at this time, and the average size of the land parcels sold also increased to over 200 acres. Land speculators (many from out of state and often representing railroad and lumber companies) purchased much of the higher elevation hill country that was unsuited for cultivation (NPS 1991a).

The construction of railroads in Missouri occurred relatively late (during the 1850s) compared to other states. The first railroad to enter the Ozarks, the St. Louis and Iron Mountain Railroad, ran approximately 45 miles northeast of the Current River and connected St. Louis with Pilot Knob, the terminus of a lead and iron mining district in the eastern Ozarks. The railroad, however, had little effect on the region's patterns of transportation or commercial development. Overland roads that frequently evolved from earlier Indian trails continued to provide the primary trade and transportation routes through the Current River valley. Van Buren and Eminence served as principal crossroads communities. Because there were almost no bridges across the Current River, early settlers crossed at established ferry locations or forded the river at shallow crossing points (NPS 1991a).

Civil War. Although no major battles were fought in the Ozark uplands during the Civil War, the area and the settlers along the Current and Jacks Fork rivers were not spared the hardships and devastation of the conflict. Admitted to the Union as a slave-holding state in 1821, Missouri had long been at the forefront of the sectional differences that arose between North and South over issues regarding state's rights and the extension of slavery. In common with other border states, the divided loyalties among families and communities were particularly heightened. At the outset of the Civil War in 1861, Missouri retained a sizeable minority of southern sympathizers who supported the Confederacy. Missouri governor Claiborne Jackson favored secession, refused President

Lincoln's call for troops, and established a pro-Confederacy government-in-exile. Pro-Union supporters controlled the state capital at Jefferson City (NPS 1991a).

Following the Union victory at Pea Ridge, Arkansas in March 1862, approximately 10,000 federal troops were concentrated in southeastern Missouri. Brigadier General John W. Davidson was placed in command of the Army of Southeastern Missouri. Davidson's troops constructed bridges and roads to facilitate the movement of troops and supplies through the difficult terrain of the Ozarks, but the success and durability of these improvements were limited. Military engagements consisted for the most part of occasional skirmishes with partisan bands of guerillas and a cavalry assault against Confederate forces at Batesville, Arkansas (January 1863). Davidson established a command post (Camp Lincoln) at Van Buren, and Union troops constructed a nearby pontoon bridge across the Current River. Because supply lines were difficult to establish and maintain, the pressing need to secure provisions forced the troops to forage and confiscate food from among the livestock and meager supplies of the resident settlers. Widespread violence was also directed at the local inhabitants from bands of guerrilla raiders who were only loosely associated with the Confederate or Union armies. The lawlessness, distrust, and dislocation brought about by the Civil War persisted in the area long after the war ended (NPS 1991a).

Post–Civil War Development. Following the Civil War (from about 1870 to 1920), large-scale commercial lumber and mining companies acquired extensive land holdings in the Ozarks and extracted the area's abundant timber and mineral resources to supply the nation's rapidly expanding industrial development and economic growth. These industries were facilitated by railroads that began to penetrate the Ozark Highlands. The St. Louis and Iron Mountain Railroad constructed a branch line from Pilot Knob into Arkansas. This railroad reorganized in 1881 to become part of the Missouri Pacific Railroad. A branch of the Kansas City, Fort Scott, and Memphis Railroad reached the Current River in the late 1880s. A third company, the Cape Girardeau and Springfield Railroad, extended a line eastward into the Ozarks from Cape Girardeau. The entry of the railroads was accompanied by a corresponding growth in towns and hamlets, and a marked population increase in the southeast Missouri Ozarks. During the 1870s, the county seats of Eminence, Van Buren, and Doniphan expanded to support a more diversified range of occupations, businesses, and services (NPS 1991a).

The large stands of yellow pine in the Ozarks were targeted by the corporate milling operations following the depletion of much of the pine resources in the eastern and northern United States. In addition to the regional transportation efficiencies provided by the railroads, the proliferation of steam-powered sawmills enabled dramatic increases in lumber production. The steam mills allowed annual lumber production to reach into the tens of millions of board feet. The Missouri Lumber and Mining Company (ML & M), incorporated in 1880 by a group of Pennsylvania investors, emerged as the largest among several lumber companies operating in the Ozarks. By 1903, the company owned over 300,000 acres of timber land in Carter, Ripley, and Shannon counties. In 1888, the Current River Railroad reached Grandin, the company town and mill site established by the ML & M in southern Carter County. The ML & M extended additional tram railroads into the timber areas and floated logs down the Current River to the Grandin mill. In 1909, the company moved the mill and town site to a new location (West Eminence) near the existing town of Eminence (NPS 1991a).

To a lesser extent than the large-scale pine lumber operations, hardwood logging companies also harvested mostly oak and hickory in the Ozarks. The hardwoods were used for railroad ties, flooring, furniture, and

other products. Mining operations did not extract the mineral deposits of the Current River basin on a scale comparable to the removal of timber resources by the lumber companies. However, some communities such as Bonne Terre and Joplin developed in the latter 19th century to support lead, iron, zinc, and other mining and smelting operations in the region (NPS 1991a).

The corporate lumber and mining operations introduced far-reaching changes that affected many facets of southeastern Ozarks culture, including technology, transportation, commerce, and social institutions. Organized churches and public schools became more prevalent, and a cash-based economy gained greater acceptance among the local communities although many continued to rely on the customary trade and barter of goods and services. To some extent, the former isolation and self-sufficiency that characterized the area's pioneer settlers began to lessen as they became more closely bound to the broader economic and social forces that accompanied the arrival of the large corporations. However, the adaptability of the settlers allowed many aspects of their frontier upland culture to coexist alongside the changes occurring during the new era (NPS 1991a).

The large pine lumber companies began to move their operations out of the region as they exhausted the area's formerly vast stands of timber by the early 1900s. Smaller timber products companies and "tie-hackers" then removed most of the remaining hardwood forest. The environmental damage from erosion, declining fish and wildlife populations, and loss of other forest resources had devastating consequences for the upland inhabitants. Efforts to promote the region for orchard growing and ranching proved unsuccessful. The marginal fertility of the upland soils was not well-suited for agricultural production, and the soils were further depleted by farming and grazing practices. Stockmen annually burned the timbered areas to improve open grazing lands, but the practice hindered regeneration of the pine forest (NPS 1991a).

Recreation and Park Development. Despite the area's environmental damage, the Current and Jacks Fork rivers became popular recreation destinations for sportsmen during the latter 19th and early 20th centuries. Several hunting and fishing clubs and cabin retreats were established that provided recreational opportunities for wealthy businessmen from St. Louis, Kansas City, Springfield, and other cities. Many arrived by the railroads that first entered the Ozarks for the logging operations.

Floating the rivers on johnboats became a popular activity. A river float trip and visit to Alley Spring in 1909 by Missouri Governor Herbert S. Hadley highlighted the area's scenic beauty and brought it national attention. In 1912, the Crystal Spring Town-site Company purchased the mill hamlet of Alley and promoted it as a middle-class "pleasure resort." The company constructed a two-story store at Alley and made other tourist-related improvements, although the site continued to be too isolated to support a large tourist industry. The Crystal Spring company sold the property to the state of Missouri in 1924, and it became one of Missouri's first state parks (NPS 1991a).

By the 1920s, growing numbers of tourists traveling by automobile entered the Current River region from outlying urban areas. State and federal support for construction of highways and bridges enabled those with available time for leisure and recreation to visit in increasing numbers.

The Missouri state parks program (established in 1919 and placed under the administration of the State Game and Fish Commission) added eight parks in the Ozarks totaling 23,224 acres. Along the Current and Jacks Fork rivers, state parks were created at Montauk, Big Spring, Alley Spring, and Round Spring as recreational destinations for the auto-touring public. The parks were also

variously managed as wildlife refuges and fish hatcheries. The influence of local political leaders and business promoters helped garner support for the establishment of these parks.

Cultural differences occasionally led to tensions between the resident upland inhabitants and the new wave of visitors. However, an estimated 8,000 to 10,000 people attended a major event in Van Buren in 1926 that marked the completion there of a new highway bridge across the Current River and the establishment (in 1924) of nearby Big Spring State Park. The state parks program carried out improvements such as roads, trails, and buildings to the Current River parks during the 1920s (NPS 1991a).

More extensive development activities were completed by the Civilian Conservation Corps during the Great Depression of the 1930s. In 1933, Civilian Conservation Corps camps of mostly young men were established at Alley Spring and Big Spring state parks with oversight and technical assistance provided by the National Park Service. Among their many projects, Civilian Conservation Corps laborers constructed several miles of gravel roads and trails. They also built campgrounds, picnic shelters, cabins, and water lines to deliver pumped water to the campgrounds. In 1936, the Civilian Conservation Corps built a dining lodge at Big Spring and a walled entrance station to the National Riverways. The buildings and structures were typically constructed of timbers, lumber, and rough-hewn, locally quarried stone. These were built in the rustic style that came to typify NPS and Civilian Conservation Corps construction throughout the country during this period (NPS 1991a).

In addition to the public parks, several private recreational resorts, health spas, and river guide/outfitting services were developed along the Current River during the 1920s and 1930s. Guided johnboat trips remained a popular activity, and local craftsmen often built the shallow-draft wooden boats as another source of income.

The deepening economic crisis of the 1930s led to increasing government intervention in the Ozarks, and many of the independent residents found it necessary to accept federal relief. Another significant outcome was the establishment of national forests, particularly the Mark Twain National Forest in Missouri. Despite considerable initial opposition from those resisting the expansion of federal control, supporters of the national forest prevailed and were able to remove state restrictions on the size of the federal forest lands. By 1935, the Mark Twain National Forest included more than 3 million acres; 44 % of the land in Carter County and significant parts of Ripley and Shannon counties became national forest. The U.S. Forest Service employed thousands of Civilian Conservation Corps and Works Progress Administration (WPA) workers for conservation and recreation development projects (NPS 1991a).

Proposals to dam the Current River for commercial power and recreational development became topics of heated political debate after 1930. The Depression curtailed funding for private initiatives, but the U.S. Congress authorized the U.S. Army Corps of Engineers to construct 50 dams in Missouri during the 1930s. The Rural Electrification Administration (REA) supported the Corps' dam construction projects in efforts to provide hydroelectric power.

A number of conservation groups and local opponents to dam construction strategized on means to maintain the Current as a free-flowing river. World War II delayed the Corps' dam-building plans for the Current, and in 1949 Missouri Governor Forrest Smith voiced his strong support for maintaining the river in its free-flowing natural condition. The Corps ultimately withdrew its plans to dam the river in 1950.

A jointly prepared state and federal agency report in 1956 called for the creation of a national recreation area for the Current, Jacks Fork, and Eleven Point rivers. A meeting was later held in Washington D.C. among agency and political leaders that resulted in the funding of a 1960 NPS study to investigate adding the rivers to the national park system. The broad coalition that had earlier formed to preserve the Current soon divided into two camps: those favoring NPS management of the Current, Jacks Fork, and Eleven Point rivers to preserve natural values and promote tourism, and others who favored the multiple-use approach of the U.S. Forest Service with scenic easements (rather than federal acquisition) to regulate private farming and timber lands along the riverways (NPS 1991a).

A series of bills were introduced in Congress between 1960 and 1964 to preserve the Ozark riverways. However, the factional differences that had emerged between those with different visions for management of the rivers contributed to the bills' defeat. Despite these setbacks, strong federal support for managing the riverways came from Secretary of the Interior Stewart L. Udall (who floated the Current River in 1961) and President John F. Kennedy, who endorsed the establishment of what was then envisioned as "Ozark National Monument."

In 1963, Missouri's congressional delegation united in drafting a revised bill that retained provisions for scenic easements and allowed hunting and fishing according to state regulations, measures that the National Park Service had initially resisted. President Lyndon Johnson signed the legislation establishing Ozark National Scenic Riverways in 1964.

The Eleven Point River was dropped from the final legislation and remained largely under the control of the U.S. Forest Service. The lower Current River downstream of Gooseneck also was not included; much of the rich agricultural lands along that stretch were held by politically connected farmers and landowners who formed a solid block against designation.

In 1972, eight years after the enabling legislation was passed, a formal dedication ceremony for Ozark National Scenic Riverways was held at Big Spring. President Richard M. Nixon's daughter, Patricia Nixon Cox, presided over the ceremony. As observed by NPS historian Don Stevens, the establishment of Ozark National Scenic Riverways represented a "complicated mix" of the traditional values and culture that persisted in the Ozark uplands and the emerging environmentalism of the 1950s and 1960s that garnered national political support (NPS 1991a).

ARCHEOLOGICAL RESOURCES

Over 480 prehistoric and historic archeological sites have been recorded within the boundaries of the National Riverways. Some amateur and other limited archeological investigations occurred along the riverways prior to authorization of Ozark National Scenic Riverways in 1964. NPS-directed surveys and testing became more routine in the 1970s with attention directed initially toward Phase I site inventories of the primary park development areas.

A long-term archeological research program was developed for the National Riverways in 1980. Investigations and research strategies were carried out primarily by Mark Lynott (NPS Midwest Archeological Center), James Price (NPS park archeologist since 2000 and later chief of resource management) and archeologist Cynthia Price (Finney 2006).

Over the ensuing years, a large body of archeological documentation was compiled for sites discovered and recorded as a result of cultural resource management projects, often completed in fulfillment of section 106 compliance responsibilities. University and museum-sponsored research also contributed to the knowledge of

archeological resources in the NPS Riverways.

Several of the archeological sites are listed in the National Register of Historic Places, and site information is entered in the Archeological Site Management Information System maintained by the NPS Midwest Archeological Center in Lincoln, Nebraska. A synthesis of the archeological resource information at the National Riverways was compiled in a 2006 report titled "An Archeological Overview and Assessment of the Ozark National Scenic Riverways, Missouri" (Finney 2006).

Most of the archeological investigations in the National Riverways have been conducted in the river valleys, where they revealed a high density of both prehistoric and historic sites. Many of the sites are large scale, complex, and/or multicomponent, and potentially overlap.

The three terraces above the floodplain of the modern Jacks Fork and Current Rivers correspond to the principal site locations, with the greatest percentage of identified sites along the second terrace. Prehistoric site types are commonly associated with lithic tool production, food processing, and long- and short-term habitation areas.

Historic archeological sites include an early 19th century trading post; the locations of farmsteads, dwellings, family cemeteries, and schools; a Civil War outpost; town and mill sites; and resources associated with extractive industries.

Natural erosional processes and human-caused impacts, such as those resulting from the use of horse trails and other recreational activities (particularly along the rivers), represent potential threats to the integrity of archeological resources as a result of ground disturbance. Despite these threats, current uses and activities present a low to medium probability that the overall data potential of most identified sites would be substantially degraded (Finney 2006).

The following sites are among the better-known in the NPS Riverways and have been investigated primarily in response to NPS construction projects. Many have been tested and researched on multiple occasions.

- *Akers Ferry*. This stratified, prehistoric site has been tested several times since the 1970s in response to park development proposals. Investigations have documented buried midden deposits, a rock-lined pit feature, and extensive numbers of ceramic and other lithic artifacts. The cultural materials support occupation from approximately the Dalton cultural stage, with Middle Woodland and Emergent Mississippian occupation components.
- *Alley Mill*. A buried prehistoric midden deposit with Dalton projectile points was identified at the site. Investigations were originally intended to locate evidence of an earlier mill that was replaced by construction of the existing Alley Spring Roller Mill in 1894.
- *Camp Lincoln*. This site marks the location of the Union Army outpost, Camp Lincoln, which was briefly occupied during the Civil War from December 1862 to January 1863. A portion of the site lies beneath the National Riverways' leased headquarters building in Van Buren. Both historic and prehistoric artifacts were identified during testing carried out for proposed headquarters area construction.
- *Chubb Hollow*. Testing of this multicomponent site was carried out in the 1970s and 1980s. Cultural material recovered from the test excavations indicated intermittent prehistoric occupation from the Late Archaic to Mississippian stages.
- *Gnat Alley Woods*. Site investigations carried out between 1989 and 1995 for a road project determined that this

site represents the entire local cultural sequence for the Early Archaic, Middle Archaic, and Late Archaic periods.

- *Gooseneck*. This site was first reported by amateur archeologists in 1940 and was extensively tested in the 1970s and 1980s. Ceramics, bone, and other artifacts were recovered from a midden deposit, some supporting Archaic period occupation. Several subsurface features were tested, including post pits associated with Emergent Mississippian and Mississippian village sites.
- *Isaac Kelley*. The site includes the original tract of land owned by pioneer settler Isaac Kelly along the Current River during the early 19th century. Several concentrations of prehistoric cultural material have been recorded at the site reflecting Archaic to Mississippian period occupation. Testing in the 1980s was conducted to test the hypothesis that the Kelley farm functioned as a plantation. The site was entered in the National Register of Historic Places in 1988.
- *Limekiln Cave*. This stratified site was identified within a cave near Round Spring. It was investigated by archeologists in the 1980s, and cultural materials and faunal remains were recovered.
- *Old Eminence*. This site marked the original location of Eminence, established in 1841 as the first county seat of Shannon County. The town was destroyed during the Civil War. After the war, the town was relocated to its present location and the former site was abandoned. Archeological testing and field school excavations of the site were conducted in the 1980s. Investigations revealed a prehistoric component and a historic farmstead in addition to the original town site, although few building sites were identified. The Old Eminence site was listed in the national register in 1988.
- *Owls Bend*. The Owls Bend site along the Current River was first tested in the 1970s. Further testing and field school excavations in the 1980s recovered extensive amounts of lithic artifacts and ceramics. A large midden deposit was identified associated with the Emergent Mississippian Owls Bend phase. Nine features were recorded representing cooking pits, and the locations of refuse disposal and human burials. The site was listed in the national register in 1988.
- *Pulltite*. In the 1970s, a Late Archaic site was identified and tested at Pulltite. The site consists of a lithic assemblage indicative of a short-term resource procurement or processing station.
- *Round Spring*. The Round Spring site was first reported in 1948, when erosion at the spring exposed a human burial and associated grave goods diagnostic of the Mississippian period. Over the next 20 years, additional burials were exposed by erosion along with diagnostic lithic and ceramic artifacts. Testing in the 1970s and 1980s revealed that the site was intensively occupied both prehistorically and historically and contains evidence of occupation from the Dalton, Late Archaic, Woodland, Emergent Mississippian, and Mississippian periods. An early 19th century farmstead was also identified. The Round Spring Archeological District was listed in the national register in 1993.
- *Shawnee Creek*. This site, on a terrace above the Jacks Fork, was tested during the 1970s and 1980s. Several prehistoric artifacts were recovered, and a Mississippian period wall trench structure with hearth was identified that dated to ca. AD 1050. The site

was listed in the national register in 1990.

- *Two Rivers*. The Two Rivers site was located in 1979 in advance of proposed ground-disturbing construction activities. The site contains significant deep subsurface deposits, and a gravel mound feature was identified in one of the project locations. A large number of projectile points were identified from archeological monitoring conducted in 1988 during the placement of a pipeline. The site was listed in the national register in 1993.

During 2010, NPS archeologists surveyed about 32 miles of authorized and unauthorized horse trails in the Two Rivers area of the NPS Riverways and near the Red Rock-Martin Bluff campground and the Nichols Cabin. Investigations were conducted to assess the potential adverse impacts of horse use on known and previously unidentified archeological sites. The National Riverways maintains four authorized horse trails in the Two Rivers area, and the area receives a high volume of horse riding traffic. As a consequence, trails have widened in places and become deeply incised and eroded; several unauthorized social trails have also developed as offshoots from the main designated trails.

The investigations yielded 15 prehistoric artifacts (three diagnostic of the Emergent Mississippian, Dalton, and Middle Archaic periods) in the Two Rivers area. Nine new archeological sites (isolated finds) were recorded, and artifacts were recovered from two previously identified sites.

It was recommended that annual monitoring be implemented to assess the ongoing condition of the archeological sites observed to be impacted by the horse trails and to assist possible stabilization efforts. Additional testing was recommended to document and evaluate the subsurface nature and areal extent of four identified sites (NPS 2011d).

HISTORIC BUILDINGS, STRUCTURES, AND CULTURAL LANDSCAPES

Most of Ozark National Scenic Riverways historic structures, buildings, and associated cultural landscapes are listed in the National Register of Historic Places or have been determined eligible for listing. The NPS Riverways' List of Classified Structures presently lists 249 historic structures. The National Riverways' Cultural Landscapes Inventory database lists 15 historic properties for which associated cultural landscape documentation has been completed.

The Maggard Cabin, Chilton House, and the Reed Log House (Macy Cabin) are the only national register-listed or -eligible buildings that predate the ca. 1880 to 1920 era of corporate railroad and lumber development.

The Chilton House (built ca. 1869 and altered in 1875) was listed in the national register in 1981 as part of the Chilton-Williams Farm Complex. This latter 19th century complex at Owls Bend is representative of the more successful commercial farms that were established on the few fertile terrace lands along the upper Current River. Francis Chilton acquired the land in 1859, and the property remained in the Chilton family until 1912. The farm's 17 contributing outbuildings and other structures, along with the surrounding agricultural landscape, retain a high degree of integrity from the late 19th and early 20th century period of significance. In efforts to convey a semblance of the early 20th century field patterns, the National Park Service rents the property's agricultural lands to local farmers primarily for hay production. Cultural Landscape Inventory documentation has been completed for the property and provides detailed information supporting the site's historical, architectural, and landscape significance (NPS 1991a; List of Classified Structures: *Chilton House*; Cultural Landscape Inventory: *Chilton-Williams Farm Complex*).

The Reed Log House, which originally was built about 1857 with later additions, is

representative of the more common rural vernacular building types of the region. The house is in Shannon County on a 37-acre parcel with surrounding open fields that provide a setting contributing to the site's historic farmstead landscape. The one-story, single-pen log building was adapted and modified over subsequent historic periods, and its period of significance extends to 1940. It has clapboard siding, incorporates half dovetail-notched joinery and stone piers, and rests on a stone and mortar foundation. The house was listed in the national register in 1991 and was stabilized in 2002. Cultural Landscape Inventory documentation has been completed for the property and provides detailed information supporting the site's historical, architectural and landscape significance (NPS 1991a; List of Classified Structures: *Reed Log House*; Cultural Landscape Inventory: *Reed Log House Site*).

The Maggard Cabin may be the oldest structure in the National Riverways. It was built about 1855 by George Howell on a bluff overlooking the Current River in Shannon County. The cabin and the Reed Log House are the only single-pen log dwellings remaining in the National Riverways. Exterior log walls are square-hewn and are joined with half dovetail notching. Partially disassembled in the 1970s, the cabin was reconstructed in 2000 with mostly original materials. The period of significance extends to 1914 when the property passed from Howell family ownership. The cabin is surrounded by a small, open clearing and a split rail fence. It was determined eligible for the national register in 2004 (List of Classified Structures: *Maggard Cabin*; Cultural Landscape Inventory: *Maggard Cabin Site*).

The Pulltite Cabin was built in 1911 to 1913 by a group of St. Louis businessmen for their use as a private seasonal dwelling for hunting, fishing, and other recreational pursuits. The 1.5-story, log cabin is recognized as a notable example of "Creole" style architecture, with vertical log walls, broken-pitch gable roof, and shingled gable ends. The period of significance extends to 1967 when ownership passed from the heirs of the last original owner to the National Park Service. The cabin's setting retains a high degree of rustic integrity from the period of significance. Pulltite Spring, steep cliffs, and tree-covered slopes are among the property's distinguishing landscape features. The cabin was determined eligible for the national register in 2004 (List of Classified Structures: *Pulltite Cabin*; Cultural Landscape Inventory: *Pulltite Cabin Site*).

The Klepzig Mill and Farm Historic District along Rocky Creek was listed in the national register in 1990. Walter Klepzig purchased an earlier water mill and converted it in the 1920s to operate on water turbine power. Klepzig also operated a farm and dairy on his property. The mill survives as the only one of dozens of small grist mills once common in the area. The cultural landscape of the site continues to reflect the relationship of a small subsistence-based milling operation and an associated farm site. The mill is also architecturally significant as the only extant example of a mill structure in the Ozarks with the vernacular "sawmill" method of construction, with boards and battens nailed to top and bottom sills without framing. The district contains several contributing properties, including the ruins of a house, barn, and granary. A smokehouse, springhouse, road, mill dam, and headrace are also contributing structures (NPS 1991a; List of Classified Structures: *Klepzig Mill;* Cultural Landscape Inventory: *Klepzig Mill and Farm;* NPS, "Klepzig Mill": park website article, n.d.b; Outlaw 1989).

The Alley Spring Roller Mill, constructed in 1893 to 1894, is an outstanding example of a rural, turn-of-the-20th-century, commercial flour mill. The mill, the last of a succession of mills at Alley Spring, was powered by a water-driven turbine. The iconic, 2.5-story, wood-frame structure (larger than most along the riverways) rests on a stone foundation, has a gabled wood shingle roof, and weatherboard exterior siding. Most of the machinery inside the mill is original to its construction in the 1890s. The mill became the focal point of a

small hamlet that developed at Alley Spring, and often served as a popular local gathering place. The mill's technology became obsolete by the mid-1920s. However, Alley Spring became a popular tourist destination and resort community; a state park was established there in 1924. The mill was restored by the Civilian Conservation Corps in 1933. The structure was listed in the national register in 1981. It is also part of the Alley Spring State Park Historic District (determined eligible for the national register in 2004) that includes a 1924 ranger station and later structures that include cabins and a pump house built by the Civilian Conservation Corps during the 1930s in the rustic style of park architecture. Cultural Landscape Inventory documentation has been completed for the historic district and provides detailed information supporting the district's historical, architectural, and landscape significance (NPS 1991a; List of Classified Structures: *Alley Spring Roller Mill*; Cultural Landscape Inventory: *Alley Spring State Park Historic District;* NPS, "Alley Mill": park website article, n.d.a).

The Nichols Farm District was listed in the national register in 1989. The property in Parker Hollow was acquired by John and Susie Nichols in 1897 and includes their house and barn (both constructed ca. 1910) and a corncrib (ca. 1932). The well-preserved farm complex represents a significant example of traditional vernacular architecture in the Ozarks. The house (built from sawmill construction with a double-pen mirror-image façade) and the single crib log barn exhibit the most common architectural forms in the area. The structures, a spring, and other elements of the site's cultural landscape reflect the persistence of Scots-Irish frontier traditions and subsistence patterns from the 19th century well into the 20th century. Cultural Landscape Inventory documentation has been completed for the farm complex and provides detailed information supporting the site's historical, architectural and landscape significance (NPS 1991a; List of Classified Structures: *Nichols Cabin/House*; Cultural Landscape Inventory: *Nichols Farm*).

Two small rural schools, the Buttin Rock School (ca. 1912) and the Lower Parker School (ca. 1906) were listed individually in the national register and were jointly included in the national register in 1991 as part of a multiple-property submission of "Missouri Ozarks Rural Schools." Throughout most of their history, the one-room wood frame schoolhouses provided education for small numbers of local children and also served as community social centers. The schools reflect the rise of public education as part of the larger social changes that occurred in the region between 1880 and 1920. The schools remained in service until about the mid-20th century. Cultural landscape documentation has been completed for both schools (NPS 1991a; List of Classified Structures: *Lower Parker Schoolhouse*; List of Classified Structures: *Buttin Rock School;* Cultural Landscape Inventory: *Buttin Rock School Site;* Cultural Landscape Inventory: *Lower Parker School Site*).

The one-room stone veneer Owls Bend School (built in 1936) and the ruins of the Cedargrove Schoolhouse (built in 1939) were also determined eligible for the national register in 2004 within the historic context of the earlier, multiple property rural school nomination (List of Classified Structures: *Owls Bend School*; List of Classified Structures: *Cedargrove Schoolhouse Ruins*).

The Big Spring Historic District was listed in the national register in 1981. The district is significant for its association with the development of tourism and recreation in Missouri and remains the most intact and accessible historic area within the NPS Riverways. The national register nomination identified two primary periods of significance (1925–1927 and 1933–1937) for the district, although recent Cultural Landscape Inventory documentation suggests expanding the period of significance to 1950 and also including the period between 1928 and 1932.

Big Spring began as a state park (dedicated in 1926) that became a popular destination for the emerging auto-touring public. In 1933, the Civilian Conservation Corps established Camp 1710 at Big Spring and undertook many site improvements. The first of these was the construction of a flood control dike system.

The district consists of over 40 structures listed on the List of Classified Structures, including an entrance building, several rental cabins, maintenance and service structures, a dining lodge, museum building, latrine, picnic shelters, foot bridge, trail and road system, and other structures associated with the Civilian Conservation Corps camp. As part of the landscape design for the area, buildings and structures were typically built in the "rustic" style of park architecture that incorporated natural materials such as logs, timber, rocks, and stone in construction to blend them with the surrounding environment.

In 1970, Big Spring State Park was conveyed by the state of Missouri to the federal government to become part of Ozark National Scenic Riverways. The historic district retains a high degree of integrity and, as noted in the Cultural Landscape Inventory, "all circulation patterns essentially maintain the historic layout, very few modern structures have been built, and the extant historic structures have been very well preserved." (NPS 1991a; List of Classified Structures: *Big Spring Historic District*; Cultural Landscape Inventory: *Big Spring Historic District*).

In 2004, the Big Spring Fire Lookout Tower and its associated structural features that include access roads, an adjacent rock quarry, stone retaining wall, privy, and radio shed sites were determined eligible for listing in the national register. The steel frame, 80-foot-tall fire lookout tower was built in 1935 by the Civilian Conservation Corps as part of regional efforts to conserve and protect the surrounding forest. A 2009 Cultural Landscape Inventory identified the fire lookout tower and site features as contributing elements of the larger Big Spring Historic District and recommended that the district boundaries be expanded to include the fire tower site. The state historic preservation officer concurred with the Cultural Landscape Inventory findings and recommendations.

A wood frame barn in the Big Spring area is thought to have been constructed for operations of Big Spring State Park in the late 1930s or 1940s. The barn is currently outside the designated Big Spring historic district and cultural landscape boundaries. Presently used for NPS storage purposes, the barn has not been formally assessed for national register eligibility. It was built on the site of an earlier (ca. 1900) farmstead developed by Robert Lee Coleman. Historic archeological and cultural landscape features associated with the site include building foundations, old agricultural fields, and historic road traces.

Foundation remains and other archeological evidence of Civilian Conservation Corps Camp 1710 are also in the Big Spring area. Formal archeological investigations of the national register-eligible campsite have not been completed. The fire tower site, barn, and Civilian Conservation Corps campsite are included in an area that has been proposed for possible wilderness designation (List of Classified Structures: *Big Spring Historic District*; Cultural Landscape Inventory: *Big Spring Historic District*; NPS, 2012).

The 194-acre Partney Farm, located along the lower Current River in Carter County, includes a two-story farmhouse built in 1913, outbuildings, a pond, spring box, and small family cemetery. The farm site, which was determined eligible for the national register in 2004, was settled in 1875 by James Chilton, who cleared the land and built a log cabin (nonextant). To maintain the open agricultural field patterns, the National Park Service leases the fields to area farmers who use them for hay production. The farm house

is currently used as seasonal quarters for NPS staff.

The farm and its cultural landscape retain a high degree of integrity representative of the area's more prosperous early 20th century working farms. Cultural Landscape Inventory documentation has been completed for the property and provides detailed information supporting the site's historical, architectural, and landscape significance (List of Classified Structures: *Partney Farm*; Cultural Landscape Inventory: *Partney Farm*).

The hamlet of Akers Ferry was determined eligible for the national register in 1993 as a rural historic district. The period of significance of the crossroads community is 1930 to 1950. Important character-defining elements of the district include the open field patterns, cemetery, Mount Zion church, store, ferry, and the road system. The Mount Zion church, which was completed in 1948, was originally determined a contributing feature of the district, and in 2010 was also determined individually eligible for the national register principally for the distinctive Ozark "giraffe" style of stonework exhibited in its exterior construction. Cultural Landscape Inventory documentation has been completed for the church site (List of Classified Structures: *Akers*; Cultural Landscape Inventory: *Mt. Zion Church Site*).

In 2004, the former recreational development known as Cardinal Acres at Buck Hollow along the Jacks Fork was determined eligible for the national register. The Cardinal Acres site presently consists of two frame summer cabins built for recreational tourists in the 1920s and 1930s on a bluff overlooking the river. Other contributing structures include privies, a shed, and building foundations (List of Classified Structures: *Buck Hollow: Cardinal Acres*; Cultural Landscape Inventory: *Cardinal Acres*).

The Cedargrove Community Site was the location of a small hamlet that emerged in the late 19th century along the Salem-West Plains Road near the Current River. The community prospered into the early 20th century, supported by the local agricultural and lumber economy. The site is now largely overgrown with natural vegetation and no standing structures exist, although a series of foundations, fences, stone walls and domestic plantings provide evidence of the former community. The site was determined eligible for the national register in 2004 (Cultural Landscape Inventory: *Cedargrove Community Site*).

The Welch Cave Site (located along the Current River about 1.75 miles north of Akers Ferry) was originally the site of a grist mill constructed ca. 1885. The property was later purchased by Dr. Christian H. Diehl in 1913. In 1935, Diehl excavated an entrance to the cave and constructed a two-story concrete wall and stone veneer entrance building. He operated the property as a commercial spa/resort promoting the therapeutic value of the cool cave air for guests. Although adjacent guest cabins, picnic grounds, and workers quarters were constructed the stabilized ruins of the stone cave entrance building is all that currently remains. The Welch Cave Site was determined eligible for the national register in 2011, locally significant for the Ozark "giraffe" style stonework of the entrance building and for its association with the region's growing popularity as a recreational destination. The site's period of significance extends from 1935 to Diehl's death in 1940. The cultural landscape associated with the site has been documented and assessed as having overall good integrity (List of Classified Structures: *Welch Cave Hospital;* Cultural Landscape Inventory: *Welch Cave Site*).

Some of the National Riverways' historic properties have been determined ineligible for the national register but are nevertheless managed as cultural resources by the National Park Service and are on the List of Classified Structures. Among these are the old general store at Round Spring (ca. 1925), and several family cemeteries (e.g., the Lower Grassy, Dyer, Kellys and Weese cemeteries).

ETHNOGRAPHIC RESOURCES

Ethnographic resources are defined by the National Park Service in Director's Order 28 as "a site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it." Ethnographic resources typically hold significance for traditionally associated groups whose sense of purpose, existence as a community, and identity as an ethnically distinctive people are closely linked to particular resources and places.

Ethnographic resources are likely to exist throughout Ozark National Scenic Riverways and the surrounding region, which have traditional cultural associations with the Osage Nation and other tribes. During the historic period from about the early 18th to early 19th centuries, the Osage dominated much of the area south of the Missouri River that is now included in southern Missouri. From permanent villages concentrated primarily in southwestern Missouri, they undertook far-ranging seasonal hunting trips that frequently entered the eastern Ozarks and sometimes traveled as far as the Red River in Texas. Hunting expeditions were undertaken primarily for buffalo, deer, bear, and other animals. They supplemented their hunting activities by collecting wild fruits, nuts, and other plants, and also grew small plots of corn, squash, and pumpkins. The Osage continued to hunt and trade in the eastern Ozarks following the relinquishment of much of their traditional tribal lands in 1808 (NPS 1991a).

Following the Treaty of 1825 by which the Osage ceded the remainder of their lands to the United States, the tribe relocated to reservation lands in present-day Kansas and Oklahoma. Other displaced eastern tribes such as the Delaware, Shawnee, Cherokee, and Choctaw relocated to southeast Missouri and established farming villages. During the early 19th century, the Delaware established short-lived villages on the Jacks Fork near present-day Eminence. By the 1830s, most members of these emigrant tribes also relocated to Kansas and later to Oklahoma reservations. However, there is evidence that some tribal members stayed or returned to the Ozarks and sometimes married members of other pioneer families (NPS 1991a; Zedeno and Basaldu 2003).

The National Riverways presently consults on a government-to-government basis with the following federally recognized tribes:

- Absentee-Shawnee Tribe of Indians of Oklahoma (Shawnee, OK)
- Cherokee Nation (Tahlequah, OK)
- Delaware Nation (Anadarko, OK)
- Delaware Tribe of Indians (Bartlesville, OK)
- Eastern Shawnee Tribe of Oklahoma (Seneca, MO)
- Osage Nation (Pawhuska, OK)
- Shawnee Tribe (Miami, OK)
- United Keetoowah Band of Cherokee Indians in Oklahoma (Tahlequah, OK)

A cultural affiliation study was completed for Ozark National Scenic Riverways by a team of ethnographic researchers from the University of Arizona's Bureau of Applied Research in Anthropology. The study focused primarily on the cultural history of American Indian habitation and use of the area encompassing the National Riverways. Information gathered from the research was used to address the NPS Riverways' cultural affiliation and consultation requirements under the Native American Graves Protection and Repatriation Act and other policy and regulatory provisions. Purposes of the study included (1) identifying the American Indian groups (both prehistoric and contemporary) determined to have cultural affiliations with the National Riverways and its resources; (2) determining potential relationships between objects in the National Riverways collections to culturally

affiliated tribal groups and individuals; and (3) determining the relationships between other park resources to contemporary Indian groups (Zedeno and Basaldu 2003).

As supported in the archeological record, the cultural affiliation study concluded that prehistoric peoples have inhabited and exploited resources in the National Riverways and the surrounding region on a primarily seasonal and semipermanent basis since the late Paleo-Indian period. The seasonal patterns of use likely continued throughout the ensuing protohistoric and historic periods, when the Osage incorporated the area into their winter hunting grounds. Human remains, associated funerary objects, and sacred objects have been recovered from archeological sites in the National Riverways, and some have ancestral associations with the late prehistoric Mississippian groups who inhabited the central Mississippi valley and its hinterlands.

The study presented several recommendations for future research and interpretation, including a high probability that investigations would identify additional historic Indian campsites, village sites, trails, burial grounds, and cemeteries. The study recommended that further ethnographic resource investigations be conducted to document the cultural use and importance of features such as plants, animals, landforms, and mineral resources that may have significance to traditionally associated tribal groups. Information acquired from these investigations could, as appropriate, be incorporated into NPS interpretive programs (Zedeno and Basaldu 2003).

Ozark National Scenic Riverways also represents a significant ethnographic landscape for the descendants of the European American settlers who moved to the area during the early 19th century. Predominantly of Scots-Irish ancestry, they established farmsteads and rural communities in the region that were commonly organized along kinship ties. Although never completely isolated, the early settlers adapted to the rugged terrain of the Ozarks and became renowned for their strong sense of individualism and self-sufficiency. The distinctive folk customs and lifestyles they introduced to the region are enduring and deeply interwoven aspects of their cultural legacy.

Nineteenth century settlement often reflected continuity with land use patterns that had prevailed along the Current River since prehistoric times, with the river terraces and broad, level areas at the river bends used for habitation and crop cultivation. The settlers used the rocky, higher elevations for livestock grazing and foraging and often allowed their cattle and hogs to roam freely in the woods. Hunting and trapping wild game and gathering plant foods and herbs were other important subsistence activities.

Topography played a critical role in shaping the frontier culture of the Ozark settlers, with more extensive commercial farms and plantations developed along the lower, more navigable stretches of the Current River. The rugged terrain and narrow valleys of the upper Current River were more suited to the generalist economic strategies of the self-sufficient settlers who relied on noncommercial farming, livestock raising, and hunting. Among the character-defining elements of the ethnographic landscape that evolved as the settlers adapted to the Ozark highlands are the patterns of agricultural fields and dense natural vegetation; the circulation network of roads, trails and river crossings; and the rivers themselves, which figured prominently in nearly all aspects of daily life, sometimes facilitating and at other times hindering transportation, communications, and commerce.

The small hamlets and villages that emerged along the rivers, some centered at the sites of saw and grist mills that often doubled as community gathering places, are enduring reminders of the patterns of settlement. Several cemeteries are within the NPS Riverways with continuing family

associations to the earliest periods of settlement (NPS 1991a).

A special-emphasis ethnographic study for the National Riverways examined the traditional and changing roles of women in the Ozarks, their traditional knowledge and relationship to the environment, and their shared experiences and commonalities as well as their unique differences. The investigators researched historical sources, including oral histories conducted for the National Riverways in the late 1970s and early 1980s, and interviewed several area women and men of different ages and economic backgrounds. The study examined the broad range of work carried out by women in and outside the home, their contributions in sustaining family livelihoods, and their far-reaching roles in community activities.

Although many of the women have witnessed profound environmental and cultural changes over their lifetimes, they and their families maintain important connections to aspects of their cultural heritage, and continue to use various areas of the NPS Riverways in sometimes shared and gender-specific ways. The study found that Ozark women have held (and continue to hold) fundamental and diversified roles in fulfilling the tasks necessary to sustain their families. As necessary, they have also applied themselves to tasks more traditionally associated with men's roles, such as tending farm animals and livestock, plowing fields, gathering plants and medicinal herbs, and repairing structures, whereas men were less likely to reciprocate with regard to domestic activities commonly viewed as "women's work." Ozark women have also served indispensable if not always highly visible roles in church and other community affairs (NPS 2001, NPS 2005).

MUSEUM COLLECTIONS

Ozark National Scenic Riverways maintains an extensive museum collection (currently placed at 529,587 items, nearly all of which have been catalogued) consisting primarily of archeological, historical, and biological objects and specimens. Most of the items are archeological artifacts obtained from surveys and excavations sponsored and/or conducted since the early 1970s by the NPS Midwest Archeological Center in Lincoln, Nebraska. The archeological artifacts, associated project reports, and records are curated offsite at Midwest Archeological Center facilities under controlled environmental conditions that meet NPS collections storage and management standards and guidelines. Site information is managed in accordance with the Archeological Site Management Information System.

Among the historical items included in the collections are mill machinery, the Bales float camp collection (including tents, johnboats, utensils, lanterns, and stoves), school furnishings, farm machinery, blacksmithing tools, and objects associated with the activities of the Civilian Conservation Corps. Also included are archival, manuscript, and photographic materials associated with National Riverways structures, activities, and adjacent communities. The natural history collection contains herbarium and fish specimens and associated field records.

The overall condition of the collection is good, although some items have sustained minor damage and deterioration that occurred primarily before the NPS Riverways' present collection storage facility was constructed in 1994. Before the new facility, museum collections were stored at various locations and outbuildings throughout the NPS Riverways under generally poor conditions, and were susceptible to pest damage and deterioration resulting from a lack of environmental controls (NPS 1996; Finney 2006).

The National Riverways' 1,650-square-foot collection storage facility is near Big Spring, about 4 miles from Van Buren and park headquarters. The secure, climate-controlled

facility houses archeological artifacts, reports, and documentary sources generated, in most cases, from recently completed or in-progress investigations. Materials are subsequently transferred to the Midwest Archeological Center upon project completion. The storage facility is equipped with fire detection and intrusion alarm systems and an automatic fire suppression system. The facility includes an additional 450-square-foot office and curatorial work space for the use of researchers and NPS staff (NPS 1996).

The National Riverways' museum collections management plan (NPS 1996) provided several recommendations to improve the storage and curatorial management of the collections in response to generally minor deficiencies noted at that time. These included recommendations to update and complete the accessioning and cataloging of collection items, and these recommendations were implemented over the ensuing years.

The plan noted that management decisions were needed with regard to the disposition of some collection items stored in the Ramsey Barn and the blacksmith shop at Powder Mill, and in the Cotton Barn at Big Spring. It was recommended that objects be deaccessioned if they were determined outside the National Riverways' scope of collections statement and no longer important to the NPS Riverways' educational and interpretive goals. It was also noted that although the collection storage building provided adequate protection for the preservation of the collections, many items required some degree of curatorial treatment, in some cases requiring the services of a professional conservator. Conservation treatment was identified as a high priority for the National Riverways (NPS 1996).

In accordance with the NPS Midwest Region's museum collection storage plan (2006), it was determined that the most practical and cost-effective means of achieving comprehensive stewardship for museum collections from the region's various park units was for several parks to share curatorial storage resources and consolidate collections at 15 multipark facilities. The plan recommended that collections from 54 park facilities identified as being in poor to serious condition be relocated to the multipark facilities. It also recommended the retention of 43 existing collection storage facilities found to be in good condition and that met 75% or more of the NPS museum standards. With specific regard to the NPS Riverways, the plan recommended that the existing collection storage building be retained, but that the storage of collections in outlying buildings be eliminated and items be deaccessioned if they were identified as being outside the scope of collections statement. It was further recommended that planning begin for the development of a dedicated, stand-alone, multipark collection storage facility at the National Riverways (NPS 2006b).

VISITOR USE AND EXPERIENCE

VISITOR USE TRENDS

Visitors to Ozark National Scenic Riverways have opportunities to enjoy the beauty of the free-flowing rivers from motorboats; while floating, such as in tubes, kayaks, or canoes; or fishing. Most visitors come to the area to float the river, while some come to the NPS Riverways for opportunities to camp, hike, tour historic sites, examine springs, ride horseback, and join ranger-led activities. Other opportunities include scenery and wildlife viewing, special events, traditional craft and skill demonstrations, bicycling, stargazing, hunting, and fishing. Although many people come to the area for recreation, others simply pass through the NPS Riverways while traveling locally.

The National Riverways boundary parallels the rivers and is intersected by several state and county roadways leading to local towns and communities. For the purpose of this document, visitors are defined as anyone who enters the park unit or uses NPS facilities for any reason. Visitor use data include how many people visit the National Riverways, when they visit, how often they visit, how long they stay, where their travels originate, and activities in which they participate.

Visitation to Ozark National Scenic Riverways has remained fairly steady since the mid-1970s with around 1.5 million recreation visits in most years (figure 10). Typically, visitation peaks during the summer months and then begins to taper off in September (figure 11).

A peak in visitation occurred in 1972, when the NPS Riverways was first established and more than 3 million people visited the park unit. Another peak in visitation occurred in 1991 with just over 2.3 million recreation visits. NPS forecasting suggests a slight decline in recreation for the next few years (NPS 2011a).

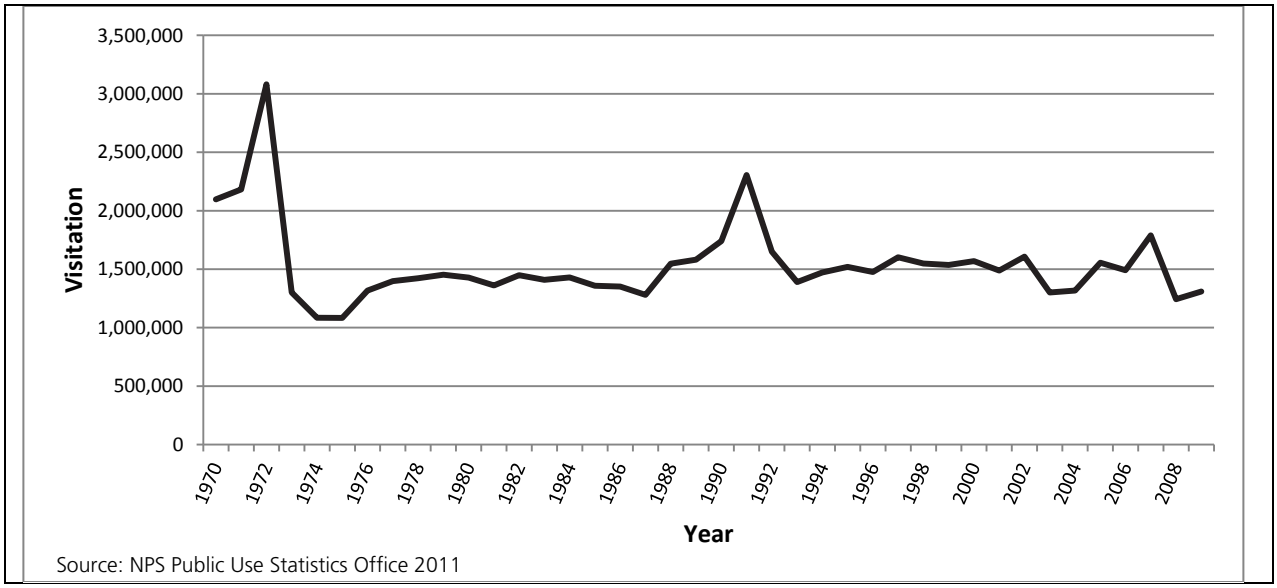


FIGURE 10. ANNUAL RECREATION VISITS, 1979–2009

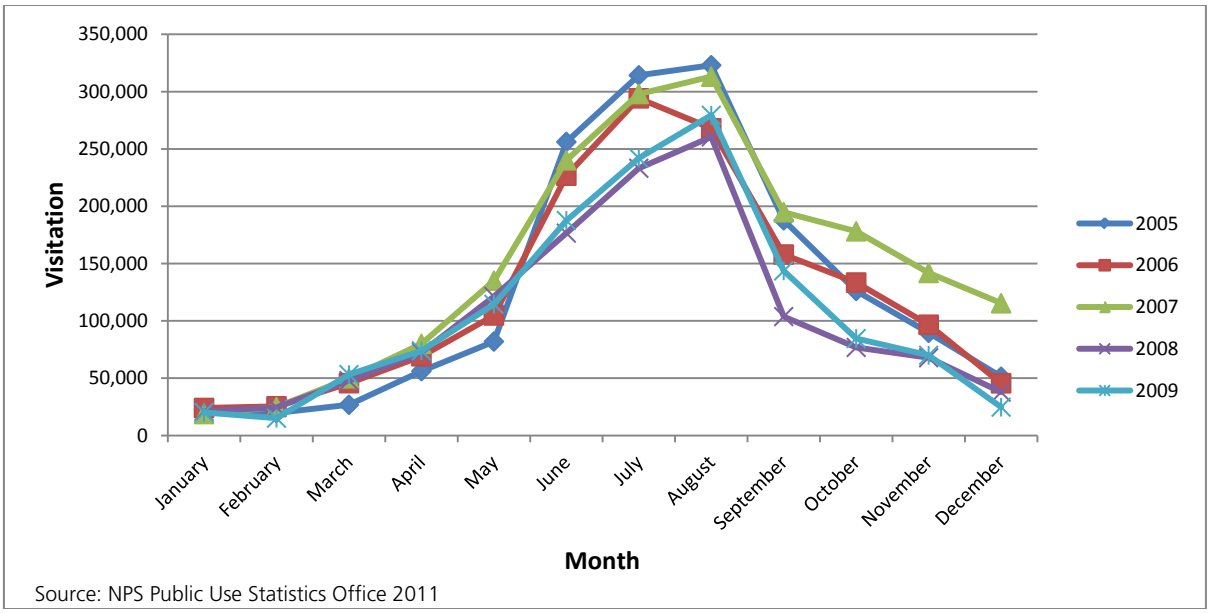


FIGURE 11. MONTHLY RECREATION VISITS, 2005–2009

VISITOR CHARACTERISTICS, PERCEPTIONS, AND OPINIONS

In 2006, a visitor survey was conducted to obtain visitor use information for the National Riverways (Morgan 2007). The following types of information were collected: (1) demographic information, (2) activity style and participation, (3) environmental and social perceptions, 4) concessioner utilization, (5) preference and satisfaction measures, and (6) policy and management issues. The response rate was 56.9% with 671 of 1180 questionnaires returned. Findings included the following:

- Most visitors to the National Riverways came with friends and family, with an average group size of 7.9 people.
- Of those that responded to the survey, 83.5% of visitors were aware that Ozark National Scenic Riverways was managed by the National Park Service.
- With 90.2% being repeat visitors, the two major sources of information about the National Riverways were previous visits and word of mouth.
- Day visitors (33.9%) tended to spend about 6 hours in the National Riverways, while overnight visitors (66.1%) stayed an average of 3.9 days.
- Many visitors used commercial service providers (35.6%). Of those, 73.3% rented a canoe, tube, or raft.
- In reference to crowding issues, most visitors (84.2%) thought there was no need to limit the amount of visitor use on the river for now and 75% felt that Ozark National Scenic Riverways was not excessively crowded.
- Most visitors (62.4%) thought the amount of recreational use they encountered neither detracted nor added to the quality of their experience. However, 22.2% thought it was somewhat detracting and 15.4% thought it added to the quality of their experience.
- Of the visitors that thought the amount of recreational use detracted from their experience, 32.1% would

change nothing and 32.4% would switch days of the week.

- Although most environmental issues were rated as "not a problem" or a "slight problem," the most severe issue was "litter or trash."

ABILITY TO ACCESS THE NATIONAL RIVERWAYS

The NPS Riverways can be reached via well-maintained state highways that intersect the park unit in several locations. These highways are hilly and winding, yet provide for excellent scenic driving.

Access to the NPS Riverways backcountry areas is typically provided via dirt roads that are less maintained. Some of these roads are suitable for passenger vehicles and recreational vehicles, while others are not. Visitors interested in using these areas can check at ranger stations, sheriff's offices, canoe rental shops, and at other local business for road conditions.

A 1991 roads and trails study at the NPS Riverways identified legal and illegal roads. Although there are many officially designated roads and access points along the length of the riverways, several illegal roads and access points exist. The official park-, state-, and county-maintained roads and access points are available for visitors; however, because of the numerous unofficial roads and access point, visitors can become confused and perpetuate the use of unofficial roads and access points.

Horseback rides occur at various places along the Current and Jacks Fork rivers with major concentrations originating at the Cross County Trail Ride campground in Eminence for rides along the Jacks Fork. This campground provides stalls for horses, a dining hall, a large arena for entertainment, and other services (Chilman and Vogel 2001). The National Riverways provides 23 miles of designated horse trails and several river crossing points for visitors to enjoy.

Visitors who are interested in motorized or nonmotorized river use can access the riverways via specified access points. A study conducted during the May–August 2010 peak season indicated that people floating in canoes, tubes, rafts, and kayaks launched from more than 27 locations, within and outside of National Riverways boundaries, as shown in table 20. The areas of the greatest activity for nonmotorized river users included Aker's Ferry, Cedargrove, and Pulltite. Waymeyer is also a busy location for nonmotorized watercraft users, but this is **not** reflected in table 20 because visitors who launched at Waymeyer ended their trip in the gap outside the NPS Riverways boundary, typically in the Town of Van Buren (Park 2011).

At canoe rental stores in the area, visitors can rent all of the equipment they need to boat and float on the rivers, including canoes, kayaks, rafts, and tubes. Most rental shops pick visitors up at the end of their river experience, and some provide pickup at hotel rooms and campsites for dropoff.
Many of the visitors to the NPS Riverways use concessioner services to access the river. However, there appears to be an increase in the number of river users who are bypassing the concessioners.

TABLE 20. NONMOTORIZED WATERCRAFT LAUNCH LOCATIONS AND FREQUENCY DURING THE MAY–AUGUST PEAK SEASON

Launch location	Launch frequency	Percent
Aker's Ferry	104	31.0
Cedargrove	67	20.0
Pulltite	42	12.5
Van Buren	26	7.8
Baptist Camp	15	4.5
Alley Spring	13	3.9
Eminence	11	3.3
Two Rivers	10	3.0
Welch Spring/ Landing	6	1.8
Private Landing	6	1.8
William's Landing	5	1.5
Waymeyer	4	1.2
Round Spring	4	1.2
Big Spring RV	4	1.2
Watercress	3	0.9
Tan Vat	2	0.6
Jerktail Landing	2	0.6
Bay Creek	2	0.6
Sinking Creek	1	0.3
Raft Yard	1	0.3
Montauk	1	0.3
Jelly Stone	1	0.3
Deer Run	1	0.3
Circle B	1	0.3
Camp Zoe (floated down Sinking Creek)	1	0.3
Below Jerktail Landing	1	0.3
Anglein	1	0.3
Total	**335**	**100.0**

SOURCE: Logan Park (2011)

RIVER-BASED RECREATIONAL OPPORTUNITIES AND EXPERIENCES

Visitors have access to a wide range of river-based recreational opportunities including motorboating, floating (canoeing, kayaking, rafting, and tubing), and fishing. The rivers are much less crowded on weekdays during the summer or during the off-peak season.

Ozark National Scenic Riverways aims to offer visitors a fun, family atmosphere where they can enjoy the natural wonders and enjoy the sparkling rivers. However, there have been problems with a small minority of nonmotorized watercraft users who have demonstrated rowdy behavior that has negatively affected the experience of other visitors. The NPS Riverways staff is making an effort to encourage displaced families that have stopped coming to the NPS Riverways to recreate in the park unit again by relying on Missouri State Statute and CFR to change behavioral issues (Park 2011).

In 1989, visitor capacity monitoring was outlined by the river use management plan. The purpose of the monitoring was to determine whether

- management objectives for river use were being met
- changes were occurring in use conditions and use patterns
- there were ways to improve quality for visitors

The 1989 plan was the result of research that began in 1972 by Chilman and has continued through the research conducted during the summer of 2010. As described by Brown and Chilman (1999 and 2002), monitoring should occur on a 3-year cycle on one-third of the 134 miles of river. This reduces the burden on the NPS Riverways staff to have a full-scale monitoring effort every year but is still sensitive enough to detect changes in amount and type of use on the rivers.

Visitor counts and interviews were conducted at five river access points in 1998 and 2001. These points included Watercress, Van Buren Bridge, Big Spring canoe access, Big Spring boat access, and Cataract Landing. Though Watercress and VanBuren are outside the

National Riverways boundary, these sites were used by Chilman, Brown, and Park since they are primary access points to the riverways and allowed for the most contact with park visitors. Due to the large number of tubes, the number of interviews with motorboaters decreased from 59 in 1998 to 41 in 2001, while the interviews with canoe and tube visitors increased from 59 to 73.

In 1998, results indicated that canoe use was in the historical range prescribed in the 1989 river use management plan objectives. However, use appeared to have increased among all user groups (canoes, tubes, and motorboats) on the Current River, especially the 11.9-mile-section between Chilton Creek and Big Spring (Brown and Chilman 1999). If managers counted motorboats and tubes in the calculation for maximum watercraft per zone, 13 sampling days exceeded the objective set for the river section between Chilton Creek and Big Spring. Similarly, 2001 results showed that 15 days exceeded the objectives set forth in the 1989 river use management plan for the section of the river between Chilton Creek and Big Spring.

Both of the Brown and Chilman (1999 and 2002) study reports indicated that results did not suggest unreasonably high levels of dissatisfaction with the quality of the recreation experience on the riverways. It was also recommended that future management plans should establish both motorboat and tube density guidelines

In 2010, another study assessed visitor-related impacts for Ozark National Scenic Riverways during the May to August peak season, and answered the following questions related to river-based recreation:

- What are the current river use levels?
- What are the range of experiences available on the river with respect to crowding and conflict (Park 2011)?

As demonstrated in table 21, per hour maximum visitor use varied greatly based both on location and activity. As shown in table 22, motorized and nonmotorized watercraft users reported that they also participated in a wide range of other activities. While visitors in using motorized watercraft were more likely to fish and swim; those using nonmotorized watercraft tended to camp, canoe, kayak, and tube (Park 2011). Park (2011) reported the following regarding visitor encounters.

Among motorized watercraft users, 26% would have preferred to encounter fewer visitors and 20% would have preferred to encounter more. About 37% of motorboaters did not have a preference and 17% would have preferred to encounter the same number of visitors as they did on the day of their trip (figure 12).

A higher percentage of nonmotorized watercraft users had a preference related to encounters, as shown in figure 13. Only 11% of these river users reported having no preference in relation to visitor encounters, while 38% reported that they would prefer to encounter the same amount of visitors that they encountered on the day of their trip. Almost 40% of nonmotorized watercraft users would have preferred to encounter fewer visitors on the river, while 12% would have preferred seeing more visitors. When asked if information on less-crowded sections of the river would cause them to use those areas instead, 36% of nonmotorized watercraft users said they would use less busy sections if given the opportunity.

Motorized and nonmotorized watercraft users were asked if other river users were a problem for them. Among motorboaters, 13.5% thought that other users were a problem, while only 3.9% of nonmotorized watercraft users perceived other users as a problem.

LAND-BASED RECREATIONAL OPPORTUNITIES AND EXPERIENCES

Research on trail riders has shown increased popularity of horseback riding at Ozark National Scenic Riverways over the last several decades (Chilman and Vogel 2001). This study obtained management data on numbers and types of horse users, their distribution on local trails, and their perceptions of conditions. Data was collected in 1999 and 2000.

TABLE 21. PER HOUR MAXIMUM BY MONITORING SITE AND ACTIVITY

Sampling site	Canoe	Tube	Kayak	John-boat	Concessioner watercraft	Raft
Aker's Ferry	16	37	25	0	110	10
Alley Spring	16	58	25	1	172	5
Big Spring	16	52	18	54	7	4
Cataract	2	6	2	10	0	0
Cedargrove	7	8	1	0	5	0
Powder Mill	7	10	2	20	10	2
Pulltite	21	12	18	0	73	10
Round Spring	13	30	20	3	76	7
Two Rivers: Current	5	20	17	9	36	2
Two Rivers: Jacks Fork	3	15	10	10	69	0
Watercress	7	383	8	20	6	25

SOURCE: Logan Park (2011)

TABLE 22. ACTIVITIES AT THE NATIONAL RIVERWAYS

Activity	Percentage of motorized watercraft users (n = 132)	Percentage of nonmotorized watercraft users (n = 400)
Camping	5.3	45.3
Swimming	15.9	1.0
Canoeing	0.0	42.0
Fishing	36.4	8.0
Tubing	13.6	52.5
Rafting	0.8	0.5
Kayaking	0.0	3.0
Caving	0.0	0.5
Picnicking	2.3	0.3
Horseback riding	0.0	0.5
Wildlife viewing	0.0	0.3

SOURCE: Logan Park (2011)

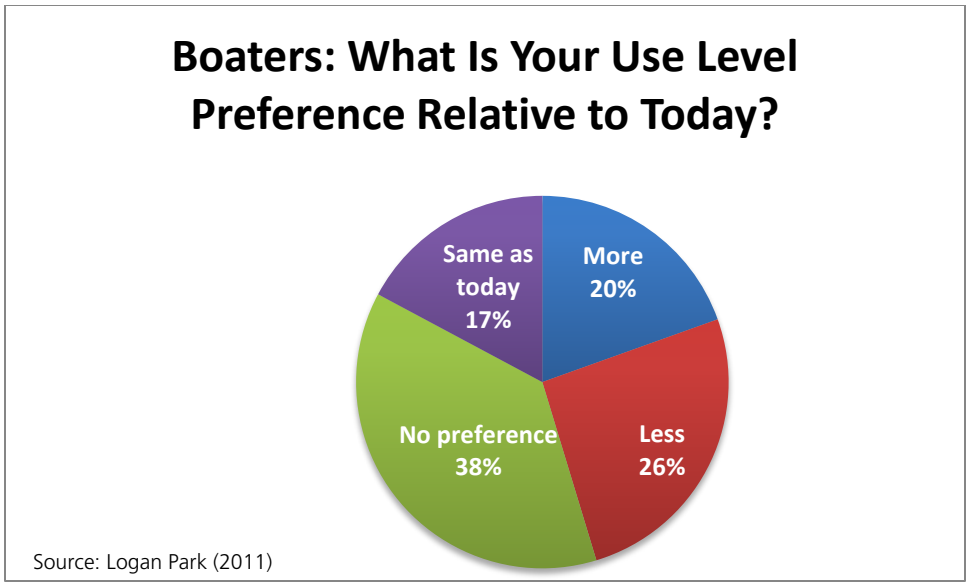


FIGURE 12. MOTORBOATER PREFERENCES ABOUT INTER-GROUP ENCOUNTER NUMBERS

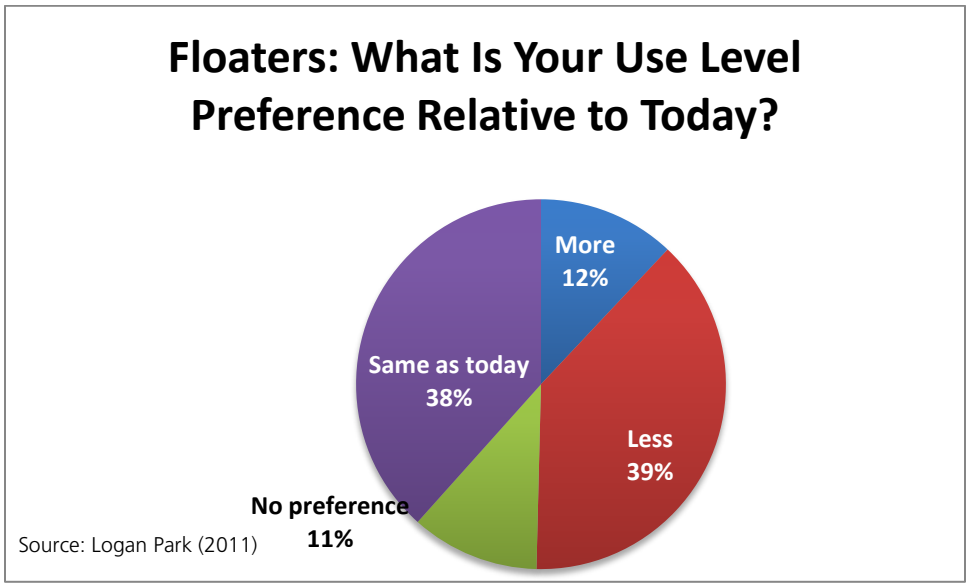


FIGURE 13. NONMOTORIZED WATERCRAFT USER PREFERENCES ABOUT INTER-GROUP ENCOUNTER NUMBERS

Results showed that the numbers of trail riders visiting the Cross Country Trail Ride (CCTR) site near Eminence had increased substantially, with up to 3,000 riders present for some rides. Although a significant portion of the horse trails are not on land owned by the National Park Service, areas upstream and downstream of Cross Country Trail Ride that run along the Jacks Fork and Current River are managed by the National Park Service so understanding how many riders were on the trail and how they distribute their use was important.

Major findings from this research indicated that not all trail riders leave camp each day, and many enjoy other activities, such as sightseeing, canoeing, and socializing at camp. Another important finding was that 77.3% of respondents that reported problems with the trails noted "getting lost," "problems due to lack of trail markers or signs," or "trouble finding way at trail crossings." Findings also showed that there was little contact or conflict with other trail users such as hikers, mountain bikers, or all-terrain vehicles (Chilman and Vogel 2001).

A 2010 study (Park 2011) documented the location and extent of trails used by horseback riders. This study helped answer questions related to horseback riding, including the extent of visitor-created horse trails, and the condition of the trails.

Results showed that the National Riverways has about 3.75 kilometers (2.3 miles) of summer-accessible informal horse trails for every 1.0 kilometer (0.6 miles) of formal trail. In total, the NPS Riverways currently has about 37.8 kilometers (23.5 miles) of park-maintained and -signed trails and 141.8 kilometers (88.1 miles) of informal, visitor-created horse trails.

The condition of the informal horse trails were ranked with condition classes that ranged from zero, representing a barely visible trail, to condition class five, representing a badly eroded trail running directly up slope. The extent of informal trails that fall into various condition class categories is presented in table 23. These results included trail segments that were primarily created or used by the NPS Riverways' herd of free-roaming horses, but that also included signs of domesticated (that is, shod) horse use or human litter. How each trail segment was evaluated for its dominate use type is shown in figure 14.

TABLE 23. INFORMAL HORSE TRAIL EXTENTS BY CONDITION CLASS

Condition class	Kilometers	Miles
0 – Barely visible	1.7	1.1
1 – Continuous loss of vegetation	12.6	7.8
2 – Loss of organic matter	45.2	28.1
3 – Continuously bare soil	27.0	16.8
4 – Isolated erosion sites	21.0	13.0
5 – Gully erosion	15.1	9.4
Other [1]	19.0	11.8
Total informal trail	**141.8**	**88.1**
Total formal trail	**37.8**	**23.5**

SOURCE: Logan Park (2011)

[1] The "other" category includes trail segments for which condition class cannot apply, such as segments with artificial surfaces like crushed stone applied decades ago.

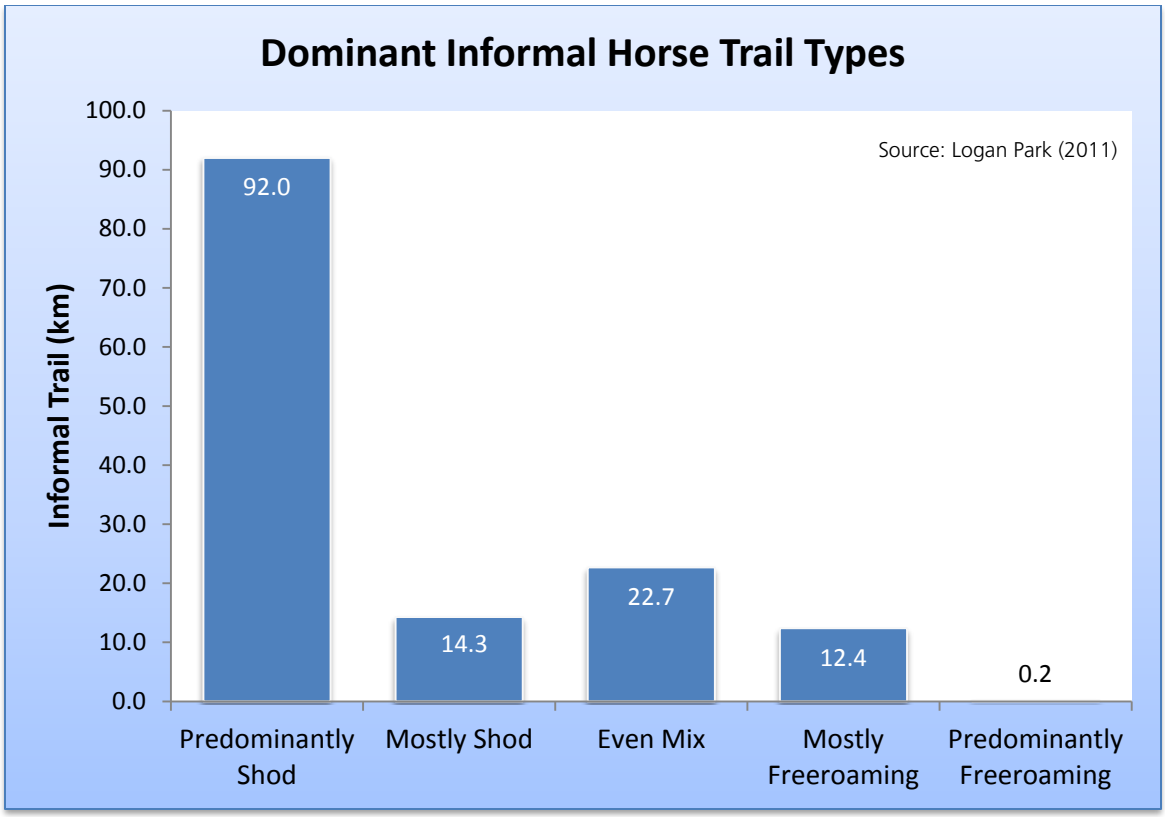


FIGURE 14. DOMINANT INFORMAL TRAIL USE TYPES

Visitors who do not wish to be on the river or ride horses have the opportunity to enjoy other activities. There are currently 49 miles of designated hiking trails ranging in length from less than a mile to the 13 mile section of the Ozark Trail. Many of these trails lead to caves that allow visitors to explore the unique karst geography of the area. However, currently most of the caves in the NPS Riverways are closed to visitors in an attempt to reduce the spread of white-nose syndrome among bats. The proposed wilderness designation of the Big Spring track within the National Riverways may provide additional opportunities for visitor use and experiences of land-based recreation within the park unit.

Camping is a popular activity at the NPS Riverways. Visitors can chose to camp at one of the six developed fee campgrounds at Big Spring, Powder Mill, Two Rivers, Alley Springs, Round Springs, and Pulltite. These developed campgrounds provide sites for tent camping as well as various services for recreational vehicles. If a visitor is looking for a more rustic experience, they have access to backcountry and primitive campsites, and gravel bars. Backcountry campsites require a fee and have basic, limited amenities such as restrooms, tables, and fire grills. Primitive campsites do not require a fee and do not have any amenities. Gravel bars provide visitors with the opportunity to camp along the river and choose their own site, as there are currently not any designated camping spaces on gravel bars.

OPPORTUNITIES TO UNDERSTAND THE SIGNIFICANT STORIES

Enjoying the NPS Riverways and its resources is a fundamental part of the visitor experience. That experience is heightened when it progresses from enjoyment to an understanding of the reasons for the National

Riverways existence and the significance of its resources. Participating in personal interpretive services (for example, staffed visitor contact stations and ranger-led activities) and making use of interpretive services such as wayside exhibits, contact station exhibits, publications, and computer technologies helps visitors form their own intellectual and emotional connections with the meanings and significance of the National Riverways resources.

Ozark National Scenic Riverways seeks to provide and promote opportunities for the scientific and public understanding of the natural and cultural resources and to offer opportunities for understanding and appreciation of the human experience associated with the Ozark Highlands landscape. Visitors have opportunities to connect with the unique stories of the NPS Riverways, including the karst geomorphology, natural resources, water quality, archeology, Ozark culture, history, and recreation.

Due to the linear nature of Ozark National Scenic Riverways with its multiple access points, it is difficult to reach visitors to provide information, interpretation, and educational opportunities. As a result, the National Park Service recently established several seasonal visitor contact locations that provide interpretation and orientation services.

The educational opportunities and the ability to use the natural environment as a classroom for formal educational programs are also challenged by the linear nature of the NPS Riverways. The NPS Riverways provide a number of interpretive facilities and programs for visitors. A year-round visitor contact facility exists at park headquarters in Van Buren where visitors can get information about the NPS Riverways and peruse items in the small bookstore. In addition, the National Park Service is a cooperating agency in the Salem Visitor Center, located in Salem, Missouri. This visitor center has information on visitor opportunities in the region, including the National Riverways, exhibits, and information on the cultural and natural history of the Ozarks.

The NPS Riverways also provides interpretive programs at Alley Mill, Alley Spring General Store, Big Spring, and Round Springs. The interpretive staff reached an estimated 42,000 visitors at these locations in 2010.

Hikes and ranger led tours are available at the National Riverways. The hikes attracted over 2,000 visitors in 2010. Evening programs and programs designed for school groups were conducted for close to 8,000 visitors in 2010.

The NPS Riverways provide several cultural demonstrations throughout the year. Haunting in the Hills, An Ozark Christmas, Ozark Heritage Day, Alley Spring Independence Day Celebration, and the Ozark Dinner Theater provide visitors with unique opportunities to learn about the natural and cultural history of the NPS Riverways.

All of the visitor contact facilities and interpretive sites support orientation and education of visitors to the NPS Riverways. However, there are concerns about the size, condition, and location of some of these facilities. The visitor contact facility in Van Buren has limited, inflexible space for exhibits and limited opportunities for direct interaction between visitors and NPS staff and volunteers. Further, this visitor facility is outside the immediate transportation routes through town, so it has limited visibility to out-of-town visitors. In addition, the current location is a distance from all of the concessions provided throughout the NPS Riverways and, thus, few visitors access and make a trip to this location. The facility is open daily Memorial Day through Labor Day, Monday–Friday the rest of the year. It is closed on federal holidays. Finally, there are no views of the river from this facility.

Additional education and orientation is provided to visitors via nonpersonal services

such as trailhead and boat dock bulletin boards, waysides, trail signs, NPS Riverways brochures, and the NPS Riverways website.

VISITOR SAFETY

The safety of visitors is of great importance to the National Park Service. Statutory and regulatory provisions applicable to national park units require the National Park Service to not only provide safe facilities, utilities, and grounds within the park unit but also to promote safety in park programs and project operations (NPS *Management Policies 2006*, section 8.2.5). A 2010 study assessed visitor-related impacts for Ozark National Scenic Riverways and showed that two-thirds of informal horse trails at the NPS Riverways included serious erosion and/or safety concerns. In fact, 29.8% of 141.8 kilometers of informal horse trails were rated as trail class condition 4 (isolated erosion site) and class 5 (gully erosion), which can pose dangers to horseback riders due to loose, wet soil and cobble-size loose rock in steep slope areas (Park 2011).

Crowding on the river by motorized and nonmotorized watercraft users could also lead to safety issues, especially if it meant that having too many people on the river at one time would make access to a rescue boat more difficult. For example, the section of the Current River from Waymeyer to the National Riverways boundary has a tendency to become "clogged" with tubes and this could be a safety issue in the instance of a serious accident on the river. In other areas, this situation could lead to conflict between river users when motorboats passing by are perceived to be too close to those in nonmotorized watercraft. The level of health and safety in the National Riverways is reflected in the incident statistics collected by the park. Figure 15 provides incident statistics from 2005 through 2010 and table 24 shows the six-year average for those violations.

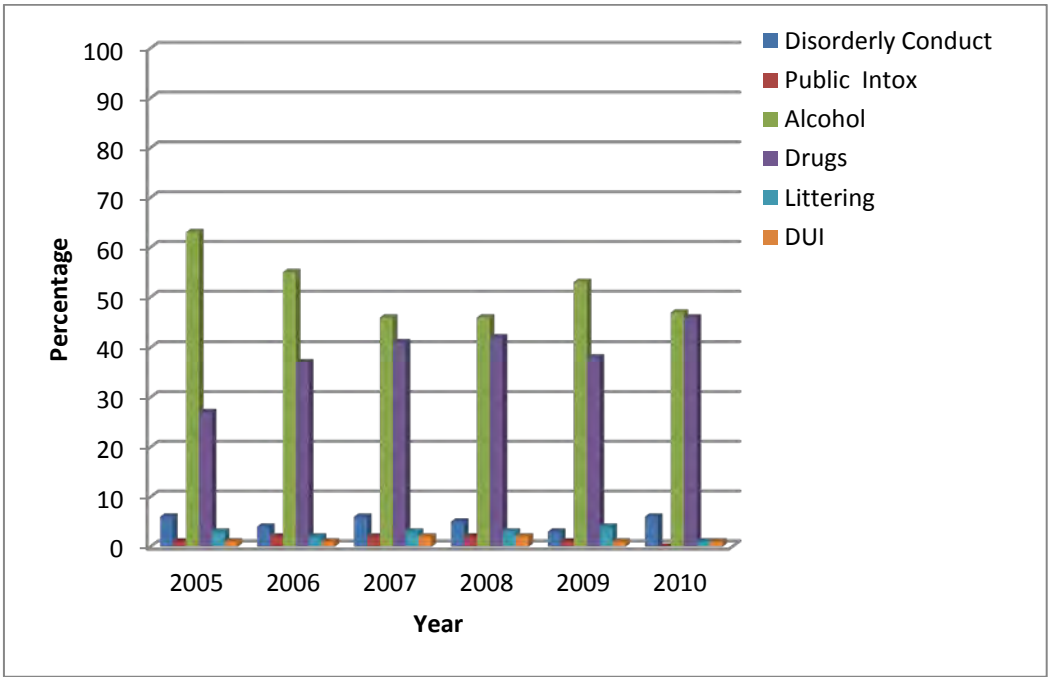


FIGURE 15. PERCENTAGE OF OZARK NATIONAL SCENIC RIVERWAYS VIOLATIONS 2005 THROUGH 2010

TABLE 24. SIX-YEAR ANNUAL AVERAGE FOR THE NATIONAL RIVERWAYS VIOLATIONS 2005 THROUGH 2010

Violation	Average number of violations [1]
Disorderly conduct	33
Public intoxication	9
Alcohol (including gift to a minor and minor in possession)	355
Drugs	256
Littering	18
DUI	9

[1] These statistics do not include arrests and citations issued by state officers within NPS boundaries.

PARK OPERATIONS

PARK ORGANIZATION

Ozark National Scenic Riverways protects134 miles of the Jacks Fork and Current Rivers, encompassing more than 80,000 acres of riparian, forest, open field, and karst environments; seven major and dozens of other springs; more than 400 archeological sites; and 249 structures that are on the List of Classified Structures. The NPS Riverways has approximately 350 miles of authorized and unauthorized roads, as well as approximately 90 associated access points through which visitors can access the river. Combined with the sprawling layout of the park unit, these factors pose a formidable management challenge for park staff.

Ozark National Scenic Riverways is administered by a superintendent, deputy superintendent, and several division chiefs. Management of the NPS Riverways is organized into the Superintendent's Office and five functional divisions. As of 2011, there were 72.2 funded full-time-equivalency employees, including those subject to furlough, at the NPS Riverways.

STAFFING

The NPS Riverways budget was $6,581,910 in fiscal year 2011. Over the course of the last 10 years, the staff of Ozark National Scenic Riverways has decreased by almost 30% as the park unit continued to operate within its current budget allocation. In fiscal year 2011, a total of 23 out of 80 positions were vacant due to funding shortages.

It was estimated in fiscal year 2011 that fully replacing lost staff for the NPS Riverways would require an operating increase of $1.3 million. In addition, it was estimated that there is a $371,000 shortfall related to recurring costs needed to carry out the no-action alternative. Staffing is pressed to meet current demands, such as the following:

- natural and cultural resources protection
- interpretation
- deferred maintenance
- education opportunities and outreach to school groups
- law enforcement
- fire management and trail maintenance needs
- volunteer coordination
- general inventorying and monitoring of park resources
- pressures on the National Riverways from heavy recreational use and surrounding development

PARK OPERATIONS

Ranger Activities Division

The main base of operations for this division is the visitor and administration center building in Van Buren. There also are district ranger offices at Akers, Round Spring, Alley, and Big Spring, and additional posts at Pulltite and Powder Mill. As of 2011, there were 16.5 full-time equivalency employees (excluding fire) in this division.

Law Enforcement and Resource Protection Group. The protection staff is responsible for visitor and employee safety, resource protection, education regarding resource protection, emergency response,

park and facility patrols, security, emergency medical services, search and rescue, structural firefighting, law enforcement, fire management, and fee collection and management.

The public safety and resource protection rangers are responsible for the enforcement of applicable laws and regulations within the National Riverways' boundaries, as well as patrol the roads and the 134 miles of river within the park unit. They also provide search-and-rescue operations and emergency medical services NPS Riverways-wide. Protection rangers work closely with the Missouri Department of Conservation, Missouri Water Patrol, Missouri State Highway Patrol, and the sheriff's departments of surrounding counties to coordinate law enforcement activities.

Fire Management Group. The fire management staff is based out of a facility at Big Spring. Its three wildland fire crews serve the National Riverways as well as other nearby national park units. The mission of this group is three-fold: suppress wildland fire, manage fuel loads within national park units in the region, and study the effects of fire on NPS land.

Fee Management Group. This group is responsible for collecting campground fees parkwide, as well as fees associated with cave tours at Round Spring Cave.

Interpretation and Education Division

The interpretation staff provides education services for diverse audiences, interpretation of park themes and stories, staffing for the visitor center and contact facilities, and information and orientation for visitors through personal (guided) and nonpersonal services (for example, web site, publications, exhibits, waysides, and Volunteer-in-the-Parks program). This division is also responsible for managing the library. The main base of operations for interpretive staff is the visitor and administrative center building in Van Buren. Full-time interpretive staff are stationed at the contact stations at Alley Spring, Round Spring, and Big Spring throughout the year. These staff members are assisted in the summer months by seasonal interpretive park rangers and park guides, who are also stationed at Big Spring, Akers, and Pulltite contact stations. As of 2011, there were 10 full-time equivalency employees in this division.

Resource Management Division

The natural resource management staff is responsible for natural resource inventory and monitoring of more than 70,000 acres of aquatic and terrestrial habitat, conducting research, protecting threatened and endangered species, restoring disturbed sites, managing invasive nonnative species, monitoring water quality, producing technical reports and data sets to support park objectives, assisting the National Riverways with environmental compliance responsibilities, operating the geographic information system, and assisting with wildland fire management.

The cultural resource management staff manages archeological sites, historic structures, cultural landscapes, ethnographic resources, a certified curatorial facility, and a museum collection. Responsibilities include oversight of 249 historic structures, over 400 known prehistoric and historic archeological sites, and approximately 50 potential cultural landscapes.

This division is operated out of the visitor and administrative center in Van Buren. As of 2011, there were 7.7 full-time equivalency employees in the Resource Management division.

Administration Division

As of 2011, there were 10 full-time equivalency employees in the Administration Division, including five full-time equivalency personnel in the superintendent's office and five full-time equivalency personnel in commercial services.

Administration. This Division is responsible for the National Riverways' budget, fiscal, purchasing, and property management activities, as well as commercial services management. Administration also has responsibility for human resources, information technology, communications, and housing. The main base of operations for Administration staff is the visitor and administrative center building in Van Buren.

Superintendent's Office. In addition to the superintendent, this office includes the deputy superintendent, superintendent's secretary, and commercial services specialist and assistant. Indirectly it manages the five division chiefs and the environmental protection specialist. In addition to responsibilities for leadership and coordination, the Superintendent's Office is responsible for public and external affairs, planning and compliance, and safety.

Commercial Services. The Commercial Services section manages 23 concession contracts, as well as commercial use authorizations and special use permits, all of which provide services to visitors. These services, which are primarily related to river recreation, include canoe and tube rentals and shuttle service. Commercial services also include lodging, dining, merchandise, firewood, and camping supplies. Management team staff are located throughout the National Riverways with major centers of activity at Van Buren (headquarters), Round Spring (Upper Current District), Alley Spring (Jacks Fork District), and Big Spring (Lower Current District).

Maintenance and Engineering Division

The Maintenance and Engineering staff is responsible for operation and maintenance of park facilities and equipment, including structures and grounds, utilities, roads and parking areas, trails and trailheads, campgrounds, picnic areas, signs, wastewater treatment facilities, vehicles, and heavy equipment. The division operates out of facilities located at Big Spring, Round Spring, Alley Spring, and Shawnee Shop (near Eminence).

Each of the maintenance districts operates from a facility within the respective district (Upper Current District at Round Spring; Jacks Fork District at Alley Spring; and Lower Current District at Big Spring). There are additional smaller "satellite" maintenance facilities at Powder Mill and Akers.

The National Riverways' size presents the maintenance division with constant logistical challenges. To go from the Cedar Grove campground in the park unit's northeast corner to the Upper Current district maintenance facility at Round Spring requires nearly 45 minutes of travel each way, much of it over gravel roads. In addition to the difficulties presented by maintaining day-to-day custodial demands in a park unit with many remote facilities, the maintenance division faces challenges relating to the upkeep of aging wastewater treatment infrastructure; the constant grading and re-graveling of roads; and maintaining historic properties, landscapes, and cemeteries. As of 2011, there were 28 full-time equivalency employees in this division.

PARK FACILITIES AND INFRASTRUCTURE

Infrastructure at the NPS Riverways includes a diverse set of facilities or assets, as shown in

table 25. In addition to meeting the operational needs for supporting the National Riverways' mission, park facilities are designed to provide river-based recreational opportunities; an array of camping, horseback riding, and hiking opportunities; and access to sites of natural and historic significance to visitors.

TABLE 25. NPS RIVERWAYS FACILITY-RELATED ASSETS

Asset type	Number
Roads	226
Parking	116
Road bridges	9
Road tunnels	0
Trails	41
Trail bridges	10
Picnic areas	7
Campgrounds	7
Backcountry campgrounds	21
Other grounds	53
Buildings (excluding housing and concessions)	200
Housing structures	16
Water systems	20
Wastewater systems	23
Radio sheds/shacks	5
Dams	6
Amphitheaters	4
Concession areas	25
Total	**789**

Because of increased operational requirements and reduced funding with associated lapsed (unfilled) staff positions, the National Park Service has deferred the preventive maintenance and even some routine maintenance of some facilities. Deferred maintenance is work that was not done primarily due to budget constraints, and can lead to the need for more costly repairs. The National Park Service monitors deferred maintenance in park units using a facility management tracking system. It is striving to reduce the deferred maintenance backlog throughout the national park system by prioritizing projects and funding them through various sources, including the Federal Lands Recreation Enhancement Act.

Public Facilities

Structures. National Riverways staff is responsible for maintaining 241 buildings. Examples include ranger and visitor contact stations, maintenance shops, employee residences, and historic Ozark structures.

Seasonal visitor contact facilities are located at Big Spring, Alley, Round Spring, Akers, and Pulltite. The NPS Riverways has no year-round visitor center, unlike many other national park units. However, it participates in a year-round visitor contact station at Headquarters in Van Buren and a multiagency information facility in Salem, Missouri.

Nonriver-based facilities are centered on the most significant natural and cultural resources in the National Riverways. These include the Civilian Conservation Corps lodge, cabins, and museum at Big Spring; the historic mill, schoolhouse, and store at Alley Spring; and cave tours at Round Spring cavern.

Roads. There is no primary vehicle travel corridor through the NPS Riverways. Instead, numerous state, county, and NPS roads provide visitor access to National Riverways areas. In addition, NPS service roads are used only for park operations. Most of the roads in the NPS Riverways are gravel and are maintained.

Some NPS Riverways' roads that no longer access specific features or facilities have been closed in accordance with the NPS Riverways' roads and trails management plan. Through the years, some traces have been created by illegal uses, and numerous illegal

and unmaintained roads and traces have been closed.

Facilities along the roads include parking areas, pull-offs, wayside exhibits, scenic overlooks, restrooms, and trailheads. Interpretive pamphlets are available for visitors at some locations.

Trails. The NPS Riverways has 49 miles of hiking trails that range in length from less than a mile to over 13 miles. Hiking opportunities exist at Alley Spring, Big Spring, Powder Mill, Pulltite, and Devil's Well. A segment of the Ozark Trail crosses the NPS Riverways at Powder Mill.

There are 23 miles of designated horse trails and seven designated stream crossings. There are also numerous miles of undesignated horse trails, stream crossings, and access points used by horse riders. Both horse and hiking trails vary in terms of terrain and habitat.

Camping. There are six developed campgrounds located throughout the NPS Riverways, containing 450 campsites. In addition, there are 21 primitive and backcountry designated locations with 93 campsites.

River Access Points. Within the National Riverways, there are approximately 90 designated and undesignated river access points. Many of these also include camping, picnicking, and hiking opportunities.

Picnic Areas. There are seven primary picnic areas in the NPS Riverways, and an additional seven day use areas that include picnic facilities.

Historic Sites and Areas. Nonriver-based facilities are found at the most significant natural and cultural resources in the National Riverways. These include the Civilian Conservation Corps-built lodge, cabins, and museum at Big Spring, and the historic mill, schoolhouse, and store at Alley Spring.

Operational Facilities

Offices, Storage, and Maintenance. The National Riverways' headquarters, which contain the main administrative offices, are in the Watercress building in Van Buren. The National Park Service leases this structure.

Each of the maintenance districts, which include Upper Current, Jacks Fork, and Lower Current, operates from a maintenance facility within its respective district. A large equipment repair facility, the Shawnee Shop, is within the Jacks Fork District approximately 13 minutes east of the city of Eminence. There are additional, smaller, "satellite" maintenance facilities at Powder Mill and Akers.

Park Housing. Employee housing is provided at Big Spring, Partney, Round Spring, Alley Spring, and Powder Mill. There are 22 employee housing units in the National Riverways.

Water and Wastewater Facilities. The National Park Service operates and maintains multiple water and wastewater treatment facilities at Akers Ferry, Round Spring, Pulltite, Alley Spring, Two Rivers, Powder Mill, Big Spring, Gooseneck, and several other locations.

VOLUNTEERS AND PARTNERS

Volunteers are key contributors to NPS operations. In 2011, the NPS Riverways had 214 volunteers who collectively contributed more than 16,000 hours in all areas of park operations. This level of effort is equivalent to eight full-time positions.

Ozark National Scenic Riverways has few formal partnerships. The friends groups that have been formed at many other NPS units to facilitate fundraising, event organization, and staff support have proved to be valuable assets, and the potential for forming a friends group for the NPS Riverways has been discussed.

SOCIOECONOMIC ENVIRONMENT

DESCRIPTION OF SOCIOECONOMIC STUDY AREA

Ozark National Scenic Riverways lies within Carter, Shannon, Dent, and Texas counties in southeast Missouri. The study area is largely rural. The distances to larger communities from the Van Buren headquarters, with 2010 populations, are as follows:

- Poplar Bluff (17,000 residents)—45 miles to the east
- Cape Girardeau (96,000 residents)—about 125 miles to the northeast
- Springfield metropolitan area (440,000 residents)—about 150 miles to the west
- St. Louis metropolitan area (2.8 million residents)—about 150 miles to the north

The socioeconomic environment focuses on Carter and Shannon counties since the communities in these counties are likely to be most affected by general management plan alternatives. Socioeconomic data from these counties are compared to Missouri and United States data, where relevant. The communities of Eminence and Van Buren, in Shannon and Carter counties, respectively, are gateway communities to the NPS Riverways and are, therefore, focus communities within the study area.

Land Use

The National Riverways is situated on the Ozark Plateau in southern Missouri. The land is characterized predominantly by hilly forest areas that are generally difficult to farm (NPS 2000). Land cover types within the NPS Riverways include forest land, open fields, and glades. Riparian habitats are also a major component of the National Riverways (NPS 2006 Natural Features). Karst features are numerous and varied throughout the National Riverways and include more than 402 documented caves, many sinkholes, and losing streams (Morgan 2007).

Accurate data on current land uses within in the study area and Missouri are not readily available. Therefore, land cover data obtained from the U.S. Department of Agriculture were used as a proxy for types of land uses within the two areas. These land cover figures are summarized in table 26. The land cover data show that the study area is rural and natural with a small percentage of developed land cover types. A smaller percentage of the land is in agricultural production than the state as a whole. This is likely due to the hilly terrain and high percentage of forested land cover in the area. The primary land cover in the study area is deciduous forest (78%), followed by pasture and hay (11%), and evergreen forest (5%). In comparison, the state has a smaller proportion of deciduous forest (37%) and evergreen forest (1%) and a greater portion of pasture/hay (32%).

Land Ownership

Shannon County is 1,004 square miles. Carter County is approximately half this size at 509 square miles (Shannon County, Missouri GenWeb 2011; Ozark Foothills Region 2011a). In 2010, federal land accounted for 22.5% of land in the study area, with 18.5% and 30% federal ownership in Shannon and Carter counties, respectively. Federal lands include the Ozark National Scenic Riverways and the Mark Twain National Forest. In comparison, federally owned lands account for approximately 4.6% of land in Missouri (DOI 2011). (Note: This information was obtained from the Federal Government's Payment in Lieu of Taxes Database.

TABLE 26. 2007 LAND COVER/USE IN THE STATE OF MISSOURI AND STUDY AREA

Land cover type	State of Missouri land cover	Study area land cover
Deciduous forest	37.20%	78.15%
Agriculture – pasture/hay	32.02%	10.61%
Agriculture – soybeans	10.28%	0.01%
Agriculture – corn	6.18%	0.01%
Developed – open space	5.00%	3.31%
Developed – non-open space	2.31%	0.16%
Evergreen forest	1.04%	5.04%
Other [1]	5.41%	2.71%

SOURCE: USDA 2009.
[1] Some of the land cover types in "other" includes open water, mixed forest, barren land, winter wheat, alfalfa, woody wetlands, and oats.

Some federal lands in the state of Missouri and the study area may be exempt from this database for various reasons and are not included in this analysis.)

Approximately 21% of land in Shannon County is state-owned and the remaining 60% is private land (Crider 2011). In Carter County, state lands account for approximately 19% and the remaining 51% are privately owned lands (Meyer 2011).

Major Communities

Carter and Shannon counties are relatively rural in nature with approximately 12 and 8 people per square mile, respectively. Communities in the area include the following:

- The town of Eminence is 5 miles west of Shawnee Creek, 7 miles west of Two Rivers, and 4 miles east of Alley Spring. Eminence is the county seat for Shannon County.
- Van Buren is the county seat for Carter County. U.S. Highway 60 passes through the Town of Van Buren between the Upper and Lower Current rivers.
- The towns of Birch Tree and Winona, in Shannon County and Salem in Dent County are near the National Riverways.
- The town of Ellington is east of the National Riverways just outside the study area in Reynolds County.
- The town of Mountain View is near the National Riverways, southwest of the park unit, just outside the study area in Howell County.

DEMOGRAPHICS

Historic and Current Population

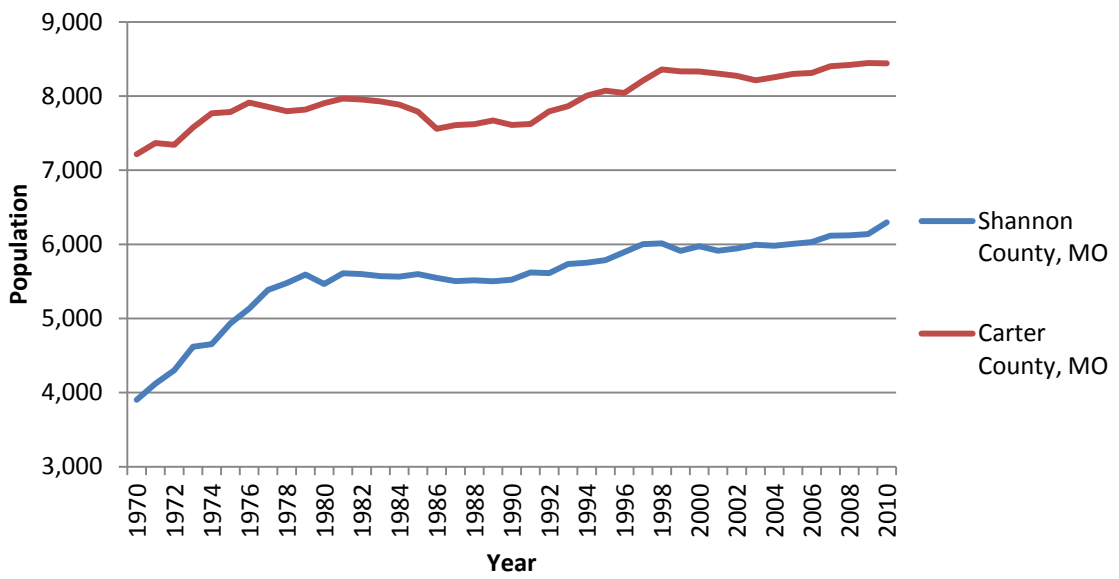
In 1970, the populations of Carter and Shannon counties were 3,902 and 7,216, respectively. At that time, the combined populations of Carter and Shannon counties represented a little more than 0.2% of the state's total population. Between 1970 and 1980, Carter County experienced a 40% increase in population, while Shannon County experienced a 10% increase. Missouri's population growth during this period was 5%.

The population remained relatively stable in Carter and Shannon counties between 1980 and 1990; Carter County grew by 1% and the population of Shannon County declined by 4%. The state's population grew by 4% between 1980 and 1990.

From 1990 to 2000, both the state and Shannon County had a population growth of 9% followed closely by Carter County at 8%.

Between 2000 and 2010, the population of Carter County grew by 5.4%, and that of Shannon County grew by 1.3%. During this period, the state of Missouri's population increased by 6.9%. Populations in 2010 were 6,297 and 8,442 in Carter and Shannon counties, respectively.

The largest town in Shannon County, Eminence, had a population of 548 in 2000 and a population of 600 in 2010 (U.S. Census 2000; U.S. Census 2010a), an increase of 9.4% during this period. The Town of Van Buren had a population of 845 residents in 2000 and 819 in 2010 (U.S. Census 2000; U.S. Census 2010a), a decline of 3.0%. Figure 16 depicts the populations of Carter and Shannon counties over time.



Source: US Bureau of Economic Analysis 2011a

FIGURE 16. POPULATION TRENDS FOR CARTER AND SHANNON COUNTIES

Future Population Projections

Population projections for the state and counties are provided in five-year increments between 2000 and 2030. The study area's population is projected to grow by 7.2% between the years 2010 and 2030, while Missouri is expected to grow at a slightly larger rate of 12.8% over the same period. These rates are relatively low compared to other states and the nation (State of Missouri 2008). Table 27 summarizes population estimates.

The United States as a whole is projected to grow in population by approximately 10% per decade. The study area is projected to experience a 4.6% population growth between 2010 and 2020 and 2.5% growth between 2020 and 2030.

TABLE 27. PROJECTED POPULATIONS IN THE STATE OF MISSOURI AND STUDY AREA: 2020 AND 2030

Year	2020	2030
Study area projected population	15,150	15,530
Study area population growth rate by decade	4.6%	2.5%
Missouri projected population	6,389,850	6,746,762
Missouri population growth rate by decade	6.9%	5.6%

Racial and Ethnic Composition

Approximately 95% of residents in the study area identified themselves as non-Hispanic white. Minority groups represent approximately 5% of the population. In comparison, non-Hispanic white populations account for 81% and 64% of the Missouri and national populations, respectively.

Minority populations in the town of Eminence are similar to those of the study area, with approximately 5% of the population identified as minority. Table 28 summarizes the racial and ethnic composition of the United States, Missouri, the study area, and the town of Eminence.

TABLE 28. 2010 RACIAL AND ETHNIC COMPOSITION OF THE VARIOUS GEOGRAPHIES

Category	United States	Missouri	Study area	Town of Eminence	Town of Van Buren
Non-Hispanic white	63.75%	81.00%	95.24%	94.83%	95.73%
Black or African American	12.61%	11.58%	0.16%	0.00%	0.00%
American Indian and Alaska Native	0.95%	0.46%	1.00%	1.83%	0.85%
Asian	4.75%	1.64%	0.16%	0.17%	0.00%
Native Hawaiian and other Pacific Islander	0.17%	0.10%	0.01%	0.00%	0.00%
Some other race	6.19%	1.34%	0.42%	0.00%	1.10%
Two or more races	2.92%	1.34%	1.99%	2.83%	2.08%
Hispanic or Latino	16.35%	3.55%	1.65%	0.83%	2.93%
Total	**308,745,538**	**5,988,927**	**14,706**	**600**	**819**
Minority [1]	36.25%	19.00%	4.76%	5.17%	4.27%

SOURCE: U.S. Census 2010a.

[1] The minority population includes all those individuals who identify themselves as being of a race other than non-Hispanic white.

TABLE 29. AGE CHARACTERISTICS FOR THE UNITED STATES, MISSOURI, STUDY AREA, AND EMINENCE

Age segment	United States	Missouri	Study area	Town of Eminence
Under 18 years	24.6%	24.2%	24.4%	17.7%
18–39 years	30.2%	29.3%	24.9%	35.0%
40–64 years	32.6%	33.0%	35.2%	31.8%
65 years and over	12.6%	13.5%	15.5%	15.5%

SOURCE: U.S. Census 2009a

Age Characteristics

As shown in table 29, approximately 24.4% of residents in the study area are under the age of 18 and approximately 15.5% of residents are aged 65 and over. The study area has a higher percentage of residents over 40 compared to residents in the state or nation. The percentage of residents under the age of 18 is approximately the same in the study area as it is in Missouri and the United States. However, approximately 17.7% of the total population of Eminence is under 18 years of age, which is nearly 7% lower than the United States, Missouri, or the study area; Eminence has a higher proportion of residents aged 18 to 39. Table 29 summarizes age characteristics.

ECONOMIC CHARACTERISTICS

This section provides an overview of the economic conditions of the study area, including personal income, average earnings, employment by industry, unemployment, and poverty rates. The study area characteristics are compared to those of Missouri and the nation. Additionally, a description of the economic contribution of the NPS Riverways to the local economy is provided. Information on the town of Eminence is included where available.

Personal Income

Per capita income is the total personal income divided by the number of people in a geographic area. Figure 17 graphs the real per capita personal income for the United States, Missouri, and the study area counties from 2000 through 2010. Per capita personal income was adjusted for inflation, termed "real income," and presented in 2010 dollars. When comparing income changes over time, it is important to adjust for inflation to identify the true increase or decrease in income, controlling for inflationary price increases.

As shown in the figure, real per capita personal income was considerably less in the study area than in the state or nation. On average, per capita income was $10,000 to $14,000 less in the study area than in the state. Per capita personal income was, on average, approximately $3,800 higher in Carter County than it was in Shannon County during this period. In 2010, per capita personal income was $26,696 and $21,015 in Carter and Shannon counties, respectively.

Real per capita income increased by 6.5% in the United States between 2001 and 2010. In comparison, real per capita personal income increased in Missouri by 6.7%, in Shannon County by 4.8%, and in Carter County by 18.9% during this period. When real income is increasing, it is an indication that the economy is expanding and standard of living is improving.

Personal income includes three income categories: labor earnings, investment income, and transfer payments. These categories of personal income can provide information about the income sources and wealth in a region.

Real personal income increased in the study area by approximately 10% between 2001 and 2008. In 2008, government transfer payments accounted for 37.7% of total personal income, increasing by approximately 6.3% from 2000. In 2008, investment income represented 11.2% of personal income, decreasing 4.5% between 2000 and 2008. Labor earnings remained relatively stable in the study area during this period; in 2008, labor income accounted for approximately 51% of total personal income the study area. In comparison, labor income in Missouri accounts for 66% of personal income, a higher proportion than occurs in the study area. Transfer payments account for 17.6% of personal income in Missouri, while investment income account for 16.5% (BEA 2011b). In general, the state has higher proportions of labor and investment income, and lower proportions of transfer payments when compared to the two-county study area. Residents in the study area are more reliant on government transfer payments or disbursements as income sources than residents in the state as a whole.

Employment Trends

Between 2001 and 2010, total employment increased in Carter County by approximately 12%, decreased by 16% in Shannon County, and increased by 1% in the state of Missouri. Employment numbers for these three areas are provided in see table 30.

Employment by Industry

Employment and earnings by industry in the study area in 2008 are shown in table 31. The manufacturing industry, which includes wood and lumber processing industries, represented the largest employing industry in the study area with 17% of employment. The "other services" industry sector has the second highest percentage of employment (12.5%); employment in grant-making, giving, and social advocacy organizations accounts for a considerable portion of employment in the "other services" industry sector. Government employs 12.1%, followed by the retail trade industry with 11.7%. Travel and tourism industry sectors generally include: retail trade; accommodations and food services; and arts, entertainment, and recreation. In total, these industries provided 17.9% of employment in the study area in 2008, which makes this collective industry a major employer in the area.

Average Earnings by Industry

Table 32 summarizes the average earnings by industry in the study area. Average earnings are estimated by dividing the total labor earnings in a given area by the number of jobs in the area; the number of jobs includes both full-time and part-time jobs.

TABLE 30. CARTER COUNTY, SHANNON COUNTY, AND STATE OF MISSOURI EMPLOYMENT

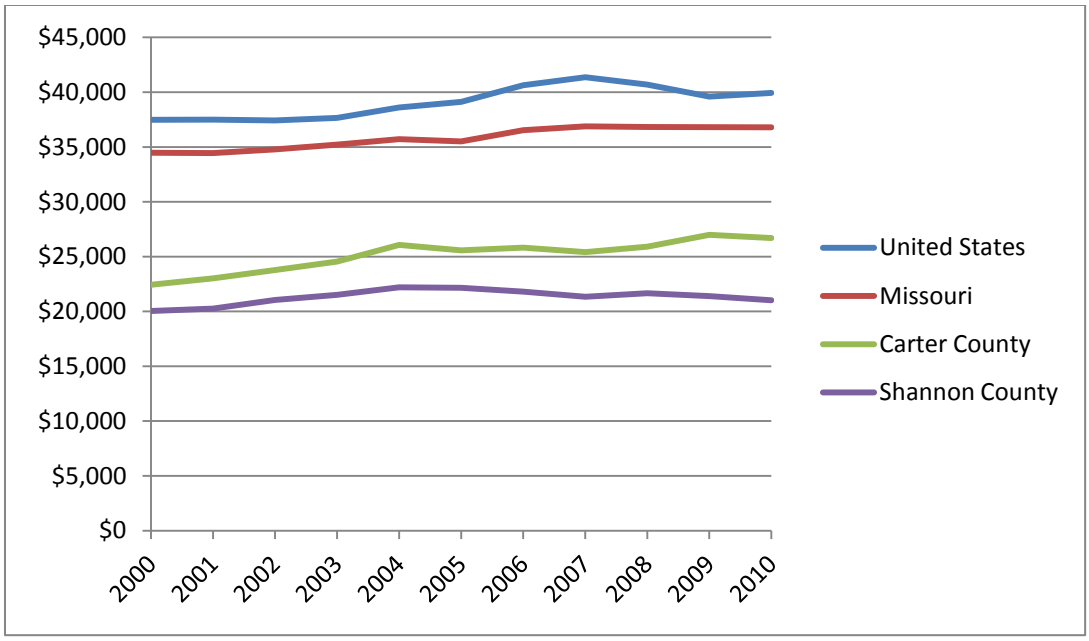
Area	2001	2004	2006	2008	2010	Percent change 2001–2010
Carter County	2,236	2,430	2,469	2,502	2,497	11.67%
Shannon County	3,536	3,489	3,374	3,419	2,968	-16.06%
Missouri	3,453,629	3,472,891	3,579,117	3,672,794	3,489,759	1.05%

SOURCE: BEA 2011c.

TABLE 31. 2008 EMPLOYMENT AND EARNINGS BY INDUSTRY IN THE STUDY AREA

Industry	Percent of total earnings	Total earnings	Percent of total employment	Total employment
Farming	0.6%	$739,663	9.2%	489
Forestry, fishing, and related services	8.9%	$11,476,029	7.7%	406
Mining	0.7%	$839,872	0.3%	17
Utilities	0.1%	$103,726	0.0%	2
Construction	4.0%	$5,157,657	3.2%	167
Manufacturing	19.1%	$24,611,223	16.8%	887
Transportation and warehousing	5.1%	$6,582,469	3.1%	164
Information	0.6%	$804,061	0.4%	20
Finance, insurance, real estate, rental and leasing	3.0%	$3,910,685	2.3%	121
Professional, scientific, and technical services	1.0%	$1,228,870	0.9%	49
Administrative and waste management services	0.4%	$577,126	0.6%	34
Education (includes state and local government, education)	0.2%	$271,776	6.2%	330
Health care	4.5%	$5,797,804	5.2%	273
Arts, entertainment, and recreation	0.3%	$358,404	1.0%	55
Accommodations and food services	2.4%	$3,031,952	5.2%	275
Other services	10.4%	$13,382,110	12.5%	661
Government (does not include state and local government education)	27.6%	$35,555,520	12.1%	640
Wholesale trade	2.0%	$2,508,299	1.6%	85
Retail trade	9.1%	$11,669,852	11.7%	619
Total	**100.0%**	**$128,607,095**	**100.0%**	**5,293**

SOURCE: Michigan IMPLAN Group 2008. A bridge table was used to convert IMPLAN sectors to Bureau of Economic Analysis sectors. Data include part-time and full-time jobs.



SOURCE: U.S. Bureau of Economic Analysis 2012b.
All values were adjusted to 2008 dollars using the Midwest consumer price index from the Bureau of Labor Statistics 2011.

FIGURE 17. 2001 TO 2010 REAL, PER CAPITA PERSONAL INCOME

TABLE 32. 2008 AVERAGE EARNINGS BY INDUSTRY IN THE STUDY AREA

Industry	Average annual earnings
Farming	$1,511
Forestry, fishing, and related services	$28,235
Mining	$50,780
Utilities	$58,007
Construction	$30,861
Manufacturing	$27,742
Transportation and warehousing	$40,093
Information	$40,919
Finance, insurance, real estate, rental and leasing	$32,430
Professional, scientific, and technical services	$25,071
Administrative and waste management services	$17,197
Education (includes state and local government education)	$40,318
Health care	$21,262
Arts, entertainment, and recreation	$6,459
Accommodations and food services	$11,035
Other services	$20,240
Government (does not include state and local education)	$35,237
Wholesale trade	$29,552
Retail trade	$18,851
Average earnings for all industries	$24,299

SOURCE: Michigan IMPLAN Group 2008. A bridge table was used to convert IMPLAN sectors to Bureau of Economic Analysis sectors. Data include part-time and full-time jobs.

Annual average earnings per job for all industries in the study area are approximately $24,000. Industries with the highest average earnings are utilities and mining. Transportation, information, and government sectors also have higher average earnings than other industries or sectors in the area. The lowest average earnings are in the farming, and arts, entertainment, and recreation sectors.

Unemployment

Unemployment rates in the study area and Missouri have followed the same general trend as the United States between the years 2000 and 2011; however unemployment rates in the study area are higher than those of the nation and the state. In 2011, Shannon and Carter counties had unemployment rates of 9.3% and 12.9%, respectively, while Missouri and the nation had unemployment rates of 8.6% and 9.8%, respectively (BLS 2012). The increase in unemployment is consistent with the economic recession experienced across the nation during this period. Figure 18 depicts unemployment rates between 2000 and 2011 for these areas.

Poverty Rates and Median Household Income

Within the study area, approximately 21% of the population lives below the poverty line, which is much higher than the poverty rate in the United States and Missouri. Similarly, median household incomes in Carter and Shannon counties are lower than in the state and the nation. Carter County's median household income is just over half that of the United States. Shannon County has a slightly higher median household income than Carter County, although it is considerably less than that of the state and the nation (U.S. Census 2010c). Poverty rates and median household income are summarized in table 33.

TABLE 33. 2009 POVERTY RATES IN THE UNITED STATES, STATE OF MISSOURI, CARTER COUNTY, SHANNON COUNTY, AND EMINENCE, MISSOURI

	Population	Population living below poverty line	Percent population living below the poverty line	Median household income
United States	296,141,149	40,917,513	13.80%	$51,914
Missouri	5,744,590	802,596	14%	$46,262
Carter County	6,125	1,203	19.60%	$28,408
Shannon County	8,394	1,910	22.80%	$30,766
Eminence, Missouri	469	219	46.70%	$14,571
Van Buren, Missouri	596	129	21.60%	$28,424

SOURCE: U.S. Census 2010b and c. Median household income is in 2010 dollars.

ECONOMIC CONTRIBUTION OF VISITATION TO THE LOCAL ECONOMY

The local economy for Ozark National Scenic Riverways and most other NPS units are defined as a 50-mile radius around the park unit. Economic multipliers are based on groupings of counties to approximate a 50-mile radius of the park unit (Stynes 2011). Visitation to Ozark National Scenic Riverways contributes to the local economy in several ways. It provides jobs to park employees, including seasonal, temporary, and permanent full-time or part-time positions. In 2009, the NPS Riverways employed 103 people. These workers spent

their income in the local economy, which supports an additional 26 jobs (Stynes 2011). Gross regional product is the market value of all final goods and services produced within a region over a period of time. The 2009 park payroll spending contributed to the gross regional product by an estimated $8.4 million (Stynes 2011).

The National Riverways also supports the local economy if local vendors are used, through contracted construction services, or purchases of supplies and materials. These figures are not assessed within this section.

The NPS Riverways attracts a large number of visitors, mostly from within Missouri and Illinois (Morgan 2007). These visitors make purchases from local businesses, such as restaurants, hotels, and retail outlets, during their visits in communities surrounding the National Riverways, which contributes to the local economy. In 2009, there were approximately 1,308,718 local and nonlocal visitors to the NPS Riverways. Total visitor spending was estimated to be approximately $55,445,000 (Stynes 2011).

Overwhelmingly, most visitors spending (88.5%) is associated with nonlocal visitors ($49,046,000), which supports local jobs and income. Nonlocal visitor spending in 2009 supported an estimated 696 part-time and full-time jobs in communities surrounding the National Riverways (Stynes 2011). The total labor income generated by this spending was over $15.9 million and the gross regional product was $27.9 million.

Total employment in the study area in 2008 was 5,293 jobs (see table 31). Employment associated with the National Riverways is estimated to be 129 (from park and nongovernmental employment), and 696 (from visitor spending), for a total of 825 jobs (Stynes 2011). This represents almost 16% of total employment in the two-county study area. In addition to government, these jobs are likely to be primarily in the recreation, accommodations, food service, arts, entertainment, and retail sales industries. A significant percentage of these jobs are related to the concessioners that directly support visitation to the NPS Riverways. There are currently 23 concession contracts with the NPS Riverways and some of these operations hire up to 80 full-time and part-time, seasonal positions to support their operations.

FISCAL CONDITIONS

Missouri's sales tax is levied on the purchase price of tangible personal property or taxable services sold at retail prices. The use tax is imposed on the storage, use, or consumption of tangible personal property. The state sales and use tax is approximately 4.2%, and its revenues are distributed into four funds to finance portions of state government: general revenue (3.0%), conservation (0.125%), education (1.0%), and parks/soils (0.10%) (State of Missouri 2011).

Cities and counties may impose local sales and use taxes, which are paid to the state and then disbursed to the local governments. Retail trade purchases would be subject to these sales taxes. Food is taxed at a lower rate of 1.2%. The state also collects taxes and fees on motor vehicle sales, motor fuel purchases, and motor vehicles. A portion of the receipts are returned to county and city governments.

As summarized in table 34, sales tax revenues are important to the local governments within the study area. Sales tax disbursements from the state account for 88% of the state tax disbursements to Eminence and Van Buren. Sales tax revenue paid from the state to local governments has remained relatively stable for Carter County between 2005 and 2009. Sales tax revenue decreased in Shannon County by 8% between 2008 and 2009 (see figure19).

TABLE 34. TAXES DISPERSED FROM THE STATE TO LOCAL GOVERNMENTS, 2009

Entity	Taxes dispersed from the state to local governments	Sales and use taxes dispersed to local governments	Percent sales and use tax receipts
Carter County	$860,283	$423,057	49%
Shannon County	$1,015,962	$447,323	44%
Eminence	$174,919	$154,353	88%
Van Buren	$261,524	$229,812	88%

SOURCE: State of Missouri 2011

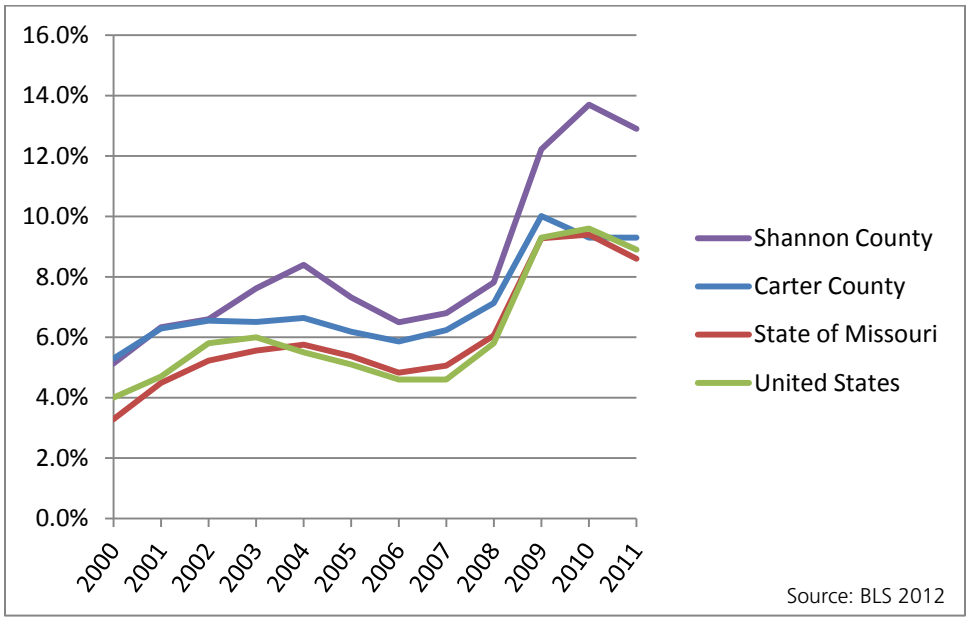


FIGURE 18. 2000 TO 2011 UNEMPLOYMENT RATES IN CARTER COUNTY, SHANNON COUNTY, STATE OF MISSOURI, AND UNITED STATES

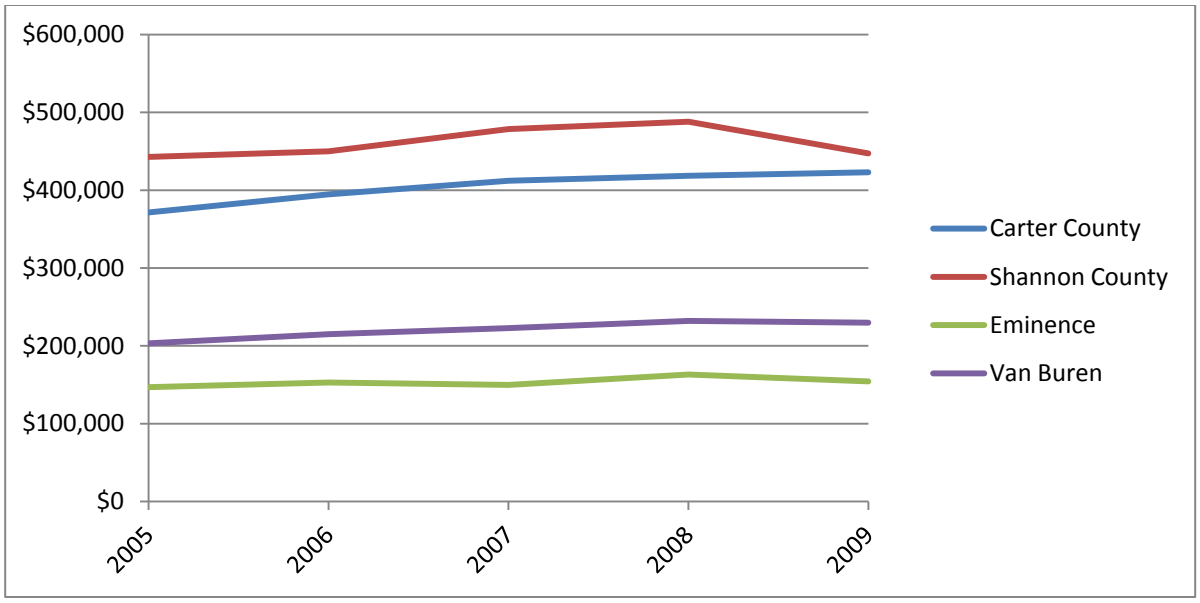


FIGURE 19. SALES TAX DISBURSEMENTS FROM THE STATE TO LOCAL GOVERNMENTS FROM 2005 TO 2009

HOUSING

This section provides housing characteristics for the United States, Missouri, study area, and town of Eminence. Median housing values in Shannon and Carter counties are almost half those in the state and 40% to 42% of the value of median housing values in the nation. Eminence has a higher median housing value than the counties in the study area at $92,100, but this value is still approximately $42,000 less than the state's median housing value.

Both Carter and Shannon counties have nearly three times the percentage of homes that lie within a value range of below $10,000 to $49,999 compared to the state. Approximately a third of homes in Shannon County are in this range. A similar percentage of homes are valued between $50,000 and $99,999 in both Shannon and Carter counties, so that about two-thirds of the study area's housing stock is valued at less than $100,000. Table 35 summarizes housing values.

TABLE 35. 2009 HOUSING VALUE RANGES AND MEDIAN HOUSING VALUE FOR UNITED STATES, MISSOURI, CARTER COUNTY, SHANNON COUNTY, AND EMINENCE

Housing value	United States	Missouri	Carter County	Shannon County	Town of Eminence
Below $10,000–$49,999	8.3%	11.2%	27.9%	33.5%	23.5%
$50,000–$99,999	15.5%	22.6%	35.8%	34.3%	34.0%
$100,000–$199,999	29.7%	40.6%	24.8%	21.2%	27.6%
$200,000–$399,999	27.5%	20.3%	9.0%	8.7%	14.2%
$400,000–$749,999	13.9%	4.0%	2.5%	0.7%	0.7%
$750,000 or more	5.1%	1.3%	0.0%	1.6%	0.0%
Median value	$185,400	$134,500	$78,800	$73,000	$92,100

SOURCE: U.S. Census 2009b and U.S. Census 2009c. All values are in year 2009 dollars.

In 2009, approximately 5,768 housing units were located in the study area. About 41% of these residences are in Carter County and 59% are in Shannon County. Of the occupied housing in Carter County, approximately 76% is owner-occupied, while 78% of the occupied housing stock in Shannon County is owner-occupied.

Approximately 24% of the housing units in Carter County were vacant in 2009, while the town of Eminence had a housing vacancy rate of 14%. Sixteen % of Shannon County housing units were vacant (U.S. Census 2009d and 2009e). Table 36 summarizes these housing figures.

While population growth in the study area is expected to be relatively low over the coming years, there is some indication that individuals are purchasing second homes and spending part of their time in the study area or retiring and living permanently in the study area (Bailiff 2011). This trend may be due to recent improvements in U.S. Highway 60, relatively inexpensive housing, and the proximity to the NPS Riverways, which offer important recreational or other outdoor opportunities important to these individuals.

TABLE 36. HOUSING STOCK: UNITED STATES, STATE OF MISSOURI, CARTER COUNTY, SHANNON COUNTY, AND EMINENCE, MISSOURI

	United States	Missouri	Carter County	Shannon County	Town of Eminence
Total housing stock	112,611,029	2,322,238	2,395	3,373	912
Percent of occupied housing that is owner-occupied	66.9%	70.3%	76.1%	77.7%	76.2%
Percent of housing units that are vacant	11.8%	12.3%	24.3%	16.5%	14.0%

SOURCE: U.S. Census 2009dand 2009e

HIGHWAY TRAFFIC AND LOCAL TRANSPORTATION CORRIDORS

The major local transportation corridor through the study area is U.S. Highway 60, which runs east-west and is the only federal highway that traverses the study area. This highway runs through the Town of Van Buren and provides access to the Lower Current River for residents in the study area. In July of 2010, the Missouri Department of Transportation finished the process of upgrading U.S. Highway 60 to four lanes along a 59-mile segment between Willow Springs and Van Buren. These improvements have increased access to the study area and the National Riverways.

Eminence is connected to U.S. Highway 60 by Missouri Highway 19, which runs north from U.S. Highway 60 in Winona, Missouri and crosses Missouri Highway 106 in downtown Eminence. The following highways connect Eminence to destinations of interest:

- Missouri Highway 106 runs east-west and connects with Ellington in neighboring Reynolds County to the northeast. This corridor provides access to the southern portion of the Upper Current River.
- Missouri Highway 19 continues north and provides access to the northern portion of the Upper Current River.
- Missouri Highway 106 runs west and provides access to the area of Jacks Fork.

Missouri Highway 17 south of the junction with Missouri Highway 106 provides access

to the western-most portions of Jacks Fork (Ozark Foothills Region 2011c).
Due to the large size of Ozark National Scenic Riverways and the number and location of roads and access points available, travelling from point to point in the park unit can be difficult and time consuming. Driving from the northern terminus of the park unit to the southern terminus can take four hours or more. Roads that connect various points in the National Riverways are in a state of disrepair and many of the river access points can only be reached by extended travel along dirt or gravel roads (NPS 2000).

LAW ENFORCEMENT

The study area is served by the two sheriff's departments. The Carter County Sheriff's Department is located in Van Buren and the Shannon County Sheriff's Department is located in Eminence. Additionally, Shannon County has four police departments serving the needs of various cities and towns within the county. These are the Eminence, Birch Tree, Summersville, and Winona police departments (Missouri Victims Assistance Network 2011a). Carter County has two police departments: the Van Buren and Ellsinore police departments (Missouri Victims Assistance Network 2011b).

The Shannon County Sherriff's Department is currently staffed by three deputies and one sheriff. Five civilian employees work on the department's staff. The department has four patrol trucks and one car. On average, the department receives between 60 and 75 calls per day (Voyles 2011).

If Shannon County dispatch receives a call from within the NPS Riverways, the county sends the call to park rangers. Most calls from within the park unit come during the summer. Shannon County Sheriff's Department has provided mutual aid in the past for prisoner transport or has provided assistance, depending on the situation and when requested by the NPS Riverways (Terril 2011).

The Carter County Sherriff's Department has three full-time deputies and one sheriff with an additional reserve deputy on staff. On average, the sheriff's department receives 50 or more calls per day. This department does not receive many calls relating to Ozark National Scenic Riverways because NPS officers handle these calls (Swigert 2011).

The Missouri Water Patrol Division (a division of the Missouri State Highway Patrol) patrols the waters by boat along the Current River and Jacks Fork within the NPS Riverways. This division is responsible for state and federal water and land up to 600 feet from the bank in the state of Missouri. Water patrol officers regularly rely on backup from park rangers within the NPS Riverways and provide backup for rangers when requested. The NPS Riverways has approximately six full-time officers with a number of boats, all-terrain vehicles, trucks, and amphibious vehicles available for use. Officers patrol on foot and using these craft and vehicles within the park unit. Officers are added to this force when they are needed. The Missouri Water Patrol Division receives many more calls regarding the riverways in summer than in winter. The number of calls increases on weekends when the population in the area can triple with visitation (Searcy 2011).

The Town of Van Buren Police Department has a three full-time officers and one reserve officer. The police department filed approximately 200 reports in 2010. The Van Buren Police Department generally responds to calls within Van Buren and within a 5-mile radius of the city (Clanton 2011).

The Eminence police department responds to calls outside the town of Eminence and mutually assists other law enforcement agencies.

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ENVIRONMENTAL CONSEQUENCES

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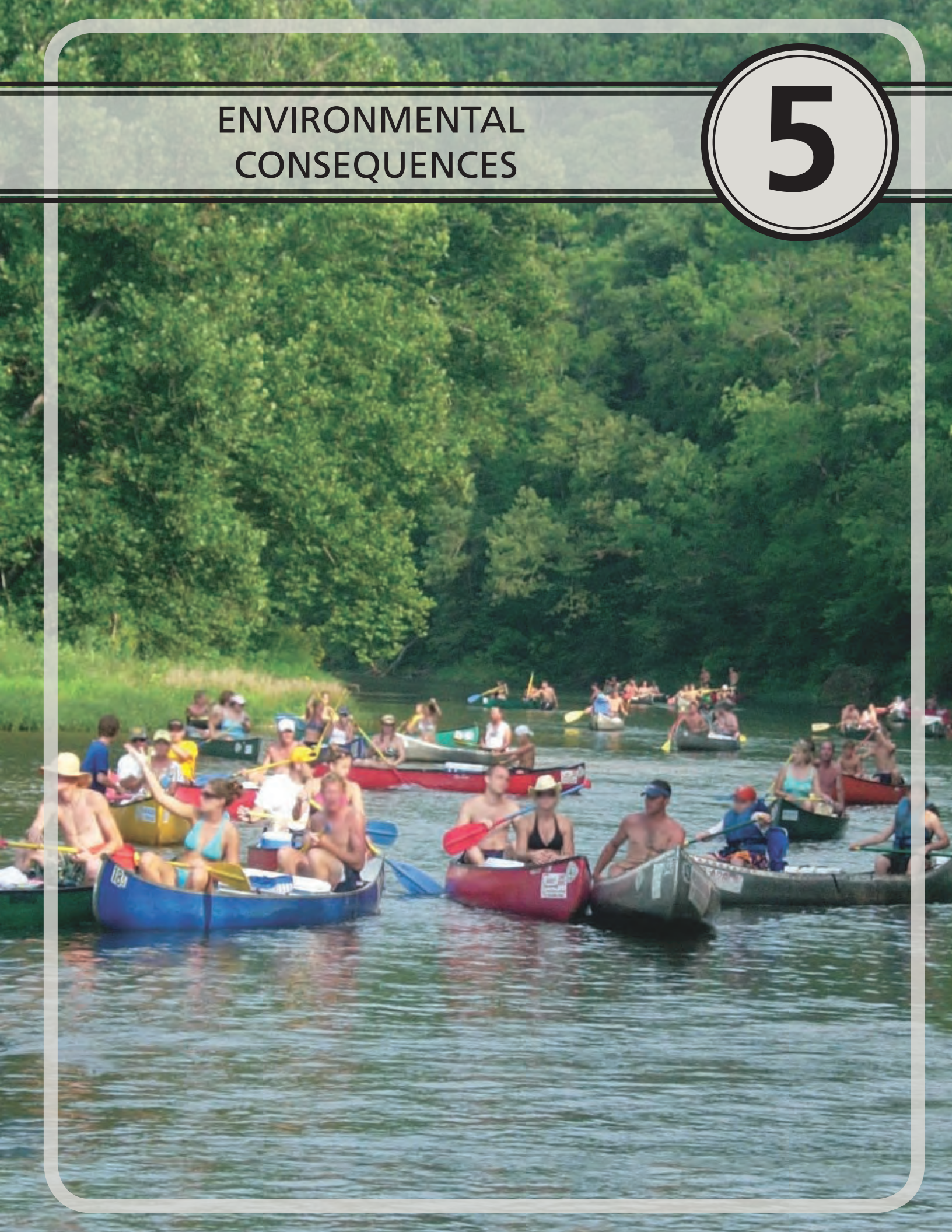

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INTRODUCTION

OVERVIEW

The National Environmental Policy Act requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if a proposed action is implemented. In this case, the proposed federal action would be the adoption of the *Ozark National Scenic Riverways General Management Plan / Wilderness Study / Environmental Impact Statement*. This chapter analyzes the environmental impacts of implementing the four alternatives on natural resources, cultural resources, visitor use and experience, soundscapes, the socioeconomic environment, and park operations. The analysis is the basis for comparing the beneficial and adverse effects of implementing the alternatives.

Because of the general, conceptual nature of the actions described in the alternatives, the impacts of these actions are analyzed in general, qualitative terms. Thus, this environmental impact statement should be considered a programmatic analysis. If, and when site-specific developments or other actions are undertaken to implement parts of this *Ozark National Scenic Riverways General Management Plan / Wilderness Study / Environmental Impact Statement*, appropriate, detailed environmental and cultural documentation would be prepared in compliance with the National Environmental Policy Act of 1969 and National Historic Preservation Act of 1966. For the purposes of this analysis, it is assumed that all of the specific actions proposed in the alternatives would occur over the life of the plan.

This chapter begins with a description of the methods and assumptions used for analyzing impacts, followed by methods for determining cumulative impacts. Impact analysis discussions are then organized by impact topic. All of the impact topics are assessed for each alternative. The existing conditions for all of the impact topics were identified in "Chapter 4: Affected Environment."

The analysis of the no-action alternative (the continuation of current management) identifies the future conditions in the National Riverways if no major changes to facilities or NPS management occurred. The three action alternatives are then compared to the no-action alternative to identify the incremental changes in conditions that would occur because of changes in park facilities, uses, and management.

Each alternative discussion also describes cumulative impacts; these are identified when this project is considered in conjunction with other actions occurring within the NPS Riverways or region. The discussion of cumulative impacts is followed by a conclusion statement. The impacts of each alternative are briefly summarized in table 14 at the end of the "Chapter 2: Alternatives, Including the Preferred Alternative."

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

The planning team based the impact analyses in this chapter on professional judgment, research of existing studies and literature, opinions from experts within the National Park Service and other agencies, and the study of previous projects that had similar effects. When assessing the potential impacts on the resources and values within the NPS Riverways boundary, several impact parameters were analyzed for each alternative. In this chapter, the potential impacts of the no-action alternative, and alternatives A, B, and C are described by four criteria: (1) type; (2) intensity; (3) duration, and (4) context. Explanations and definitions of these criteria are as follows:

- *Type* of impact is either beneficial or adverse. Beneficial and adverse impacts on resources and values are assessed by comparing the anticipated changes that would result from implementing each action alternative to the results of the continuing current management direction (no-action). Once it is determined if an impact is beneficial or adverse, the other impact measurement criteria of intensity, duration, and context can be assessed.
- *Intensity* refers to the degree, level, or strength of the impact on the respective resource or value. Impact intensities for beneficial and adverse effects are quantified as negligible, minor, moderate, and major. Because the definitions of intensity vary by resource topic, separate intensity definitions are provided for each impact topic (in the individual sections of this chapter).
- *Duration* refers to the length of time the impact affects the resource or value. In this analysis, impact durations are as follows, unless otherwise noted in the impact topic section:
  - Short term: Impacts would last less than three years.
  - Long term: Impacts would persist for three or more years, or may be permanent. Although an impact may only occur for a short duration at one time, it is considered to be a long-term impact if it occurs regularly over a longer period.
- *Context* refers to the setting or geographic scope of the impact on the particular resource or value. In this analysis, impacts are measured relative to the following two context levels (unless otherwise noted in the impact topic section):
  - Local: Impacts would be limited to a specific site or relatively small area within the NPS Riverways' boundaries.
  - Regional: Impacts would occur over a large, widespread area within and/or beyond the NPS Riverways' boundaries, or in several areas along the riverways.

The effects of the management alternatives on impact topics of the NPS Riverways are analyzed based on impacts resulting from the visitor use patterns, levels of development, and other management actions associated with each alternative. The impacts analyses of the action alternatives are determined by comparing against the effects of the no-action alternative. Understand the impacts of implementing any of the action alternatives must take into consideration the impacts that would occur from continuing current management in the no-action alternative.

Impacts were assessed assuming that mitigation measures would be implemented to minimize or avoid impacts. If the mitigation measures described in chapter 2 were not applied, the potential for adverse resource impacts and the magnitude of those impacts would increase. Therefore, the mitigation measures would be incorporated into the record of decision for the selected alternative.

CUMULATIVE IMPACTS

Council on Environmental Quality regulations, which ensures that federal agencies meet their obligations under the National Environmental Policy Act, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are described in Council on Environmental Quality regulation 1508.7 as follows:

> Cumulative impacts result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts are evaluated separately for the no-action alternative and the three action alternatives by adding the impacts from each alternative with the impacts from past, present, and reasonably foreseeable future actions. To do this, it was necessary to identify other such projects or actions at the NPS Riverways and in the surrounding "action area." The extent of the "action area" was determined to be the counties adjacent to the entire 134 miles of river within the NPS Riverways. The action area for assessing cumulative impacts is the same for all impact topics.

To determine which actions within this area may have cumulative impacts on NPS Riverways' resources and values, the National Park Service identified projects and programs that have occurred in the past, are currently being implemented, or would likely be implemented over the next 20 years, which is the typical life of a general management plan. Combined, these actions are referred to as the cumulative scenario. Conceptual plans focusing on long-term goals and objectives, rather than on specific projects that have been funded and approved, have not been included in the cumulative scenario.

Past, present, and reasonably foreseeable future actions that could contribute to cumulative impacts are summarized below. The evaluation of cumulative impacts, described under each impact topic, is qualitative in nature.

Recreation and Tourism Enhancements

Counties and municipalities adjacent to the NPS Riverways have a variety of recreation and tourism initiatives to stimulate economic growth and improve the quality of life in the area. The following projects are among those that could have cumulative impacts on NPS Riverways resources and visitor experiences.

The Missouri Department of Conservation has an ongoing elk reintroduction program in the Peck Ranch Conservation Area in Shannon, Carter, and Reynolds counties. The National Park Service provided a letter of support to the Missouri Department of Conservation regarding the reintroduction of elk to the state. At the time of the printing of this document, public access to this refuge is limited to a driving loop through a portion of the refuge for viewing elk and other wildlife along fields, streams, and forested areas. The entire road system within the refuge will likely return to full, open public access in the future, as it existed prior to the elk reintroduction effort. It should also be noted that the elk are not fenced in and are free to roam freely. To date, they have been documented inside the National Riverways boundary numerous times and have been crossed the Current River and made it to U.S. Highway 60.

The town of Van Buren plans to complete the Old Tram Road Trail, a 10.2-mile-long, multiuse trail along the Current River in Carter County, Missouri, that would connect Van Buren to the land and water resources of Ozark National Scenic Riverways. When

completed, the trail would become part of the larger Ozark Trail.

Recreational use adjacent to the NPS Riverways is expected to continue to increase, particularly as state and local highways between St. Louis and other metropolitan areas and the NPS Riverways vicinity are improved and widened.

Overcrowding and conflicting river uses in adjacent areas can affect the quality of recreational experiences within the NPS Riverways as well. For example, manure associated with horseback riding and petroleum byproducts from gas-powered motorboats can affect river water quality, which in turn can affect recreational experiences in the NPS Riverways. It should be noted that the "gaps" at Eminence and Van Buren are outside the National Park Service's jurisdiction; thus, increased pollution and overcrowding in and near these areas may occur without National Park Service management control.

Adjacent Land Uses and Land Development

Various types of land uses and development activities on surrounding lands within the Current and Jacks Fork river basins can have effects on park resources and values. These activities include

- residential and commercial development
- various types of mining
- agriculture
- recreational land uses
- forestry practices
- sewage treatment and disposal (municipal and individual/septic)
- garbage dumps, and salvage yards;
- pipelines
- petroleum and other chemical storage sites

Because of the ecological connectivity of natural systems and because the karst system of the Ozark Highlands extends well beyond the boundary of the NPS Riverways, adjacent land use practices can directly affect the NPS Riverways.

None of the counties within the action area have zoning or construction permitting processes. New land development may occur, but would not be reported or tracked until completed (and then only for assessment and taxing purposes). Within the NPS Riverways' boundaries, most private property is restricted by scenic easements. This can ensure that scenic viewsheds remain intact; however, improperly managed scenic easements can result in negative effects on viewsheds along the river corridors over time.

Historic clearing of riparian forests that occurred prior to the National Riverways' designation had a variety of effects on natural resources in the area, ranging from habitat fragmentation to river channel instability. Although large scale forest clearing activities no longer occur, the agricultural activities and other lands uses on these cleared lands throughout the Current and Jacks Fork basins could continue to have effects on park resources. Also, since 1998, there have been four permitted gravel removal operations in the Jacks Fork watershed. Additional, future gravel mining operations within the basins could occur.

The Viburnum Trend, the world's largest lead-zinc mining district, extends into the Current River watershed. Exploration for mineral deposits has occurred on the southeastern edge of the river basin in the Mark Twain National Forest and may continue near the NPS Riverways.

Air pollution from near and distant land use sources has deposited mercury into the streams and rivers of the National Riverways.

The nonnative Asian clam is present in the riverways and may be increasing in

abundance and range. This clam may outcompete native mussel species. Other nonnative species that could affect native species and the ecological integrity of the National Riverways include zebra mussels, Eurasian water milfoil, *Didymosphenia*, purple loosestrife, and nonnative crayfish. Lastly, unmanaged or undermanaged all-terrain vehicles, four-wheel-drive vehicles, and motorboats on surrounding lands and waters can affect park resources and values.

Road Construction and Improvements

U.S. Highway 67 from St. Louis to Poplar Bluff has been expanded to a four-lane highway. This improvement is expected to increase tourist traffic near and into the NPS Riverways.

Expansion of U.S. Highway 60 through Van Buren recently was completed. The Missouri Highway 19 bridge over Sinking Creek is anticipated to be funded for construction in the Missouri Department of Transportation's next statewide transportation improvement 5-year construction program and is scheduled for replacement in the near future.

Other Actions

A new repeater site has been installed within the National Riverways boundaries at Rhymer Ridge as part of an upgrade to the NPS Riverways' radio system. The previously undeveloped Rhymer Ridge site is on a ridge near a commercial power source and is surrounded by a 6-foot-high, chain-link security fence. The fence has a vehicle-width gate at the compound entrance. The surface within the compound and extending a few feet beyond the security fence has aggregate rock installed over a weed barrier mat.

GEOLOGIC RESOURCES AND SOILS

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

This impact topic includes the surface and subterranean geologic resources and soils along the riverways. The impact intensities for geologic resources and soils are as follows:

- **Negligible:** Impacts on geologic resources and soils would be barely detectable and would result in no measurable or perceptible changes to geologic resources.
- **Minor:** Impacts on geologic resources and soils would be slight but detectable and would result in small but measurable changes to geologic resources.
- **Moderate:** Impacts on geologic resources and soils would be readily apparent and easily measureable and would result in considerable changes to geologic resources.
- **Major:** Impacts on geologic resources and soils would be severely adverse or exceptionally beneficial and would result in substantial changes to geologic resources (in scale, degree, and/or size).

NO-ACTION ALTERNATIVE

The no-action alternative would involve the continuation of current park management actions and practices. Generally, the degradation of soils and other geologic features of the National Riverways, including karst surfaces and subsurfaces, would continue to be managed on a site-by-site, case-by-case basis. National Riverways lands would not be zoned for different types and levels of development and recreational uses. Areas of soil erosion and sedimentation would continue to occur as a result of the continued recreational and transportation land uses throughout the National Riverways, such as motorized vehicle and equestrian use, hiking, and camping. Although surface soil degradation would be relatively controlled and minimal in developed areas and along designated roads and trails, a notable amount of erosion and sedimentation could continue to result from the excessive use of undesignated roads and trails used by motorized vehicles, hikers, and equestrian users. These uses would displace vegetation cover and expose soils to weathering. Similarly, the ongoing creation and use of undesignated trails and roads, as well as the expansion of high-use areas, could continue to compact soils and alter the natural make-up of the soil horizon, reducing the quality of the soils for sustaining plant growth and other natural processes.

The continued generation and use of undesignated roads and trails from dispersed recreational and transportation uses by park visitors could continue to degrade karst features throughout the National Riverways. Expansion and use of high-use areas in the National Riverways could also continue to alter nearby karst landscape. Motorized vehicles and equestrian uses would likely continue to be the largest contributors to the degradation of geologic resources and soils. In addition to direct impacts to these unique geologic resources, the ground surface alterations from undesignated trail use could alter surface hydrology, which could indirectly impact the karst hydrology (both water quality and water quantity effects).

Undesignated river access points, launches, and crossings would continue to disturb and destabilize riverbanks and riverbeds, resulting in bank and riverbed erosion and sedimentation. With all stretches of the Jacks Fork and Current Rivers in the park unit allowing motorboat use, potential effects of riverbank erosion from boat wakes could continue.

Overall, the continued management of the National Riverways under the no-action alternative would result in a long-term, moderate, adverse, localized to regional effect on geologic resources and soils.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the National Riverways have had and would contribute to notable effects on the soils and geologic resources in the area. Throughout the springsheds and watersheds of the Current and Jacks Fork rivers, land use and development, flow/channel alterations, other recreational uses, and mineral development are the primary contributors to these past, present, and future effects.

Potential land use and land development effects include adverse impacts associated with earthwork and landscape alterations from agricultural and forestry practices, urban and suburban land development, garbage dumps, industrial sites, pipelines, and transportation infrastructure (including roads and bridges). These types of land alterations disturb or displace the native soils and geologic strata in the watersheds and springsheds, including possible disturbances to the karst geologic system adjacent to the National Riverways. Many of these land uses can also lead to altered surface drainage patterns and increased runoff volumes in the tributary basins of the NPS Riverways' rivers, which typically result in soil erosion and sedimentation (often far downstream from the land disturbance site).

In particular, road development can have considerable effects in altering flow patterns and channelizing drainage. Past and present agricultural and logging practices have also caused notable changes to the soils and geologic resources of the area. The past clearance of native bottomland forests after European settlement and the transition to intensive agricultural land uses contribute to exposing large areas of native soils and geology to the effects of weathering and erosion. In addition to exposing native soils to erosion and migration, the land clearing and subsequent agricultural uses resulted in the deposition of large volumes of chert gravel in the rivers and tributaries of the area.

Mining and mineral development is another notable contributor to soils and geologic resource impacts. The drainage basins of the Current and Jacks Fork rivers are home to a number of substantial mining projects. The past and current mining activities in the watersheds have disturbed or displaced areas of native soils and karst geology. Future mining and mineral development would likely continue this trend in the region.

Gravel mining operations can adversely affect the geology of adjacent tributaries by altering flow patterns, changing channel structure, increasing stream gradient, relocating channels, and causing scouring and bank erosion. The removal of larger-sized gravel can also release finer sediment into the tributaries of the river system, which not only alters the geology of the stream and river channels, but also has notable adverse effects on aquatic habitat quality. Since 1998, there have been four permitted gravel removal operations in the Jacks Fork watershed.

In addition to gravel mining, the Current River watershed is home to a portion of the world's largest lead-zinc mining district, the Viburnum Trend. The exploration for similar mineral deposits has occurred on the southwestern edge of the river basin in the Mark Twain National Forest.

Recreational uses on other private and state lands (inside and outside the NPS boundary) contribute to the cumulative effects on soils and geologic resources. Equestrian and off-road motorized vehicle use outside NPS-managed lands are just two examples. Unmanaged equestrian and vehicle use often lead to soil erosion and sedimentation, stir up riverbed material, and can alter underlying karst features.

Collectively, these past, present, and reasonably foreseeable future actions and activities in the Jacks Fork and Current river basins would have long-term, moderate, adverse, localized to regional impacts on soils and geologic resources.

When the likely effects of the no-action alternative are added to the effects of past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, regional, cumulative impact on soils and geologic resources. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

Conclusion

The no-action alternative would contribute to long-term, moderate, adverse, localized to regional impacts on geologic resources and soils. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, regional, cumulative impact on soils and geologic resources. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

ALTERNATIVE A

Alternative A would place a stronger emphasis on managing natural resources in the National Riverways. The new approach would include managing for desired conditions using management zones, more use of applied biology and geographic information systems, program enhancements in aquatic resource monitoring and rare terrestrial plant/wildlife protection, karst system management, restoration of fragmented habitats, and monitoring of boundary effects on resources. Collectively, this stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on geologic resources.

Land management zoning would be introduced to the park management strategy under this alternative, with the National Riverways having the following zoning: 26.8% primitive, 68.6% natural, 3.2% resource-based recreation, and 1.4% developed. Establishment of land management zones (with approximately 96% of the National Riverways being managed as primitive or natural) would substantially reduce the effects of recreational use and park operations on geological resources and soils. Facility development, park operations, and recreational uses that negatively affect geological resources (erosion, sedimentation, and compaction) would be better contained and mitigated. This would result in a long-term, moderate, beneficial, regional effect on soils and geologic resources.

River management zoning would be introduced to the park management strategy under this alternative, with the following zoning on the Current and Jacks Fork rivers: 51% nonmotorized river, 13% seasonal mixed-uses river, and 36% mixed-use river. Establishment of river management zones that provide for lengthy nonmotorized stretches and stretches with increased management of horsepower and seasonal use could help reduce and control wake disturbances on riverbanks and associated erosion and sedimentation along several stretches of the rivers. This could result in a long-term, minor, beneficial, regional effect on soils and geologic resources.

Under this alternative, approximately 20 access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better manage watercraft crowding on the rivers that results from concessioner services. New access points for nonmotorized watercraft users would be located and built in a way that minimized natural resource impacts. The restoration of riverbank and riverbed areas where the existing nonmotorized watercraft access points are closed and restored could have beneficial effects on soils and geologic features along the rivers. However, the

development of new access points for these users would result in additional compaction, erosion, and sedimentation of riverbank soils and surrounding submerged and upland soils. These visitor management actions would have long-term, minor, localized effects that were both beneficial and adverse to soils and geologic resources. Due to the reduced number of access points for nonmotorized watercraft users and the sustainable design of the new access points, most of the effects would be beneficial.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the National Riverways and, thus, reduce negative effects on local soils and geology. In addition, the closure and restoration of approximately 50 miles of undesignated roads and traces in the National Riverways would minimize further soil compaction, erosion, and sedimentation and allow restoration to occur. The closure of undesignated vehicle accesses and crossings along the rivers would also reduce bank erosion and sedimentation. Collectively, these actions related to vehicle/access management would have a long-term, minor to moderate, beneficial, localized to regional effect on geology and soils.

This alternative would eliminate motorized terrestrial vehicle access to all gravel bars in the National Riverways. Camping would be allowed only on designated gravel bars and away from the river. This would substantially reduce riverbed disturbances, soil disturbances, and the potential for erosion and sedimentation in all gravel bar areas. These management actions would result in a long-term, moderate, beneficial, localized effect on soils and geologic resources. Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for soil compaction, erosion, and sedimentation along the designated trails would increase notably from conditions that would develop, including rutting and braiding. This could result in a long-term, minor, adverse, localized effect on soils and geologic resources.

This alternative would include improvements to the NPS Riverways' equestrian management. These changes would include a better-designed horse trail system that would minimize geology and soil damage by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 50 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 25 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails and no additional stream crossings would be designated. Thus, most new designated equestrian trails would not be expected to directly increase soil disturbance or compaction beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in soil disturbance and compaction from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on soils and geology.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated river crossings and undesignated river access points in the National Riverways. These resource restoration areas would prevent further degradation of local soils and geology, both along the riverbanks and in upland areas.

Reductions in soil compaction, soil erosion, and sedimentation would be expected. This action would result in a long-term, moderate, beneficial, localized to regional effect on soils and geology.

This alternative would include the establishment of an equestrian permitting system that would help manage horse use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against soil and geology degradation from horse use, which would result in a long-term, minor to moderate, beneficial, localized to regional effect on soils and geology.

An additional mile of trails that were accessible to people with disabilities would occur under this alternative. These trail developments would cause compaction of native soils and possibility lead to isolated areas of erosion and sedimentation, resulting in a long-term, minor, adverse, localized effect on soils and geology.

The proposed designation of 3,424 acres of wilderness at Big Spring under alternative A would have a long-term, minor, beneficial, localized effect on geologic resources and soils. Approximately 10 acres in the wilderness study area would be excluded from the proposed designation as a small developed area and its narrow access corridor, sometimes called a cherry stem. The structures, roads, and utilities (and associated uses and management) in these excluded areas would remain. Although the lands of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), land management would not be notably different from the no-action alternative. However, the primitive zoning and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under the no-action alternative. In addition, with the proposed wilderness designation, motorized vehicle use of the access road to the fire tower would be prohibited. This change of allowed use would reduce disturbances to surface soils and minimize erosion and sedimentation along the road corridor. However, since very little motorized use is currently occurring in this area (i.e., under no-action alternative), the reduction in motorized use would be negligible.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on geologic resources and soils. When the beneficial and adverse effects of alternative A are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on soils and geologic resources. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative A would have long-term, minor to moderate, localized to regional, beneficial impacts, and long-term, minor, localized, adverse impacts on geologic resources and soils. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on soils and geologic resources. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

ALTERNATIVE B (NPS PREFERRED)

The NPS preferred alternative would place a stronger emphasis on managing natural

resources in the National Riverways. The new approach would include managing for desired conditions of management zones, more use of applied biology and geographic information system, program enhancements in aquatic resource monitoring, spring monitoring, restoration of fragmented habitats, information sharing, volunteer stewardship projects, and monitoring of boundary effects on resources. Collectively, this stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on soils and geologic resources.

Land management zoning would be introduced to the park management strategy under this alternative, with the following land zoning: 16.4% primitive, 72.0% natural, 8.8% resource-based recreation, and 2.8% developed. Establishment of land management zones (with approximately 88% of the National Riverways being managed as primitive or natural) would help minimize recreation use and park operations effects on geological resources and soils. Facility development, park operations, and recreation uses that negatively affected geological resources (erosion, sedimentation, and compaction) would be better contained. Management of these impacts could focus on specific concentrated zones of use. This would result in a long-term, moderate, beneficial, regional effect on soils and geologic resources.

The new development associated with alternative B would increase the footprint of the developed area of the National Riverways from the current 1.4% to 2.8%. This would increase disturbances and displacement of geologic resources and soils. A portion of this increased area of development would provide two new developed campgrounds (along the upper Current River near Akers and the upper Jacks Fork near Blue Spring) and a 25-site horse camping area along the Jacks Fork. Although some of the proposed campground developments would occur in existing disturbed areas (for example, day use areas), the expansion would likely increase the disturbance zone to surrounding soils and increase the potential for soil compaction, erosion, and sedimentation. This increase in developed areas of the National Riverways would result in short- and long-term, moderate, adverse, localized effects on soils and geologic resources in and near the proposed developed zones of the park unit.

River management zoning would be introduced to the park management strategy under this alternative, with the following zoning on the Current and Jacks Fork rivers: 34% nonmotorized river, 14% seasonal mixed-use river, and 52% mixed-use river. Establishment of river management zones that provide for nonmotorized stretches and stretches with increased management of horsepower and seasonal use would help reduce and control wake disturbances on riverbanks and associated erosion and sedimentation along several stretches of the rivers. However, since much of the proposed nonmotorized zones currently receive low levels of motorized use, the potential reductions in wake erosion in these areas would likely be minimal. Overall, the river management zoning would result in a long-term, negligible to minor, beneficial, regional effect on soils and geologic resources.

Under this alternative, approximately 20 access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better manage watercraft crowding on the rivers that results from concessioner services. At the relocation sites, this would result in additional compaction, erosion, and sedimentation of riverbank soils and surrounding submerged and upland soils. However, this action would also result in beneficial effects from the restoration of riverbank areas where the existing nonmotorized watercraft access points were closed and restored. These visitor management actions would have long-term, minor, localized effects that were both beneficial and adverse to soils and geologic resources.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the National Riverways and, thus, reduce negative effects on local soils and geology. In addition, the closure and restoration of approximately 45 miles of undesignated roads and traces in the park unit would minimize further soil compaction, erosion, and sedimentation and allow restoration to occur. The closure of undesignated vehicle accesses and crossings along the rivers would also reduce bank erosion and sedimentation. Collectively, these actions related to vehicle/access management would have a long-term, minor to moderate, beneficial, localized to regional effect on geology and soils.

This alternative would reduce the number of gravel bars that are accessible by motorized terrestrial vehicles. Camping would be allowed only at designated gravel bars and away from the river. This would reduce riverbed disturbances, soil disturbances, and the potential for erosion and sedimentation in many gravel bar areas. These management actions would result in a long-term, minor to moderate, beneficial, localized effect on soils and geologic resources.

Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for soil compaction, erosion, and sedimentation along the designated trails would increase notably from conditions that would develop, including rutting and braiding. This could result in a long-term, minor, adverse, localized effect on soils and geologic resources.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include a better-designed horse trail system that would minimize geology and soil damage by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 60 miles of designated equestrian trails, including (approximately 23 miles of existing and approximately 35 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase soil disturbance or compaction beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use the new designated trails as avenues to create other undesignated trails in new areas. This would increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in soil disturbance and compaction from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on soils and geology.

The proposed equestrian management could result in some new river crossing points along newly designated trail alignments. These new crossings could alter and compact riverbank soils and lead to erosion if they are located in previously undisturbed areas. In addition, horse camping may be allowed in designated sites under this alternative. These actions could result in a long-term, minor, adverse, localized effect on soils and geologic resources.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated river crossings and undesignated river access points in the National Riverways. These resource restoration areas would prevent further degradation of local soils and geology, both along the riverbanks and in upland areas. Reductions in soil compaction, soil erosion,

and sedimentation would be expected. This action would result in a long-term, moderate, beneficial, localized to regional effect on soils and geology.

The establishment of a 25-campsite horse campground along the Jacks Fork would introduce new ground disturbances, soil compaction, and the potential for erosion and sedimentation at the new campground site and in areas radiating from the horse camp (from an accompanying increase in equestrian activity in this area). This action would result in a long-term, minor, adverse, localized effect on soils and geologic resources.

This alternative would include the establishment of an equestrian permitting system that would help manage horse use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against soil and geology degradation from horse use, which would result in a long-term, minor to moderate, beneficial, localized to regional effect on soils and geology.

The planned increased access to discovery sites in the National Riverways could generate the need for additional trail development in some areas. An additional mile of trails that were accessible to people with disabilities would also occur under this alternative. These trail developments would cause compaction of native soils and possibility lead to isolated areas of erosion and sedimentation, resulting in a long-term, minor to moderate, adverse, localized effect on soils and geology.

The proposed designation of approximately 3,430 acres of wilderness at Big Spring under alternative B would have a long-term, minor to moderate, beneficial, localized effect on geologic resources and soils. Approximately 4 acres in the wilderness study area (existing utility corridor) would be proposed as potential wilderness addition, pending eventual decommissioning of the utility line. Although the lands of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management. In addition, with the proposed wilderness designation, the NPS training range would be removed and restored to a natural condition. Also, motorized vehicle use of the access road to the fire tower, NPS training range, and barn would be prohibited. These roads would be evaluated to determine if they should be rehabilitated to a natural condition or restored to Civilian Conservation Corps-era condition. These restoration efforts and changes in allowed use would reduce disturbances to surface soils and minimize erosion and sedimentation along the road corridor.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on geologic resources and soils.

When the beneficial and adverse effects of alternative B are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on soils and geologic resources. Alternative B would contribute a small, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative B would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, minor to moderate, localized, adverse impacts on geologic resources and soils. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on soils and geologic resources. Alternative B would contribute a small, long-term, beneficial increment to the cumulative effect.

ALTERNATIVE C

Alternative C would place a stronger emphasis on monitoring water quality, aquatic ecology, and terrestrial ecology to ensure the protection of these natural resources because of the notably higher levels of visitor use associated with this alternative. This management approach would also include an increase in habitat restoration efforts. Collectively, these management actions would result in a long-term, minor, beneficial, regional effect on soils and geologic resources.

Land management zoning would be introduced to the park management strategy under this alternative, with the following land zoning: 6.5% primitive, 28.2% natural, 59.6% resource-based recreation, and 5.7% developed. Establishment of land management zones (with approximately 34% of the National Riverways being managed as primitive or natural) would help minimize negative effects from recreational use, facility development, and park operations on geological resources and soils in areas zoned for protection. However, with roughly 6% of the National Riverways being zoned as developed and 60% as resource-based recreation, many large areas that are currently undisturbed would be exposed to increased development and visitor uses. As a result, considerable disturbances and displacement of geological resources would occur under this alternative, resulting in increased erosion, sedimentation, soil compaction, and loss of topsoil. Thus, although the application of zoning would help contain adverse effects on resources, the degradation of resources from the large amount of developed and recreation zoning in alternative C would result in a long-term, moderate, adverse, regional effect on soils and geologic resources.

This alternative would increase the developed area of the park unit from the current 1.4% to 5.7%. A portion of this increased area of development would provide two new developed campgrounds (along the upper Current River near Akers and the upper Jacks Fork near Blue Spring) and a 25-site horse camping area along the Jacks Fork. Although some of the proposed campground developments would occur in existing disturbed areas (for example, day use areas), the expansion would likely result in an increase in the disturbance zone to surrounding soils and an increase in the potential for additional soil compaction, erosion, and sedimentation. This would result in short- and long-term, moderate, adverse, localized effects on soils and geologic resources.

River management zoning would be introduced to the park management strategy under this alternative, with following zoning on the Current and Jacks Fork rivers: 21% nonmotorized river, 20% seasonal mixed-use river, and 59% mixed-use river. Establishment of river management zones that provide for nonmotorized stretches and stretches with increased management of horsepower and seasonal use would help reduce and control wake disturbances on riverbanks and associated erosion and sedimentation on several stretches of the rivers. This would result in a long-term, minor, beneficial, and localized to regional effect on soils and geologic resources.

Under this alternative, approximately 20 access points (dropoff and pickup) for

nonmotorized watercraft users would be closed, restored, and relocated to better manage watercraft crowding on the rivers that results from concessioner services. At the relocation sites, this would result in additional compaction, erosion, and sedimentation of riverbank soils and surrounding submerged and upland soils. However, this action would also result in beneficial effects from the restoration of riverbank areas where the existing nonmotorized watercraft access points were closed and restored. These visitor management actions would have long-term, minor, localized effects that were both beneficial and adverse to soils and geologic resources.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the National Riverways and, thus, reduce negative effects on soils and geology. In addition, the closure and restoration of approximately 40 miles of undesignated roads and traces in the park unit would minimize further soil compaction, erosion, and sedimentation and allow restoration to occur. The closure of undesignated vehicle accesses and crossings along the rivers would also reduce bank erosion and sedimentation. Collectively, these actions related to vehicle/access management would have a long-term, minor to moderate, beneficial, localized to regional effect on geology and soils.

Although vehicular access to gravel bars would remain unchanged (same as no-action alternative), this alternative would limit gravel bar camping to designated gravel bars and away from the river. This would help minimize some riverbed disturbances, soil disturbances, and the potential for erosion and sedimentation in gravel bar areas. These management actions would result in a long-term, minor, beneficial, localized effect on soils and geologic resources.

Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for soil compaction, erosion, and sedimentation along the designated trails would increase notably from conditions that would develop, including rutting and braiding. This could result in a long-term, minor, adverse, localized effect on soils and geologic resources.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include a better-designed horse trail system that would minimize geology and soil damage by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 70 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 45 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase soil disturbance s or compaction beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use the new designated trails as avenues to create other undesignated trails in new areas. This would increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in soil disturbance and compaction from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on soils and geology.

The proposed equestrian management could result in some new river crossing points along newly designated trail alignments. These new crossings could alter and compact riverbank soils if they are located in previously

undisturbed areas. This could result in a long-term, minor, adverse, localized effect on soils and geologic resources.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated river crossings and undesignated river access points in the National Riverways. These resource restoration areas would prevent further degradation of local soils and geology, both along the riverbanks and in upland areas. Reductions in soil compaction, soil erosion, and sedimentation would be expected. This action would result in a long-term, moderate, beneficial, localized to regional effect on soils and geology.

The establishment of a 25-campsite horse campground along the Jacks Fork would introduce new ground disturbances, soil compaction, and the potential for erosion and sedimentation at the new campground site and in areas radiating from the horse camp (from an accompanying increase in equestrian activity in this area). This action would result in a long-term, minor, adverse, localized effect on soils and geologic resources.

An additional mile of trails that were accessible to people with disabilities would occur under this alternative. These trail developments would cause compaction of native soils and possibly lead to isolated areas of erosion and sedimentation, resulting in a long-term, minor, adverse, localized effect on soils and geology.

The proposed designation of 1,779 acres of wilderness at Big Spring under alternative C would have a negligible effect on geologic resources and soils. Although the lands of this area would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on geologic resources and soils.

When the beneficial and adverse effects of alternative C are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, regional, cumulative impact on soils and geologic resources. Alternative C would contribute a small to appreciable, long-term, adverse increment to the cumulative effect.

Conclusion

Alternative C would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, minor to moderate, localized to regional, adverse impacts on geologic resources and soils. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, regional, cumulative impact on soils and geologic resources. Alternative C would contribute a small to appreciable, long-term, adverse increment to the cumulative effect.

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

This impact topic includes water quality and water quantity effects on surface water and groundwater, including effects to rivers, streams, wetlands, and ponds. The impact intensities for water resources are as follows:

- **Negligible:** Impacts on the surface and subsurface flow regime, related water resource features, and water quality would be either barely detectable or the effects would be considered slight and isolated. Any measureable changes would be well within the natural range of variability. These changes would not have any measurable effect on the overall hydrological system of the area.
- **Minor:** Impacts on the surface and subsurface flow regime, related water resource features, and water quality would be measureable, but isolated and minimal. Natural processes, functions, and integrity would be affected, but would be within the natural range of variability. These changes would not have any measurable effect on the overall hydrological system of the area.
- **Moderate:** Impacts on the surface and subsurface flow regime, related water resource features, and water quality would be readily apparent and measurable. Natural processes, functions, and integrity would be affected and would be outside the natural range of variability. These changes could have detectable effects on the overall hydrological system of the project area.
- **Major:** Impacts on the surface and subsurface flow regime, related water resource features, and water quality would be multiple and readily measurable. Changes to some natural processes, functions, and integrity would be drastic, well outside the natural range of variability, and would have considerable consequences on natural resources along the riverways. These changes would have substantial effects on the overall hydrological system of the project area.

NO-ACTION ALTERNATIVE

The no-action alternative would involve the continuation of existing river management and land management actions and practices of NPS Riverways lands and the Jacks Fork and Current Rivers. The continuation of the various recreational uses of the park unit would continue to have adverse effects on the National Riverways' water resources.

All segments of both rivers in the park unit would continue to be open to at least some level of motorboat use, with various stretches continuing to be managed for particular motor horsepower limits. This continued degree and geographic extent of allowed motorboat use along the Current and Jacks Fork Rivers would maintain the current level of threat of introducing petroleum product pollutants into the rivers throughout the park unit. The potential for water quality degradation in the National Riverways' rivers from boat-based petroleum pollutants could remain at current levels or increase if motorboat use increases on the rivers in the park unit.

The no-action alternative would involve the continuation of current park land management approaches and would not include land management zoning. Generally, the degradation of water resources in the National Riverways from land-based recreation would continue to be managed on a site-by-site, case-by-case basis.

Equestrian uses in the National Riverways would continue to adversely affect surface water resources throughout the park unit, including rivers, streams, wetlands, and seeps. Along the Jacks Fork and Current Rivers, the seven designated horse crossings, 24 undesignated horse crossings, and 38 undesignated horse access points to the rivers would continue to disturb riverbeds and riverbanks, stir up sediment in the rivers, and introduce horse manure into the riverways. This equestrian activity along and in the rivers would continue to degrade water quality by increasing turbidity and increasing nutrient loading and bacteria in the rivers.

Equestrian uses away from the rivers would also continue to have adverse effects on water resources. The 23 miles of designated equestrian trails and nearly 90 miles of undesignated equestrian trails would continue to introduce nutrient loading and bacteria into adjacent water features and groundwater. In addition, the undesignated trails would continue to be sources of soil erosion and sedimentation that could degrade the quality of adjacent water resources such as wetlands, groundwater recharge zones, sinks, and losing streams. For example, over 22 miles of the undesignated equestrian trails are on steep slopes and have serious erosion/sedimentation problems, resulting in adverse impacts to nearby water resources.

Land-based motorized vehicle use on the many roads and traces in the National Riverways by NPS staff and park visitors would continue to have adverse effects on water resources under the no-action alternative. The water quality of surface water and groundwater could be affected (if near a sinkhole, losing stream, or discrete recharge area) by the deposition of petroleum product pollutants onto the park landscape. Adjacent water bodies could continue to be degraded by erosion and sedimentation. Soil compaction and soil rutting along the roads and traces would continue to have effects on local hydrologic patterns and subsurface water flows. The circuitous nature and length of designated roads and undesignated roads in the National Riverways would contribute to the dispersal and extent of these continuing effects from motorized land vehicles.

Motorized land-based vehicles would continue to access and/or cross the rivers in multiple designated and undesignated locations under the no-action alternative. These vehicles would have adverse effects on the water quality of the rivers by depositing petroleum product pollutants directly into the river when the vehicles are partially submerged. In addition, turbidity in river water would continue to result from motorized vehicles stirring up riverbed sediment when accessing or crossing the rivers.

Public recreation in and along the rivers and septic systems on lands within the NPS boundary could also continue to adversely affect water quality. Human waste that results from recreational activity along the river would continue to contribute bacteria directly to the surface water system. Leachate from ineffective septic systems on lands within the NPS boundary could also contribute nutrient loading into groundwater, which may reach surface water through seeps and springs in the karst landscape.

NPS staff would continue to work with state, counties, municipalities, and landowners to study, improve, and maintain water quality in the Jacks Fork and Current river watersheds. In addition, staff would aim to remove undesignated river accesses and crossings in accordance with guidance from the National Riverways' road and trail study.

Overall, management of the park unit under the no-action alternative would continue to result in a long-term, minor to moderate, adverse, regional effect on water resources.

Cumulative Impacts

Several past, present and reasonably foreseeable future projects and actions in the vicinity of the National Riverways have had and would have notable effects on the water resources in the area. These actions and activities include flow and channel alterations by other private and public entities, land use and development, wastewater discharges, other recreational uses, and mineral development. Most of these other actions can affect surface water resources, groundwater resources, or both. In other words, given the karst geology of the area, surface water contamination can quickly become groundwater contamination, and vice versa. In a karst system, there is not sufficient time for effective filtration and absorption of pollutants, bacteria, and viruses from surface water as it travels through the groundwater system.

Flow and channel alterations by other private and public entities in the Jacks Fork and Current Rivers and their tributaries can change hydraulics in the waterways, resulting in riverbed scouring, bank instability, and sedimentation upstream and downstream of the alteration feature. These features include bridge abutments, culverts, river access points, and artificial bank hardening.

Wastewater discharges from human uses throughout the watersheds and springsheds can potentially have considerable effect on water quality in the region. For example, point source influxes of wastewater discharges from t municipal wastewater treatment facilities have been documented along the lower Jacks Fork River. Nonpoint pollution sources of wastewater enter the system from the ineffective septic leachfield discharges in the basins. This source of nutrient loading into the hydrologic system can have notable effects on downstream water quality because of the large number of residences in the watershed that are served by individual septic disposal systems and the porous nature of the karst geology.

Recreational uses on other private and state lands (inside and outside NPS boundary) contribute to the cumulative effects on water resources. For example, unmanaged equestrian use can contribute nutrients and bacteria from horse manure to rivers. Equestrian use can also erode soils along trails and stir up riverbeds, resulting in sedimentation and turbidity in surface waters. Motorboats and off-road motorized vehicles can contribute petroleum byproducts and other chemicals (on land and in water) to the water resources of the basins. Off-road vehicles can also contribute to trail erosion and sedimentation into water bodies, and can degrade groundwater recharge areas.

Land use and land development in the watersheds and springsheds of the National Riverways' rivers can have substantial effects on water resources. Agricultural land use contributes nutrient loading from livestock manure, pollutants from herbicide and pesticide migration, increased sedimentation from surface erosion on deforested lands, and increased runoff rates and volumes from exposed land without native groundcover. Urban and suburban land uses alter drainage patterns, increase runoff rates and volumes, and contribute nutrients and pollutants from lawn fertilizer and herbicide treatments. Garbage dumps can contribute polluted leachate into the karst geology and groundwater. Industrial sites, including petroleum and other chemical storage sites, can yield polluted runoff into the basin.

Transportation infrastructure substantially alters surface flow patterns and often results in channelized flows through ditches and other conveyances. The channelization of flows from roadway development often results in downstream erosion and sedimentations.

Mining and mineral development is another contributor to water resource impacts in the area. Gravel mining operations have the potential to adversely affect the adjacent tributaries by altering flow patterns, changing channel structure, increasing stream gradient,

relocating channels, and causing scouring and bank erosion. The removal of coarse gravel can release finer sediments into the tributaries of the river system, which not only alter the geology and hydrology of the stream and river channels, but also have adverse effects on aquatic habitat quality. Given its small size and light weight, the released fine sediment migrates down to the Current and Jacks Fork rivers. Since 1998, there have been four permitted gravel removal operations in the Jacks Fork watershed.

The Current River watershed is part of the world's largest lead-zinc mining district, the Viburnum Trend. The exploration for similar mineral deposits has occurred on the southeastern edge of the river basin in the Mark Twain National Forest. Large-scale mineral development operations can introduce substantial alterations to the local hydrology.

Collectively, these past, present, and reasonably foreseeable future actions and activities in the Jacks Fork and Current river basins would have long-term, moderate, adverse, localized to regional impacts on water resources.

When the likely effects of the no-action alternative are added to the effects of past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, regional, cumulative impact on water resources. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

Conclusion

The no-action alternative would have long-term, minor to moderate, adverse, regional impacts on water resources. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, regional, cumulative impact on water resources. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

ALTERNATIVE A

Alternative A would place a stronger emphasis on managing natural resources in the National Riverways. The approach would include managing for desired conditions of management zones, more use of applied biology and geographic information systems, program enhancements in aquatic resource monitoring and rare terrestrial plant/wildlife protection, karst system management, restoration of fragmented habitats, and monitoring of boundary effects on resources. Collectively, this stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on water resources.

Percentages of the park unit in each land management zone would include 26.8% primitive, 68.6% natural, 3.2% resource-based recreation, and 1.4% developed. Establishment of land management zones (with 95% of the National Riverways being managed as primitive or natural) would help minimize negative effects from recreational use, facility development, and park operations on rivers, wetlands, streams, seeps, floodplains, and groundwater recharge/discharge areas across the landscape. The most notable adverse effects on water resources from human activities would primarily be limited to the 1.4% of the NPS Riverways land that is zoned developed and resource-based recreation. Land management zoning would result in a long-term, moderate, beneficial, regional effect on water resources in the park unit.

River management zoning would also be introduced to the park management strategy. Zoning of the Current and Jacks Fork rivers, based on river miles, would be 51% nonmotorized river, 13% seasonal mixed-use river, and 36% mixed-use river. The entire stretch of the Jacks Fork in the National

Riverways would be limited to nonmotorized use at all times.

Establishment of river management zones that provide for year-round nonmotorized stretches and stretches with increased management of horsepower and seasonal motorized use would help reduce the threat of water quality degradation from petroleum-based pollutants from motorboats in these areas and in downstream waters. A potential reduction in petroleum-based pollutants could also result from seasonal restrictions to motorboats between Two Rivers and Round Spring on the Current River. These management zones would collectively result in a long-term, moderate, beneficial, regional effect on water resources.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the National Riverways and, thus, reduce direct negative effects on water resources such as streams, wetlands, seeps, and groundwater recharge areas, as well as indirect effects on water quality in the area.

The closure and restoration of approximately 50 miles of undesignated roads and traces in the National Riverways would eliminate or reduce existing disturbances to water resources. The closure of undesignated vehicle accesses and crossings along the rivers would reduce negative water quality effects on the Current and Jacks Fork rivers. Riverbed disturbances and associated turbidity in the rivers would likely decrease. In addition, the release of petroleum-based pollutants from land vehicles would be reduced due to improved management of vehicle river crossings. Collectively, these actions related to road/trace restoration would have a long-term, minor to moderate, beneficial, localized to regional effect on water resources.

This alternative would eliminate motorized terrestrial vehicle access to all gravel bars in the park unit except at launch areas. Camping would be allowed only at designated gravel bars away from the river. This would substantially reduce riverbed disturbances, erosion/sedimentation, and turbidity at most gravel bar areas. These management actions would result in a long-term, moderate, beneficial, localized effect on water resources.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include a better-designed horse trail system that would minimize water resource degradation by removing trails from sensitive areas (e.g., wetlands, streambanks, floodplain lands, seeps, groundwater recharge zones), better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 50 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 25 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails and no additional stream crossings would be designated. Thus, most new designated equestrian trails would not be expected to directly increase water resource impacts beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional adverse effects on water resources and quality from new off-trail use. Overall, the new equestrian management would result in a long-term, minor, beneficial, localized to regional effect on water resources.

This alternative would include the closure and restoration of a minimum of approximately 65 miles of undesignated

equestrian trails, as well as several undesignated river crossings and undesignated river access points in the National Riverways. These trail restoration efforts would allow currently disturbed water resources to recover and minimize further degradation of other water resources. Benefits would result along the riverbanks and in upland areas, particularly in areas where existing undesignated equestrian trails run through or along springs and seeps, wetlands, floodplains, groundwater recharge zones, sinkholes, and losing streams. In addition, better management of horse access and crossing points along the rivers would result in reduced levels of manure and horse-generated sediment and turbidity in the rivers. The closure and restoration of undesignated equestrian trails and river crossing or access points in the National Riverways would result in a long-term, moderate, beneficial, localized to regional effect on water resources.

This alternative would include the establishment of an equestrian permitting system that would help manage horse-use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against water resource degradation from horse use, which would result in a long-term, minor to moderate, beneficial, localized to regional effect on water resources in the National Riverways.

The proposed designation of 3,424 acres of wilderness at Big Spring under alternative A would have a long-term, minor, beneficial, localized effect on water resources in the NPS Riverways. Approximately 10 acres in the wilderness study area would be excluded from the proposed designation as a small developed area and its narrow access corridor, sometimes called a cherry stem. The structures, roads, and utilities (and associated uses and management) in these excluded areas would remain. Although the lands and waters of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), water resource management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management. In addition, with the proposed wilderness designation, motorized vehicle use of the access road to the fire tower would be prohibited. This change of allowed use would reduce disturbances to surface soils and minimize sedimentation and associated effects on water resources in the area. However, since very little motorized use is currently occurring in this area (i.e., under no-action alternative), the reduction in motorized use would be negligible.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on water resources.

When the effects of alternative A are added to the effects of past, present, and reasonably foreseeable future actions, there would be a long-term, minor to moderate, adverse, localized to regional, cumulative impact on water resources. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative A would have long-term, minor to moderate, localized to regional, beneficial impacts on water resources. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse, localized to

regional, cumulative impact on water resources. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

ALTERNATIVE B (NPS PREFERRED)

The NPS preferred alternative would place a stronger emphasis on managing natural resources in the National Riverways. The new approach would include managing for desired conditions of management zones, more use of applied biology and geographic information systems, program enhancements in aquatic resource monitoring, spring monitoring, restoration of fragmented habitats, information sharing, volunteer stewardship projects, and monitoring of boundary effects on resources. Collectively, this stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on water resources. Such a management strategy would help foster a landscape that was better able to adapt to climate change impacts in the future.

Land management zoning would be introduced to the park management strategy under this alternative, with the following zoning: 16.4% primitive, 72.0% natural, 8.8% resource-based recreation, and 2.8% developed. Establishment of land management zones (with roughly 88% of the park unit managed as primitive or natural) would help minimize negative effects from recreation use and park operations of water features such as wetlands, sinkholes, and seeps. Facility development, park operations, and recreational use that negatively affect water resources would be better contained. Management of these impacts could focus on specific concentrated zones of use. This would result in a long-term, moderate, beneficial, regional effect on water resources in the National Riverways.

Increasing the developed area footprint in the National Riverways from roughly 1.4% of the park unit in the no-action alternative to 2.8% of the park unit in alternative B would increase the potential for water resource degradation (e.g., to wetlands, streambanks, floodplain lands, seeps, groundwater recharge zones). A portion of this increased area of development would provide for two new developed campgrounds (along the upper Current River near Akers and the upper Jacks Fork near Blue Spring). Although some of the proposed campground developments would occur in existing disturbed areas (for example, day use areas), the expansion would alter the local hydrology in vicinity of the developments, increase imperviousness of soils, and increase the potential for water quality degradation in some areas. This would result in short- and long-term, moderate, adverse, localized effects on water resources in and near the proposed developed zones of the National Riverways.

The Current and Jacks Fork rivers would have the following zoning based on river mileage: 34% Nonmotorized River, 14% seasonal mixed-use river, and 52% mixed-use river. Establishment of river management zones that provide for year-round, nonmotorized stretches (34%) and stretches with increased management of horsepower and seasonal motorized use (14%) would help reduce the threat of water quality degradation from petroleum-based pollutants from motorboats in these areas and in downstream waters. The most notable changes would occur on the Current River upstream of Pulltite, where no motorized use would be allowed. A potential reduction in petroleum-based pollutants could result from seasonal restrictions on motorboats between Pulltite and Round Spring on the Current River, and between Bay Creek and Eminence on the Jacks Fork. These management zones would collectively result in a long-term, moderate, beneficial, regional effect on water resources.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions with an increase in law enforcement staff to monitor and enforce

vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the park unit and, thus, reduce direct negative effects on water resources such as wetlands, streams, floodplains, seeps, and groundwater recharge areas, as well as indirect effects on water quality.

The closure and restoration of approximately 45 miles of undesignated roads and traces in the National Riverways would eliminate or reduce existing disturbances to water resources. The closure of undesignated vehicle accesses and crossings along the rivers would also reduce negative water quality effects on the Current and Jacks Fork rivers. Riverbed disturbances and associated turbidity in the rivers would decrease. In addition, the release of petroleum-based pollutants from land vehicles would be reduced due to improved management of vehicle river crossings. Collectively, these actions related to road and trace restoration would have a long-term, minor to moderate, beneficial, localized to regional effect on water resources.

This alternative would reduce the number of gravel bars that are accessible by motorized vehicles and would limit camping to designated gravel bars away from the river. This would reduce riverbed disturbances, erosion, sedimentation, and turbidity in many gravel bar areas. These management actions would result in a long-term, minor to moderate, beneficial, localized effect on water resources.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include a better-designed horse trail system that would minimize water resource degradation by removing trails from sensitive areas (e.g., wetlands, streambanks, floodplain lands, seeps, groundwater recharge zones), better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 60 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 35 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase water resource impacts beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional adverse effects on water resources and quality from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, localized to regional effect on water resources.

The proposed equestrian management could result in some new river crossing points. These new crossings would introduce erosion and sedimentation potential to riverbanks and riverbeds in previously undisturbed areas and increase nutrient loading in the rivers from manure. River turbidity would also likely increase in these areas. This could result in a long-term, moderate, adverse, localized effect on water resources.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated river crossings and undesignated river access points in the National Riverways. These trail restoration efforts would allow currently disturbed water resources to recover and minimize further degradation of other water resources. Benefits would result along the riverbanks and in upland areas, particularly in areas where existing undesignated equestrian trails run through or along springs and seeps, wetlands, floodplains, groundwater recharge zones, sinkholes, and losing streams. In addition, better management of horse access

or crossing points along the rivers would result in reduced levels of manure (and associated nutrient loading) and horse-generated sediment and turbidity in the rivers. These improved equestrian management actions would result in a long-term, moderate, beneficial, localized to regional effect on water resources.

The establishment of a 25-campsite horse campground along the Jacks Fork would introduce new disturbances to surface hydrology and water quality at the new campground site itself and in areas radiating from the horse camp (from an accompanying increase in equestrian activity in this area). Degradation of local water features such as wetlands and surface drainages and nutrient loading into surface water from manure could be expected. This action would result in a long-term, moderate, adverse, localized effect on water resources.

This alternative would establish an equestrian permitting system that would help manage horse use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against water resource degradation from horse use, which would result in a long-term, minor to moderate, beneficial, localized to regional effect on water resources in the National Riverways.

The proposed designation of approximately 3,430 acres of wilderness at Big Spring under alternative B would have a long-term, minor to moderate, beneficial, localized effect on water resources. Approximately 4 acres in the wilderness study area (existing utility corridor) would be proposed as potential wilderness addition, pending eventual decommissioning of the utility line. Although the lands and water resources of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), the land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management. In addition, with the proposed wilderness designation, the NPS training range would be removed and restored to a natural condition. Also, motorized vehicle use of the access road to the fire tower, NPS training range, and barn would be prohibited. These roads would be evaluated to determine if they should be rehabilitated to a natural condition or restored to Civilian Conservation Corps-era condition. These restoration efforts and changes in allowed use would reduce disturbances to surface water quality, natural drainage patterns, and other water resources.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on water resources.

When the effects of alternative B are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on water resources. Alternative B would contribute a small, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative B would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, moderate, localized, adverse impacts on water resources. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative

impact on water resources. Alternative B would contribute a small, long-term, beneficial increment to the cumulative effect.

ALTERNATIVE C

Alternative C would place a stronger emphasis on monitoring water quality, aquatic ecology, and terrestrial ecology to ensure the protection of these natural resources from the higher levels of visitor use associated with this alternative. This management approach would also include an increase in habitat restoration efforts. Collectively, these management actions would result in a long-term, minor, beneficial, regional effect on water resources.

The National Riverways would have the following land management zoning: 6.5% primitive, 28.2% natural, 59.6% resource-based recreation, and 5.7% developed. Establishment of land management zones (with over 34% of the park unit being managed as primitive or natural) would help minimize negative effects from recreational use, facility development, and park operations on water resources in areas zoned for protection. However, with roughly 6% of the National Riverways being zoned as developed and 60% as resource-based Recreation, water resources in many areas that are currently undisturbed would be exposed to increased development and visitor uses. As a result, considerable deterioration of wetlands, floodplains, groundwater recharge/discharge areas, and water quality could be expected under this alternative. Although the application of zoning would help contain adverse effects on resources in some areas, the degradation of resources from the large amount of developed and recreation zoning in alternative C would offset the benefits of land use zoning on water resources. This would result in a short- and long-term, moderate, adverse, regional effect on water resources in the National Riverways.

The Current and Jacks Fork rivers would have the following zoning, based on river mileage: 21% nonmotorized river, 20% seasonal mixed-use river and 59% mixed-use river. Establishment of river management zones that provide for year-round nonmotorized stretches and stretches with increased management of horsepower and seasonal motorized use would help reduce the threat of water quality degradation from petroleum-based pollutants from motorboats in these areas and in downstream waters. The most notable changes would occur on the Current River upstream of Akers, where no motorized would be allowed under this alternative. A potential reduction in petroleum-based pollutants could result from seasonal restrictions to motorboats between Round Spring and Akers on the Current River, and between Bay Creek and Rymers on the Jacks Fork. These management zones would result in a long-term, minor, beneficial, regional effect on water resources.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the park unit and, thus, reduce direct negative effects on water resources such as wetlands, floodplains, streams, seeps, and groundwater recharge areas, as well as indirect effects on water quality in the area.

The closure and restoration of approximately 40 miles of undesignated roads and traces in the park unit would eliminate or reduce existing disturbances to water resources (e.g., to wetlands, streambanks, floodplain lands, seeps, groundwater recharge zones). The closure of undesignated vehicle accesses and crossings along the rivers would also reduce negative water quality effects on the Current and Jacks Fork rivers. Riverbed disturbances and associated turbidity in the rivers would likely decrease. In addition, the release of petroleum-based pollutants from land vehicles would be reduced due to improved

management of vehicle river crossings. Collectively, these actions related to vehicle/access management would have a long-term, minor to moderate, beneficial, localized to regional effect on water resources.

Although vehicular access would remain unchanged (same as no-action alternative), this alternative would limit gravel bar camping to designated gravel bars away from the river. This would help minimize some riverbed disturbances, erosion, sedimentation, water quality degradation, and turbidity in many gravel bar areas. These management actions would result in a long-term, minor, beneficial, localized effect on water resources.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include a better-designed horse trail system that would minimize water resource degradation by removing trails from sensitive areas (e.g., wetlands, streambanks, floodplain lands, seeps, groundwater recharge zones), better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 70 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 45 miles of newly designated trails). Much of the newly designated trail mileage would follow alignments of existing, undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase water resource impacts beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional adverse effects on water resources and quality from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on water resources.

The proposed equestrian management could result in new river crossing points. These new crossings would introduce erosion and sedimentation potential to riverbanks and riverbeds in previously undisturbed areas and increase nutrient loading in the rivers from manure. River turbidity would also likely increase in these areas. This could result in a long-term, moderate, adverse, localized effect on water resources.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated river crossings and undesignated river access points in the National Riverways. These trail restoration efforts would allow currently disturbed water resources to recover and minimize further degradation of other water resources. Benefits would result along the riverbanks and in upland areas, particularly in areas where existing undesignated equestrian trails run through or along springs and seeps, wetlands, floodplains, groundwater recharge zones, sinkholes, and losing streams. In addition, better management of horse access and crossing points long the rivers would result in reduced levels of manure (and associated nutrient loading) and horse-generated sediment and turbidity in the rivers. These improved equestrian management actions would result in a long-term, moderate, beneficial, and localized to regional effect on water resources.

The establishment of a 25-campsite horse campground along the Jacks Fork would introduce new disturbances to surface hydrology and water quality at the new campground site itself and in areas radiating from the horse camp (from an accompanying increase in equestrian activity in this area). Degradation of local water features such as wetlands and surface drainages and nutrient loading into surface water from manure could be expected. This action would result

in a long-term, moderate, adverse, localized effect on water resources.

The proposed designation of 1,779 acres of wilderness at Big Spring under alternative C would have a negligible effect on water resources. Although the land and water resources of this area would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on water resources.
When the effects of alternative C are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on water resources. Alternative C would contribute a small, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative C would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, moderate, localized to regional, adverse impacts on water resources. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on water resources. Alternative C would contribute a small, long-term, beneficial increment to the cumulative effect.

VEGETATION

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

This impact topic includes native plant communities and individual native plant species that exist along the riverways. The impact intensities for vegetation are as follows:

- **Negligible:** Impacts on native plant communities and species would be either barely detectable or the effects would be considered slight and isolated. Any effects would be well within natural fluctuations.
- **Minor:** Impacts on native plant communities and species would be detectable, but the change would be slight and would be within the natural range of variability. This could include changes in the abundance and distribution of individual plant species in limited areas, but would not include changes that would affect the viability of vegetation communities. Changes to local ecological processes would be minimal.
- **Moderate:** Impacts on native plant communities and species would be clearly detectable and would be outside the natural range of variability. This could include changes in the abundance, distribution, or composition of vegetation communities, but would not include changes that would affect the viability of plant populations throughout the NPS Riverways. Changes to local ecological processes would be of limited extent.
- **Major:** Impacts on native plant communities and species would be substantial, highly noticeable, and could result in widespread change. These changes would be outside the natural range of variability. This could include changes in the abundance, distribution, or composition of vegetation communities or plant populations to the extent that the population might not recover. Key ecological processes would be altered, and landscape-level changes would be expected.

NO-ACTION ALTERNATIVE

The no-action alternative would involve the continuation of current park management actions and practices. Threats to vegetation communities in the National Riverways would continue to be managed on a site-by-site, case-by-case basis. Park unit lands would not be zoned and managed for different types and levels of development and recreational uses. Efforts to minimize the degradation and fragmentation of native vegetation communities would continue, such as invasive plant control efforts and the restoration of disturbed sites.

Under the no-action alternative, recreational and transportation land uses throughout the National Riverways, such as equestrian use, motorized vehicles, hiking, and camping, would continue to displace, alter, fragment, and degrade native upland and riparian vegetation communities. Most of the adverse effects from these uses would continue to occur along undesignated roads and trails, undesignated river access points, and around the perimeter of designated high-use areas where trampling occurs too intensely or too frequently for the native plants to survive. The 90 miles of undesignated equestrian trails are an example of how recreation uses can displace and fragment vegetation communities in the National Riverways. Several undesignated river accesses, launches, and crossings (for horses, motorized vehicles, and nonmotorized watercraft) would continue to disturb riparian vegetation along the rivers. In addition to direct impacts to vegetation from

park uses, the disturbances would increase the potential of invasive plant infestation, which could further degrade the condition of plant communities in the National Riverways. Motorized vehicles and horses also have the potential to spread invasive plants throughout the park unit by transporting weed seeds via manure or vehicle tires.

The continued management of the National Riverways under the no-action alternative would result in a long-term, moderate, adverse, regional effect on vegetation in the park unit.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the National Riverways have had and would have notable effects on vegetation in the area. These actions and activities include land use and development, recreational uses on lands not managed by the National Park Service, nonnative and invasive species, and mining.

Several types of land use and land development in the watersheds and springsheds of the National Riverways' rivers have had and could continue to have substantial effects on native vegetation. Most notably, the historic logging and land clearing for agricultural land uses during and after European settlement fragmented and displaced large areas of native plant communities (particularly forests). In addition to direct displacement of plant communities, these land alternations fragmented the functionality of several plant communities and introduced disturbance zones that are prone to nonnative, invasive plant infestation.

Agricultural land uses contribute nutrients from livestock manure, herbicide pollution, and surface erosion and sedimentation to the local and regional ecological system, which can have both direct and indirect adverse effects on vegetation. For example, high levels of nutrients from agricultural runoff can lead to eutrophic conditions in local water bodies, which can lead to algal blooms and low dissolved oxygen in the water. This effect can directly change the composition and health of aquatic plant communities.

Urban and suburban land development in the area has contributed to the displacement and fragmentation of native plant communities in the region. In addition to direct displacement and fragmentation of plant communities, land development introduced widespread land disturbances that are prone to nonnative, invasive plant infestation. Growth and expansion of towns and villages (and the associated impacts) can be expected to continue in the future. Similarly, the roads in the basins have fragmented plant communities and introduced disturbance corridors for weed infestation.

Wastewater discharges from municipal wastewater treatment plant outfalls and the many septic leachfield discharges in the Current and Jacks Fork basins can potentially contribute nutrients to the local water bodies. This nutrient loading can lead to algal blooms and lowered dissolved oxygen conditions in water bodies throughout the basins (eutrophic conditions), which can alter aquatic plant communities.

Mining and mineral development in the basins is another contributor to vegetation impacts in the area. Both small- and large-scale mining operations directly displace and/or fragment upland plant communities and open up large areas of ground disturbance that is prone to weed infestation.

Recreational uses on other private and state lands inside and outside the NPS boundary also contribute to the cumulative effects on vegetation. Off-road motorized vehicles and equestrian use are some examples of land-based recreational use that result in ground disturbances that can lead to nonnative, invasive plant proliferation and fragmentation of plant communities.

Spreading of weed seeds via horse manure is also a common effect.

As a result of a variety of the previously identified human activities and human-based disturbances to the native plant communities in the area (including direct displacement of native plants), several nonnative and invasive plant species have moved in and proliferated in the river basins. Many of these nonnative plant species out-compete the native species, resulting in reduced or stressed populations of native plants and lower diversity of plants. The above-mentioned ground disturbances have contributed and would continue to contribute to the spread of invasive plants. Some examples of invasive plants that threaten native plant communities include Eurasian water milfoil, purple loosestrife, and *Sericea lespedeza*. Also, nonnative wildlife can have adverse effects by stressing native plant populations. For example, the gypsy moth causes substantial defoliation of native trees and shrubs in the regions' woodlands.

Collectively, these past, present, and reasonably foreseeable future actions and activities in Ozark National Scenic Riverways would have long-term, moderate, adverse, localized to regional impacts on vegetation.

When the effects of the no-action alternative are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on vegetation. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

Conclusion

The no-action alternative would have long-term, moderate, adverse, regional impact on vegetation. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on vegetation. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

ALTERNATIVE A

Alternative A would place a stronger emphasis on managing natural resources in the National Riverways. The approach would include managing for desired conditions of management zones, more use of applied biology and geographic information systems, program enhancements in aquatic resource monitoring and rare terrestrial plant/wildlife protection, karst system management, restoration of fragmented habitats, and monitoring of boundary effects on resources. This stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on upland, riparian, and gravel bar vegetation communities in the National Riverways.

The following zoning would be applied to NPS Riverways lands: 26.8% primitive, 68.6% natural, 3.2% resource-based recreation, and 1.4% developed. Establishment of land management zones (with roughly 96% of the park unit being managed as primitive or natural) would substantially reduce negative effects from recreational use, facility development, and park operations on upland and riparian vegetation communities. The most notable adverse effects of zoning would occur in the 4.6% of the park unit lands in the developed and resource-based recreation zones. Zoning would result in a long-term, moderate, beneficial, regional effect on vegetation in the National Riverways.

Under this alternative, approximately 20 floater access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better distribute nonmotorized watercraft use of the rivers. Some new access points would be located and built in a way that minimizes natural resource impacts. The restoration of riverbank areas where the existing

nonmotorized watercraft access points are closed and restored could have beneficial effects on riparian vegetation communities and gravel bar vegetation communities. However, the new site would result in the displacement and disturbance of riparian vegetation in some areas. These visitor management actions would have long-term, minor, localized effects that are both beneficial and adverse to vegetation.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the park unit and, thus, reduce negative effects on upland and riparian vegetation communities. In addition, the closure of approximately 50 miles of undesignated roads and traces would allow the restoration of native vegetation in previously disturbed areas and reduce the potential for invasive plant infestations along disturbance corridors. These actions related to vehicle/access management would have a long-term, minor to moderate, beneficial, localized to regional effect on vegetation.

Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for increased upland and riparian vegetation disturbances along trails would likely increase from trail braiding and rutting. If the trail surface degradation or trail width go unmanaged, the potential for the spread of nonnative, invasive plants would also increase. This potential new allowed use could result in a long-term, minor, adverse, localized effect on vegetation.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include a better-designed horse trail system that would minimize degradation of upland, riparian, and gravel bar vegetation communities by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 50 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 25 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails and no additional stream crossings would be designated. Thus, most new designated equestrian trails would not be expected to directly increase impacts to vegetation communities beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional adverse effects on vegetation from new off-trail use (e.g., vegetation trampling, introduction of nonnative vegetation via manure). Overall, this new equestrian management would result in a long-term, minor, beneficial, localized to regional effect on vegetation.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated equestrian river crossings and undesignated river access points in the National Riverways. These equestrian trail restoration efforts would allow currently disturbed upland, riparian, and gravel bar vegetation communities to recover and minimize further degradation of other vegetation. This would also likely result in a reduction in the potential for invasive weed infestation in the National Riverways. Benefits to vegetation would occur along the riverbanks and in upland areas. Collectively, the closure and restoration of undesignated equestrian trails in the park unit would result in a long-term, moderate, beneficial, localized to regional effect on vegetation.

This alternative would include the establishment of an equestrian permitting

system that would help manage horse use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against vegetation community disturbances from horse use, which would result in a long-term, minor to moderate, beneficial, localized to regional effect on vegetation.

An additional mile of trails that were accessible to people with disabilities would occur under this alternative. These trail developments could displace and fragment local upland and riparian plant communities and introduce new sources for invasive plants to move into previously undisturbed areas. This would result in a long-term, minor, adverse, localized effect on vegetation.

The proposed designation of approximately 3,430 acres of wilderness at Big Spring under alternative B would have a long-term, minor to moderate, beneficial, localized effect on vegetation. Approximately 4 acres in the wilderness study area (existing utility corridor) would be proposed as potential wilderness addition, pending eventual decommissioning of the utility line. Although the lands of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), the land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management. In addition, with the proposed wilderness designation, the NPS training range would be removed and restored to a natural condition. Also, motorized vehicle use of the access road to the fire tower, NPS training range, and barn would be prohibited. These roads would be evaluated to determine if they should be rehabilitated to a natural condition or restored to Civilian Conservation Corps-era condition. These restoration efforts and changes in allowed use would reduce ongoing disturbances to local plant communities and allow native plants to repopulate the previously disturbed areas.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on vegetation.

When the likely effects of alternative A are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, minor to moderate, adverse, localized to regional, cumulative impact on vegetation. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative A would have long-term, minor to moderate, localized to regional, beneficial impacts, and long-term, minor, localized, adverse impacts on vegetation. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse, localized to regional, cumulative impact on vegetation. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

ALTERNATIVE B (NPS PREFERRED)

The NPS preferred alternative would place a stronger emphasis on managing natural resources in the National Riverways. The new approach would include managing for desired conditions of management zones, more use of applied biology and geographic

information systems, program enhancements in aquatic resource monitoring, spring monitoring, restoration of fragmented habitats, information sharing, volunteer stewardship projects, and monitoring of boundary effects on resources. Collectively, this stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on upland, riparian, and gravel bar vegetation communities in the National Riverways. Such a management strategy would help foster a landscape that was better able to adapt to climate change impacts in the future.

The following zoning would be applied to NPS Riverways lands: 16.4% primitive, 72.0% natural, 8.8% resource-based recreation, and 2.8% developed. Establishment of land management zones (with over 88% of the park unit being managed as primitive or natural) would help minimize negative effects on upland and riparian vegetation communities from recreation use and park operations, such as vegetation trampling, community fragmentation, and invasive plant introduction. Generally, facility development, park operations, and recreational use that negatively affect vegetation communities would be better contained. Management of these impacts could focus on specific, concentrated zones of use. The use land management zoning would result in a long-term, moderate, beneficial, regional effect on vegetation communities in the National Riverways.

Alternative B would increase the developed footprint in the park unit from roughly 1.4% in the no-action alternative to 2.8% of the park unit. This would increase disturbances and displacement of upland and riparian vegetation communities. A portion of this increased area of development would provide for two new developed campgrounds (along the upper Current River near Akers and the upper Jacks Fork near Blue Spring) and a 25-site horse camping area along the Jacks Fork. Although some of the proposed campground developments would occur in existing disturbed areas (for example, day use areas), the expansion would likely result in a loss of surrounding vegetation (from direct displacement by development and from subsequent trampling by associated uses) and an increase in the potential for the spread of invasive plants. This increase in developed areas of the National Riverways would result in short- and long-term, moderate, adverse, localized effects on vegetation communities in and near the proposed developed zones of the park unit.

Under this alternative, approximately20 access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better distribute nonmotorized watercraft use on the rivers. This would result in additional displacement and disturbance of riparian and gravel bar vegetation at the new relocation sites. However, these actions would also result in beneficial effects from the restoration of riparian and gravel bar vegetation in other areas where the existing access points are closed and restored. These visitor management actions would have long-term, minor, localized effects that are both beneficial and adverse to vegetation.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the park unit and, thus, reduce negative effects on upland and riparian vegetation communities. In addition, the closure of approximately 45 miles of undesignated roads and traces in the National Riverways would allow the restoration of native vegetation in previously disturbed areas and reduce the potential for invasive plant infestations along these disturbance corridors. Collectively, these actions related to vehicle and access management would have a long-term, minor to moderate, beneficial, localized to regional effect on vegetation.

Some of the discovery sites that would be promoted through this alternative would necessitate the re-opening of old access roads to allow public access to the sites. The anticipated vehicle use of the re-opened roads would end the upland and riparian vegetation restoration along these old access road corridors and increase the potential for nonnative, invasive plants to spread. This action would result in a long-term, minor, adverse, localized effect on vegetation.

Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for increased vegetation disturbances along existing trails would likely increase from trail braiding and rutting. If the trail surface degradation or trail width go unmanaged, the potential for the spread of nonnative, invasive plants would also increase. This potential new allowed use could result in a long-term, minor, adverse, localized effect on vegetation.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include a designing a better horse trail system to minimize degradation of upland, riparian, and gravel bar vegetation communities by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 60 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 35 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase impacts to vegetation communities beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional adverse effects on vegetation from new off-trail use (e.g., vegetation trampling and introduction of nonnative vegetation via manure). Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on vegetation.

The proposed equestrian management could result in some new river crossing points or accesses. These new crossings and accesses would disturb or displace riparian and gravel bar vegetation and would also introduce a source of nonnative, invasive plants (via horse manure). In addition, horse camping may be allowed in designated sites under this alternative. These actions could result in a long-term, minor to moderate, adverse, localized effect on vegetation.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated equestrian river crossings and undesignated river access points in the National Riverways. These equestrian trail restoration efforts would allow currently disturbed upland and riparian vegetation communities to recover and minimize further degradation of other vegetation. This would result in a reduction in the potential for invasive weed infestation in the park unit. Benefits to vegetation would occur along the riverbanks and in upland areas. Collectively, these improved equestrian management actions would result in a long-term, moderate, beneficial, localized to regional effect on vegetation communities.

This alternative would include the establishment of an equestrian permitting system that would help manage horse use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against vegetation community disturbances from horse use, which would result in a long-term, minor to moderate,

beneficial, localized to regional effect on vegetation.

The planned increased in access to discovery sites in the parks could generate the need for additional trail development in some areas. An additional mile of trails that would be accessible to people with disabilities would also occur under this alternative. These trail developments could result in the displacement and fragmentation of local upland and riparian plant communities and could introduce new opportunities for invasive plants to move into previously undisturbed areas. This action would result in a long-term, minor to moderate, adverse, localized effect on vegetation communities in the National Riverways.

The proposed designation of approximately 3,430 acres of wilderness at Big Spring under alternative B would have a long-term, minor to moderate, beneficial, localized effect on vegetation. Approximately 4 acres in the wilderness study area (existing utility corridor) would be proposed as potential wilderness addition, pending eventual decommissioning of the utility line. Although the lands of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), the land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management. In addition, with the proposed wilderness designation, the shooting range would be removed and restored to a natural condition. Also, motorized vehicle use of the access road to the fire tower, shooting range, and barn would be prohibited. These roads would be evaluated to determine if they should be rehabilitated to a natural condition or restored to Civilian Conservation Corps-era condition. These restoration efforts and changes in allowed use would reduce ongoing disturbances to local plant communities and allow native plants to repopulate the previously disturbed areas.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on vegetation.

When the likely effects of alternative B are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on vegetation. Alternative B would contribute a small to appreciable, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative B would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, minor to moderate, localized, adverse impacts on vegetation. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on vegetation. Alternative B would contribute a small to appreciable, long-term, beneficial increment to the cumulative effect.

ALTERNATIVE C

Alternative C would place a stronger emphasis on monitoring water quality, aquatic ecology, and terrestrial ecology to ensure the protection of these natural resources from the higher levels of visitor use associated with this alternative. This management approach would also include an increase in habitat restoration efforts. Collectively, these management actions

would result in a long-term, minor, beneficial, regional effect on upland, riparian, and gravel bar vegetation communities in the National Riverways.

The following zoning would be applied to NPS Riverways lands: 6.5% primitive, 28.2% natural, 59.6% resource-based recreation, and5.7% developed. Establishment of land management zones (with approximately 34% of the park unit being managed as primitive or natural) would help minimize negative effects on upland and riparian vegetation communities from recreational use, facility development, and park operations on vegetation communities in areas zoned for protection. However, with roughly 6% of the park unit zoned as developed and 60% as resource-based recreation, many large areas of natural areas that are currently undisturbed would be exposed to increased development and visitor uses. As a result, considerable disturbance and displacement, such as trampling, of plant communities would occur under this alternative. Reductions in plant species diversity, smaller populations of sensitive plant species, fragmented plant communities, and increases in invasive plants could be expected under this alternative. Thus, although the application of zoning would help contain adverse effects on resources, the impacts to vegetation from the large amount of developed and recreation zoning in alternative C would offset the benefits of land use zoning. Overall, the zoning of this amount of developed and recreation land would result in a long-term, moderate, adverse, regional effect on vegetation in the National Riverways.

Under this alternative, approximately 20 access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better distribute nonmotorized watercraft use on the rivers. This would result in additional displacement and disturbance of riparian and gravel bar vegetation in some areas (at the new, relocation sites). However, these actions would also result in beneficial effects from the restoration of riparian and gravel bar vegetation in areas where the existing access points are closed and restored. These visitor management actions would have long-term, minor, localized effects that are both beneficial and adverse to vegetation.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the park unit and, thus, reduce negative effects on upland and riparian vegetation communities. In addition, the closure of approximately 43 miles of undesignated roads and traces in the park unit would allow the restoration of native vegetation in previously disturbed areas and reduce the potential for invasive plant infestations along these disturbance corridors. Collectively, these actions related to vehicle/access management would have a long-term, minor to moderate, beneficial, localized to regional effect on vegetation.

This alternative would include an increase in the area of NPS Riverways land developed with park facilities from 1.4% in the no-action alternative to the proposed 5.7% development zone. A portion of this increased area of development would provide for two new developed campgrounds (along the upper Current River near Akers and the upper Jacks Fork near Blue Spring) and a 25-site horse camping area along the Jacks Fork. Although some of the proposed campground developments would occur in existing disturbed areas (for example, day use areas), the expansion would likely result in an area increase of the disturbance zone to surrounding upland and riparian vegetation communities and an increase in the potential for additional vegetation trampling and import of nonnative, invasive plants. This would result in a long-term, moderate, adverse, localized effect on surrounding vegetation.

Mountain biking may become a new, allowed trail use under this alternative (only a designated trails that are yet to be determined). The potential for increased vegetation disturbances along existing trails would likely increase from trail braiding and rutting. If the trail surface degradation or trail width are unmanaged, the potential for the spread of nonnative, invasive plants would also increase. This potential new allowed use could result in a long-term, minor, adverse, localized effect on vegetation.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include designing a better horse trail system that would minimize degradation of upland, riparian, and gravel bar vegetation communities by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 70 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 45 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase impacts to vegetation communities beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional adverse effects on vegetation from new off-trail use (e.g., vegetation trampling and introduction of nonnative vegetation via manure). Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on vegetation.

The proposed equestrian management could result in some new river crossing points. These new crossings would disturb or displace riparian and gravel bar vegetation and would also introduce a source of nonnative, invasive plants via horse manure. This could result in a long-term, minor to moderate, adverse, localized effect on vegetation.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated equestrian river crossings and undesignated river access points in the National Riverways. These equestrian trail restoration efforts would allow currently disturbed upland and riparian vegetation communities to recover and minimize further degradation of other vegetation. This would also likely result in a reduction in the potential for invasive weed infestation in the National Riverways. Benefits to vegetation would occur along the riverbanks and in upland areas. Collectively, these improved equestrian management actions would result in a long-term, moderate, beneficial, and localized to regional effect on vegetation.

An additional mile of trails that were accessible to people with disabilities would occur under this alternative. These trail developments could result in the displacement and fragmentation of local upland and riparian plant communities and introduce new opportunities for invasive plants to move into previously undisturbed areas. This would result in a long-term, minor, adverse, localized effect on vegetation communities in the National Riverways.

The proposed designation of 1,779 acres of wilderness at Big Spring under alternative C would have a negligible effect on vegetation. Although the land in this area would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), the management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit

the potential for future facility development and/or types of use relative to what is allowed under current management.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on vegetation.

When the likely effects of alternative C are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on vegetation. Alternative C would contribute a small, long-term, adverse increment to the cumulative effect.

Conclusion

Alternative C would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, minor to moderate, localized to regional, adverse impacts on vegetation. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on vegetation. Alternative C would contribute a small, long-term, adverse increment to the cumulative effect.

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

This impact topic focuses on fish and wildlife resources in the NPS Riverways, including federally and state threatened, endangered, and candidate species that might occur in or near the NPS Riverways. Since the aquatic and terrestrial habitats used by federally and state-listed species are also used by many other fish and wildlife species, these topics have been combined in one analysis section of this chapter.

Impact Threshold Definitions for General Fish and Wildlife Habitat

This impact topic includes the native fish and wildlife species that inhabit the lands and waters of the NPS Riverways, including birds, fish, mammals, crustaceans, mollusks, insects, reptiles, and amphibians. The impacts may relate to the effects on the wildlife individuals or to the effects on the habitat that sustains them. The impact intensities for fish and wildlife are as follows:

- **Negligible:** Impacts on native species, their habitats, or the natural processes sustaining them would be either barely detectable or the effects would be considered slight and isolated. Any effects would be well within natural fluctuations.
- **Minor:** Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, but they would not be expected to be outside the natural range of variability. Population numbers, genetic variability, and other demographic factors for species might have small changes, but they would remain stable and viable. Occasional responses to disturbance by some individuals could be expected. Sufficient habitat would remain functional to maintain viability of native species.
- **Moderate:** Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability. Population numbers, genetic variability, and other demographic factors for species might change, but would be expected to rebound to preimpact numbers and to remain stable and viable over time. Frequent responses to disturbance by some individuals could be expected. Sufficient habitat would remain functional to maintain viability of native species and changes to the regional populations of some species would be minimal.
- **Major:** Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability. Population numbers, genetic variability, and other demographic factors for species might experience substantial changes. Frequent responses to disturbance by many individuals would be expected. Loss of habitat might affect the viability of at least some native species and changes to the regional populations of some species would be apparent.

Impact Threshold Definitions of State and Federal Threatened and Endangered Species

Federally and state-listed threatened and endangered species are addressed together in this section because many of these species (1) have dual federal and state special status, (2) occur together in the same habitats, or (3) would be impacted similarly under each

alternative. Plants and animals that have federal and state "species of concern" status are not included as part of this environmental impact analysis. However, these species are protected under all of the management alternatives and general NPS policy.

The following impact threshold definitions are used to describe the severity and magnitude of changes to federally and state-listed species under each of alternative. Separate threshold definitions are provided for both adverse and beneficial impacts to provide additional details about the susceptibility and response of at-risk species to alternative management actions.

Negligible

- **Adverse:** There would be no observable or measurable impacts on federally and state-listed species, their habitats (including critical habitat designated under the Endangered Species Act), or the natural processes sustaining them in the proposed project area.
- **Beneficial**: There would be no observable or measurable impacts on federally listed species, their habitats, or the natural processes sustaining them in an NPS Riverways site.

Minor

- **Adverse**: Impacts would not affect critical periods of life-cycle processes (for example, reproduction) or their habitat. Individuals may temporarily avoid areas. Essential features of critical habitat would not be impacted.
- **Beneficial:** Impacts would result in slight increases to viability of the species in the NPS Riverways as species-limiting factors (for example, habitat loss, competition, and mortality) are kept in check. Nonessential features of critical habitat in an NPS Riverways site would be slightly improved.

Moderate

- **Adverse:** Individuals may be impacted by disturbances that interfere with critical life-cycle processes or their habitat; however the level of impact would not result in a physical injury, mortality, or extirpation from the park unit. Some essential features of designated critical habitat would be reduced; however, the integrity of the habitat would be maintained.
- **Beneficial:** Impacts would result in slight increases to viability of the species in the NPS Riverways as species-limiting factors (for example, habitat loss, competition, and mortality) are reduced. Some essential features of critical habitat would be improved.

Major

- **Adverse:** Individuals may suffer physical injury or mortality or populations may be extirpated from the National Riverways. Essential features of designated critical habitat would be reduced, affecting the integrity of the designated unit.
- **Beneficial:** Impacts would result in highly noticeable improvements to species viability, population structure, and species population levels in the National Riverways, as species-limiting factors (such as habitat loss, competition, and mortality) are eliminated. All essential features of critical habitat would be improved.

NO-ACTION ALTERNATIVE

The no-action alternative would involve the continuation of existing river management and land management actions and practices of NPS Riverways lands and the Jacks Fork and Current Rivers. As a result of these continued management and uses, the various recreational uses of the National Riverways would continue to have adverse effects on the park unit's fish and wildlife habitat. The management of fish and wildlife habitat, and the mitigation of disturbances to habitat, would continue to be addressed on a site-by-site, case-by-case basis. NPS Riverways lands would not be zoned for different types and levels of development and recreational uses.

All segments of both rivers in the park unit would continue to be open to at least some level of motorboat use (with various stretches continuing to be managed for motor horsepower limits). This continued degree and geographic extent of allowed boat use along the Current and Jacks Fork rivers would continue to disturb fish and aquatic habitat and other wildlife that rely on riparian areas for nesting and foraging (e.g., physical disturbance, noise disturbances, etc.).

The potential threat of water quality degradation in the park unit's rivers from motorboat-based petroleum pollutants could be expected to remain at current levels or increase if motorboat use increased on the rivers in the National Riverways. Water quality degradation from petroleum-based pollution could have adverse effects on aquatic habitat.

In addition to the continuing adverse effect of motorboat use, the human presence and noise associated with people using nonmotorized watercraft on the Jacks Fork and Current Rivers would continue to disturb riparian habitat. Wildlife species would continue to alter their natural behaviors of nesting and foraging in riparian habitat, particularly during high-use periods of the year.

Land-based recreational uses and transportation modes, such as equestrian use, hiking, camping, and motorized vehicle use, would continue to have adverse effects on fish and wildlife habitat in the National Riverways. These effects would continue to degrade riparian habitat at river access and crossing points; wetland habitats away from the rivers; and meadow, shrub, and forest habitats in upland areas. The effects of these uses would result from human activity along designated and undesignated trails, roads, and traces. The noises and disturbances associated with land-based recreation and transportation uses would continue to alter wildlife behavior such as nesting and foraging and limit the available effective habitat for some species.

When land-based recreational uses occur off-trail, they would continue to trample and displace vegetation communities, which would diminish habitat value for wildlife species. Once native vegetation displaced, these recreation use areas are prone to nonnative plant infestations, which would further degrade habitat value. In addition, since the alignment and routing of undesignated trails typically does not take habitat quality into consideration, the development and use of undesignated roads and trails would continue to fragment larger areas of quality habitat. This adverse effect would result in smaller, less effective "islands" of high-quality habitat in the National Riverways.

The continued use of designated and undesignated river access and crossing points by horses and motorized vehicles would continue to disturb aquatic habitat and alter aquatic chemistry by stirring up riverbeds, increasing river turbidity, and increasing nutrient and pollutant loading (such as from manure and petroleum-based chemicals) in the rivers.

The management efforts to limit and control populations of nonnative wildlife in the park unit would continue. However, given the extent of the threat of these species, the

adverse effects on native fish and wildlife would likely continue.

Overall, the continued management of the National Riverways under the no-action alternative would continue to result in a long-term, moderate, adverse, and localized to regional effect on fish and wildlife habitat.

Federally and State-listed Species

The aforementioned fish and wildlife habitat impacts from implementing the no-action alternative would also impact the federally and state-listed threatened and endangered species of the National Riverways. The adverse impacts could primarily result from a continuation of existing recreational uses in the park unit and the management of habitat issues on a site-by-site, case-by-case basis. See the above section on fish and wildlife habitat impacts for a brief explanation of these effects. The beneficial impacts of the no-action alternative would result from continued species monitoring and public education and interpretation efforts that help promote an understanding of threatened and endangered species in the NPS Riverways.

To pursue compliance with section 7 of the Endangered Species Act, the National Park Service must disclose the anticipated potential impacts from the proposed alternatives on federally listed species that are protected under the act. The potential impacts from the no-action alternative to federally listed species are summarized below.

Ozark Hellbender. The park management strategies and visitor uses under the no-action alternative could continue to have potential adverse and beneficial impacts on the Ozark hellbender. However, at the time of printing of this document, an Ozark hellbender action plan was not yet developed by the U.S. Fish and Wildlife Service. Furthermore, existing data regarding the effects of NPS Riverways management on hellbender habitat was limited. Thus, the following analysis on the Ozark hellbender is based on *potential* impacts from park unit uses and management. The noted potential impacts are derived from past and ongoing interagency hellbender research in the basin and region.

The potential adverse impacts could be long-term, minor to moderate, adverse, and localized to regional. These potential adverse impacts under the no-action alternative could relate to river recreation uses and disturbances in aquatic habitat for the hellbender that result from both permitted and unpermitted activities in the NPS Riverways. The most notable river and riverbed disturbances to aquatic habitat for the hellbender under the no-action alternative include boating (including canoeing, floating, and motorboating), equestrian use in the river and along the shoreline (including sandbars), and motor vehicle use in and along the rivers. If these uses occur in or near hellbender habitat, the uses allowed under the no-action alternative could potentially disturb foraging and breeding habitats for the hellbender. Interagency and academic research in Missouri indicates that riverbed disturbances from boating and canoeing near den sites may negatively impact hellbender breeding and that river rock removal (to protect canoes) can displace potential breeding habitat (USFS 2003).

Research also indicates that degradation of water quality can have considerable negative impacts on hellbender habitat given the hellbender's dependence on clean, clear, and cool river water (USFS 2003; USFWS 2011). Continued equestrian and motor vehicle access in the rivers and along the shorelines and sandbars, as allowed under the no-action alternative can contribute to increases in turbidity in adjacent and downstream waters. These uses can also introduce pollutants to the river water. Most notably, bacterial pollutants from equestrian fecal matter have the potential to degrade water quality in the Current and Jacks Fork rivers. Petroleum-

based pollutants from motor vehicles and motorboats can also contribute to diminished water quality. Given these continued potential threats to water quality in the NPS Riverways and the documented correlation between water quality and hellbender habitat needs, uses allowed under the no-action alternative have potential adverse impacts on the Ozark hellbender.

The fact that boating, equestrian, and motor vehicle uses of the NPS Riverways are heaviest during spring and summer months compounds the potential for the above-mentioned impacts, since these heavy use periods occur during important hellbender foraging life stages.

The beneficial impacts of the no-action alternative would result from active natural resource management actions. For example, the NPS Riverways' continued hellbender monitoring and research efforts could yield a better understanding of the species and the possible causes for its population decline. In addition, resource managers at the National Riverways would continue to be active in interagency efforts aimed at hellbender protection. The NPS Riverways' education and interpretation program would also continue to make the visiting public aware of the hellbender and its status, which could advance the importance of species sustainability. NPS Riverways' enforcement staff would continue to strive for preventing the removal or manipulation of hellbenders or their habitat.

Overall, the no-action alternative could potentially have long-term, minor to moderate, adverse, and localized to regional impacts on the Ozark hellbender.

Indiana Bat and Gray Bat. The park management strategies and visitor uses under the no-action alternative could continue to have potential adverse and beneficial impacts on the Indiana bat and gray bat. The potential adverse impacts could be long-term, minor, adverse, and localized to regional. These potential adverse impacts would relate to the continuation of guided tours at Round Spring cave, which are offered from May 1 to Labor Day (prior to swarming or hibernation season). This could continue to introduce human disturbances (e.g., noise and human presence) to the cave that potentially could negatively affect habitat and behavior of these two bat species.

The potential for white-nose syndrome would also be a threat at Round Spring cave and other caves in the National Riverways. For an indeterminate amount of time, all other caves would continue to be closed to visitor use due to the threat of white-nose syndrome (with Round Spring cave being the only exception). The other caves may eventually be reopened when the National Park Service determines that the threat to bats and other cave resources is diminished. However, it should be noted that the park staff may not be able to effectively enforce the closures of all caves in the National Riverways.

Although white-nose syndrome may be inadvertently transmitted into caves by humans carrying the fungus on their clothing and gear, the transmittal through a bat population is primarily from bat to bat. The likelihood that bats in Round Spring cave having white-nose syndrome is no more likely than any other cave in the park unit. In fact, Round Spring cave may be more protected since park staff pre-screens each visitor and their clothing prior to allowing them to go on a tour of Round Spring cave.

The existing river management and land management practices and the allowed recreational uses could potentially have adverse impacts on bat hibernacula and foraging. Equestrian use, hiking, camping, motorized vehicles, motorboats, and other active National Riverways uses near bat foraging habitat and hibernacula could alter bat behavior and/or displace effective habitat areas. The effects of these uses would result from human activity along both designated and undesignated trails, roads, and traces.

Since the alignment and routing of undesignated trails typically does not take bat habitat quality into consideration, the development and continued use of undesignated roads and trails could continue to fragment larger areas of quality habitat.

The beneficial impacts of the no-action alternative would result from active natural resource management actions. For example, the NPS Riverways' continued bat monitoring efforts could yield a better understanding of the species and habitat. The NPS Riverways' education and interpretation program would also continue to make the visiting public aware of these bat species and their sensitivities.

Overall, the no-action alternative could potentially have long-term, minor, adverse, and localized to regional effects on the Indiana bat and the gray bat.

Cumulative Impacts

Several past, present, and reasonably foreseeable future projects and actions in the vicinity of the National Riverways have had and would have notable effects on fish and wildlife and their habitat in the area. These actions, activities, and processes include land use and development, wastewater discharges, recreational uses on lands not managed by the National Park Service, nonnative and invasive species, and mining.

Other land uses and land development in the watersheds and springsheds of the park unit's rivers affect fish and wildlife habitat. Historic logging and land clearing for agricultural land uses fragmented and displaced large areas of riparian and upland habitats. Increased surface runoff from the cleared landscape has resulted in bank erosion and accelerated channel movement, which degrade riparian and aquatic habitat. Erosion of cleared and farmed lands has resulted in large amounts of sediment and chert gravel deposition into the rivers and tributaries. These chert deposits in the river bottoms from past land uses are still migrating downstream, continuing to degrade downstream aquatic riffle and pool habitat in the riverways. As a result of these changes to the riparian vegetation and aquatic conditions, the disturbed areas have substantially lower biological diversity and productivity compared to undisturbed bottomland forests.

The ongoing agricultural land uses can also contribute nutrients from livestock manure, herbicide and pesticide pollution, and surface erosion and sedimentation to the local and regional ecological system, which can have both direct and indirect adverse effects on fish and wildlife. For example, high levels of nutrients from agricultural runoff can lead to eutrophic conditions in local water bodies, which can produce algal blooms and low dissolved oxygen in the water. This adversely alters habitat conditions for several aquatic species.

Urban and suburban land development in the area has fragmented wildlife habitats, both locally and regionally. Since many of the existing town and village developments occur along riverways, wetland and riparian habitats have experienced particularly high levels of fragmentation from urban development throughout the region. Growth and expansion of these towns and villages (and the associated impacts) can be expected to continue in the future. The region's road system has also fragmented habitat throughout the region, resulting in an increase in "edge" habitats and a decrease in core, intact habitats. Roadways have altered surface hydrology in ways that affect wetland habitats (in quantity and quality of surface water delivered). Most of these effects from lands uses and development would continue in the region, with some expanding in geographic coverage.

Wastewater discharges from municipal wastewater treatment plant outfalls and the many septic leachfield in the Current and Jacks Fork basins have the potential to contribute nutrients to the local and regional hydrology. This nutrient loading can

contribute to eutrophic conditions in water bodies throughout the basins, which degrades aquatic habitat.

Recreational uses on other private and state lands (inside and outside the NPS boundary) can contribute to the cumulative effects on fish and wildlife habitat. Off-road motorized vehicles, equestrian use, hunting, and hiking are some examples of land-based recreational use that bring human disturbances and noises into intact upland, wetland, and riparian habitats. These uses can fragment habitat (in high/regular use areas) and are capable of locally displacing habitat by trampling vegetation and destabilizing riverbanks. The human presence and noise disturbances associated with these uses can also alter the behavior of many native wildlife species, including their foraging, breeding, and movement behaviors. In some cases, breeding success rates can be adversely affected by human presence associated with these land recreation uses. However, hunting can also benefit wildlife populations by providing control in the absence of native predatory species.

River-based recreation, such as floating, jet boating, and motorboating, can have adverse effects on aquatic habitat and riparian habitat. For example, human noises and motor noises from these uses can potentially disturb the behavior of many bird species that rely on riparian habitat for nesting or foraging. In addition, pollutants, turbidity, and nutrient-loading from motorboats and equestrian use in the rivers can degrade aquatic habitat conditions for many fish and macroinvertebrate species.

As a result of human alterations to the native ecology of the NPS Riverways, several nonnative and invasive plant and animal species have moved into the area over the years. Many of these nonnative species are capable of outcompeting and displacing native species, resulting in degraded habitat (native plants displaced), decreases in fish and wildlife diversity, and a destabilization of the ecological system. For example, the Asian clam is present in the National Riverways and may be increasing in abundance and range. Because of its similar life history to native mussels, this nonnative clam may out-compete native mussel species. The stocking of rivers and streams with hatchery game fish could also increase competition with native fish populations. Other species that displace native wildlife species and/or degrade habitat quality include Eurasian water milfoil, *Sericea lespedeza*, and gypsy moths.

Mining and mineral development is another contributor to cumulative fish and wildlife impacts in the area. In addition to direct displacement and fragmentation of upland habitat from mine development, these mining activities can have considerable effects on aquatic habitat. The gravel mining operations adversely affect the adjacent tributaries by altering flow patterns, changing channel structure, relocating channels, and causing scouring and bank erosion, which all can degrade aquatic and riparian habitat along tributaries to the Current and Jacks Fork rivers. The removal of coarse gravel can release finer sediments into the tributaries of the river system, which can quickly degrade aquatic habitat quality and biodiversity by covering the riverbeds with sediment. Given its small size and light weight, the released sediment can migrate down to the Current and Jacks Fork rivers.

Collectively, these past, present, and reasonably foreseeable future actions and activities in the Jacks Fork and Current river basins have long-term, moderate, adverse, localized to regional impacts on fish and wildlife.

When the effects of the no-action alternative are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on fish and wildlife. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

Conclusion

The no-action alternative would have long-term, moderate, adverse, localized to regional impact on fish and wildlife habitat. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on fish and wildlife. The no-action alternative would contribute an appreciable, long-term, adverse increment to the cumulative effect.

ALTERNATIVE A

Alternative A would place a stronger emphasis on managing natural resources in the National Riverways when compared to the no-action alternative. The approach would include managing for desired conditions of management zones, more use of applied biology and geographic information systems, program enhancements in aquatic resource monitoring and rare terrestrial plant/wildlife protection, karst system management, restoration of fragmented habitats, and monitoring of boundary effects on resources. Collectively, and relative to the no-action alternative, this stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on fish and wildlife habitat.

The following zoning would be applied to park unit lands: 26.8% primitive, 68.6% natural, 3.2% resource-based recreation, and 1.4% developed. Establishment of land management zones (with roughly 96% of the park unit managed as primitive or natural) would substantially reduce negative effects from recreation use, facility development, and park operations on wildlife behavior and wildlife habitat. Habitat disturbances from these activities would primarily be limited to the 4.6% of the National Riverways lands that are zoned developed and resource-based recreation. This would result in a long-term, moderate, beneficial, regional effect on wildlife habitat.

The Current and Jacks Fork rivers would have the following zoning based on river mileage: 51% nonmotorized river, 13% seasonal mixed-use river, and 36% mixed-use river. Establishment of river management zones that provide for year-round nonmotorized stretches and stretches with increased management of horsepower and seasonal motorized use) would help reduce motorboat disturbances to aquatic habitat, such as displaced aquatic vegetation, fish spawning impacts, and petroleum-based water pollution. It also would reduce motorboat noise disturbance to riparian habitat and wildlife behavior, such as bird nesting and bird communication. The most notable changes would occur on the Jacks Fork and on the Current River upstream of Round Spring, where no motorized used would be allowed. Reductions in disturbances to fish and wildlife habitat along the rivers would also result from seasonal restrictions to motorboats between Two Rivers and Round Spring on the Current River. These river management zones would collectively result in a long-term, moderate, beneficial, regional effect on fish and wildlife habitat.

Under this alternative, approximately 20 access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better distribute watercraft use on the rivers. Some new access points would be located and built in a way that minimizes natural resource impacts. The restoration of about 20 riverbank and riverbed areas would have beneficial effects on aquatic habitat and riparian habitat. This would help minimize human disturbances on riparian habitat, such as high volumes of nonmotorized watercraft traffic and high levels and persistence human noise. However, the development of new access points would introduce human disturbances to currently undisturbed habitat areas along the rivers. These visitor management actions would have long-term,

minor, localized effects that are both beneficial and adverse to fish and wildlife habitat.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the park unit and, thus, reduce negative effects on wildlife habitat, such as habitat fragmentation and direct disturbances to wildlife behavior. In addition, the closure of approximately 50 miles of undesignated roads and traces in the park unit would help eliminate existing disturbances to wildlife habitat. The closure of undesignated vehicle accesses and crossings along the rivers would reduce degradation of riparian habitat (for example, by noise and vegetation trampling) and aquatic habitat (for example, from turbidity and riverbed disturbances). Collectively, these actions related to vehicle and access management would have a long-term, moderate, beneficial, regional effect on wildlife habitat.

This alternative would eliminate motorized terrestrial vehicle access to all gravel bars in the National Riverways and would allow camping only at designated gravel bars away from the river. This would substantially reduce impacts to riparian and aquatic habitat in many gravel bar areas, including riverbed disturbances to aquatic habitat. These management actions would result in a long-term, moderate, beneficial, localized effect on fish and wildlife habitat.

About 15 miles of the approximately 50 restored miles of undesignated roads and traces would occur in the proposed primitive zones and relate to backcountry hiking. Although this elimination of motor vehicle access to these backcountry areas would benefit wildlife habitat, some of these of benefits would be offset by hiking trail development or use. This alternative would replace road and trace alignments in primitive areas with hiking trails. The pedestrian activity along these trail corridors would introduce human disturbances to wildlife and possibly lead to localized fragmentation of habitat (depending on frequency and volume of hiking use). Generally, wildlife tend to have more adverse reactions to pedestrians than to motor vehicles. This trail development action could result in a long-term, minor to moderate, adverse, localized effect on wildlife habitat.

Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for increased trail use and human activity along designated trails would increase, which would likely increase the frequency, degree, and duration of human disturbances, such as noise, on surrounding habitat values. This potential new allowed use could result in a long-term, minor, adverse, regional effect on wildlife habitat.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include discouraging the creation of social trails, designing a better horse trail system that would minimize wildlife habitat degradation by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The equestrian trail system would include nearly 50 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 25 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails and no additional stream crossings would be designated. Thus, most new designated equestrian trails would not be expected to directly increase impacts to wildlife habitat or wildlife behavior beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park

enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional wildlife habitat fragmentation from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on wildlife habitat.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated equestrian river crossings and undesignated river access points in the National Riverways. These trail restoration efforts would reduce levels of habitat fragmentation in the park unit from dispersed human use and minimize sensitive riparian and wetland habitat disturbances. In addition, better management of horse access and crossing points along the rivers would result in reduced levels of nutrient loading and horse-generated sediment in the rivers, which would improve aquatic habitat conditions in the rivers. These improved equestrian management actions would result in a long-term, minor to moderate, beneficial, regional effect on fish and wildlife habitat.

This alternative would establish an equestrian permitting system that would help manage horse use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against habitat degradation from horse use, which would result in a long-term, minor to moderate, beneficial, localized to regional effect on wildlife habitat.

An additional mile of trails that were accessible to people with disabilities would occur under this alternative. These trail developments could result in the localized fragmentation of wildlife habitat and introduced noise/presence disturbances from human activity, resulting in a long-term, minor, adverse, localized effect on wildlife habitat.

The proposed designation of 3,424 acres of wilderness at Big Spring under alternative A would have a long-term, minor, beneficial, localized effect on wildlife habitat.

Approximately 10 acres in the wilderness study area would be excluded from the proposed designation as a small developed area and its narrow access corridor, sometimes called a cherry stem. The structures, roads, and utilities (and associated uses and management) in these excluded areas would remain. Although the lands and wildlife resources of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management. In addition, with the proposed wilderness designation, motorized vehicle use of the access road to the fire tower would be prohibited. This change of allowed use would reduce noise and vehicular disturbances to wildlife habitat along the road corridor.

Federally and State-listed Species

The aforementioned fish and wildlife habitat effects from actions in alternative A would also result in both adverse and beneficial impacts to federally and state-listed threatened and endangered species of the National Riverways.

The adverse impacts of alternative A on listed species could result from the continuation of various current uses and effects noted under the no-action alternatives, as well as some new impacts. For more information on continued uses and impacts, also see the impact analysis of federally and state-listed species under the no-action alternative. The new adverse impacts would primarily result from replacement of road and trace

alignments in primitive areas with hiking trails, potential mountain biking use on designated trails, and some new access points for nonmotorized watercraft.

The beneficial impacts would primarily result from a stronger emphasis on managing natural resources in the National Riverways, land management zoning (with 96% of the park unit being managed as primitive or natural), river management zones (with year-round nonmotorized stretches and seasonality and horsepower limits on other stretches), improved vehicular access management, closure and restoration of undesignated roads, improvements to the National Riverways' equestrian management, closure and restoration of undesignated equestrian trails and crossings, and the establishment of an equestrian permitting system.

To pursue compliance with section 7 of the Endangered Species Act, the National Park Service must disclose the anticipated potential impacts from the proposed alternatives on federally listed species.

Ozark Hellbender. At the time of printing of this document, existing data regarding the existing effects of NPS Riverways management on hellbender habitat was limited. Thus, the following analysis on the Ozark hellbender is based on *potential* effects from NPS Riverways uses and management. The noted potential effects are derived from past and ongoing interagency hellbender research in the basin and region (as cited in the analysis of the no-action alternative).

Adverse impacts to the hellbender could result from the continuation of various current uses and activities in the NPS Riverways, as described under the no-action alternative. Most notably, contributions to water quality degradation from various ongoing recreation activities (e.g., equestrian use, motor vehicle use, boating, etc.) and park development could have negative impacts on hellbenders and their habitat. Likewise, potential adverse impacts could also relate to direct disturbances to aquatic habitat from permitted and unpermitted recreational activities in the rivers, and on sandbars and shorelines (e.g, motorboating, floating, equestrian crossings, etc.). See the impact analysis under the no-action alternative for a more detailed explanation. The potential new adverse impacts from alternative A, relative to the no-action alternative, could be long-term, minor, and localized. They would result from the development of new river access points for floaters and equestrians. These points would degrade the aquatic habitat in the vicinity of the access area and would allow for ongoing water quality degradation in previously undisturbed areas, such as from turbidity and horse manure in the area from equestrian and human access.

However, relative to the no-action alternative, alternative A could have beneficial impacts on the Ozark hellbender that would be short- to long-term, minor to moderate, and localized to regional. The potential beneficial impacts would relate to a stronger emphasis on managing natural resources in the National Riverways, river management zones that include year-round nonmotorized stretches and seasonal use restrictions on other stretches, improved vehicular access management, improved equestrian management, closure and restoration of undesignated equestrian river crossings, and the establishment of an equestrian permitting system. These actions would reduce the amount of direct disturbances to aquatic habitat for hellbender foraging and breeding. They also could reduce water quality degradation relative to the no-action alternative, which could help meet a critical need of the hellbender.

In addition, under alternative A, the National Park Service would continue consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act to develop and implement a conservation plan for the Ozark hellbender. This would enhance the beneficial impacts of proactive resource management on the hellbender.

Overall, alternative A would likely provide for an improvement in Ozark hellbender habitat relative to the no-action alternative as a result of a variety of resource management strategies noted in the fish and wildlife habitat analysis above.

Indiana Bat and Gray Bat. Relative to the no-action alternative, the park management strategies under alternative A would primarily have beneficial impacts on the Indiana bat and gray bat. The beneficial impacts would be long-term, minor to moderate, localized to regional, and would result from a stronger emphasis on managing natural resources in the National Riverways, land management zones (with 96% of the park unit managed as primitive or natural), river management zones (with year-round nonmotorized stretches and stretches with seasonal restrictions), improved vehicular access management, closure and restoration of undesignated roads, improvements to the National Riverways' equestrian management, closure and restoration of undesignated equestrian trails and crossings, the establishment of an equestrian permitting system, and enhanced protection of karst caves. These actions would help reduce disturbances to natural vegetation, riparian areas, and caves and, thus, would improve foraging habitat and hibernacula for the Indiana bat and gray bat. For example, some undesignated equestrian trails currently exist near cave entrances. As these undesignated trails were closed and restored under this alternative, the negative impacts to bat activity should decrease. Likewise, the primitive and natural zones under this alternative would help ensure that human activities in these zones are more consistent with bat habitat protection.

In addition, under alternative A, the National Park Service would continue consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act to develop and implement a conservation plan for the gray bat and Indiana bat. This would enhance the beneficial impacts of proactive resource management on both bat species. However, the potential threat of white-nose syndrome would remain for these bat species, as described in the impact analysis of the Indiana bat and gray bat under the no-action alternative. Cave management under alternative A would be the same as the no-action alternative. This management would include the continuation of the public tours of Round Spring cave, also as described under the no-action alternative.

Overall, alternative A would likely provide for an improvement in bat habitat relative to the no-action alternative as a result of a variety of resource management strategies noted in the fish and wildlife habitat analysis above.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on fish and wildlife.

When the likely beneficial and adverse effects of alternative A actions are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, minor to moderate, adverse, localized to regional, cumulative impact on fish and wildlife. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative A would have long-term, minor to moderate, localized to regional, beneficial impacts, and long-term, minor to moderate, localized to regional, adverse impacts on fish and wildlife habitat. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable

future actions, would result in a long-term, minor to moderate, adverse, localized to regional, cumulative impact on fish and wildlife. Alternative A would contribute an appreciable, long-term, beneficial increment to the cumulative effect.

ALTERNATIVE B (NPS PREFERRED)

The NPS preferred alternative would place a stronger emphasis on managing natural resources in the National Riverways when compared to the no-action alternative. The new approach would include managing for desired conditions of management zones, more use of applied biology and geographic information systems, program enhancements in aquatic resource monitoring, spring monitoring, restoration of fragmented habitats, information sharing, volunteer stewardship projects, and monitoring of boundary effects on resources. Collectively, and relative to the no-action alternative, this stronger emphasis on natural resource management would result in a long-term, moderate, beneficial, regional effect on fish and wildlife habitat. Such a management strategy would help foster a landscape that was better able to adapt to climate change impacts in the future.

The following zoning would be applied to park unit lands: 16.4% primitive, 72.0% natural, 8.8% resource-based recreation, and 2.8% developed. Establishment of land management zones (with roughly 88% of the park unit being managed as primitive or natural) would substantially reduce negative effects from recreation use, facility development, and park operations on wildlife behavior and wildlife habitat. The most notable habitat disturbances from these activities would occur in the 11.6% of the NPS Riverways lands that are zoned developed and resource-based recreation. Management of these impacts could focus on specific, concentrated zones of use. The use of land management zoning would result in a long-term, moderate, beneficial, regional effect on wildlife habitat.

The developed area in the National Riverways (in the developed zone) would be 2.8% compared to 1.4% in the no-action alternative. The increased area would increase disturbances to wildlife habitat in areas near the developments. A portion of this increased area of development would provide for two new developed campgrounds (along the upper Current River near Akers and the upper Jacks Fork near Blue Spring) and a 25-site horse camping area along the Jacks Fork. Although some of the proposed campground developments would occur in existing disturbed areas (for example, day use areas), the development expansion would displace and/or fragment adjacent habitat areas and would introduce larger volumes of visitor activity in and around these areas. The increase in visitor use associated with these sites in the developed zone would introduce higher amounts, durations, and frequencies of habitat disturbances, such as human noises and presence. This increase in developed areas of the National Riverways would result in short- and long-term, moderate, adverse, localized effects on wildlife habitat and behavior in and near the proposed developed zones.

The Current and Jacks Fork rivers would have the following zoning based on river mileage: 34% nonmotorized river, 14% seasonal mixed-use river, and 52% mixed-use river. Establishment of river management zones that provide for year-round nonmotorized stretches (34%) and stretches with increased management of horsepower and seasonal motorized use (14%) would help reduce motorboat disturbances to aquatic habitat (such as displaced aquatic vegetation, fish spawning impacts, and petroleum-based water pollution) and motorboat noise disturbance to riparian habitat and wildlife behavior (such as bird nesting and bird communication). The most notable changes would occur on the Current River upstream of Pulltite, where no motorized boating would be allowed under this alternative. Reductions in disturbances to fish and wildlife habitat along the rivers would also result from seasonal restrictions

to motorboat use between Pulltite and Round Spring on the Current River, and between Bay Creek and Eminence on the Jacks Fork. These river management zones would collectively result in a long-term, moderate, beneficial, regional effect on fish and wildlife.

Under this alternative, approximately 20 access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better distribute watercraft use on the rivers. The closure and restoration of several access points would benefit riparian and aquatic habitat values in these areas by reducing human disturbances on riparian habitat, such as high volumes of nonmotorized watercraft traffic and high levels and persistence human noise. However, the development of new access points would introduce human disturbances to currently undisturbed habitat areas. These visitor management actions would have long-term, minor, localized effects that are both beneficial and adverse to fish and wildlife habitat.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the park unit and, thus, reduce negative effects on wildlife habitat, such as habitat fragmentation and direct disturbances to wildlife behavior. In addition, the closure of approximately 45 miles of undesignated roads and traces in the park unit would help eliminate existing disturbances to wildlife habitat throughout the National Riverways. The closure of undesignated vehicle accesses and crossings along the rivers would also reduce degradation of riparian habitat (for example, noise and vegetation trampling) and aquatic habitat (for example, turbidity and riverbed disturbances). Collectively, these actions related to vehicle and access management would have a long-term, moderate, beneficial, regional effect on wildlife habitat.

This alternative would reduce the number of gravel bars that are accessible by motorized terrestrial vehicles. It also would limit, camping to designated gravel bars away from the river. This would reduce riparian and aquatic habitat disturbances in many gravel bar areas. These management actions would result in a long-term, minor to moderate, beneficial, localized effect on fish and wildlife.

About 10 miles of the approximately 45 restored miles of undesignated roads and traces would occur in the proposed primitive zones and would relate to backcountry hiking. Although this elimination of motor vehicle access to these backcountry areas would benefit wildlife habitat, some of these of benefits would be offset by hiking trail development. This alternative would replace these road and trace alignments in primitive areas with hiking trails. The pedestrian activity along these trail corridors would introduce human disturbances to wildlife and possibly lead to localized fragmentation of habitat (depending on frequency and volume of hiking use). Generally, wildlife tend to have more adverse reactions to pedestrians than to motor vehicles. This trail development action could result in a long-term, minor to moderate, adverse, localized effect on wildlife habitat.

The establishment of a 25-campsite horse campground along the Jacks Fork (and the associated concentration of equestrian activity in this area) would increase the likelihood for water quality degradation in nearby water features from horse manure, including the Jacks Fork. This could alter aquatic habitat conditions for native species that are dependent on high water quality, and could result in a long-term, minor to moderate, adverse, localized effect on fish and wildlife habitat.

Some of the discovery sites that would be promoted through this alternative would reopen old access roads to allow public access to the sites. Vehicle use of the reopened roads could reintroduce human

disturbances, such as noise, and associated fragmentation to habitat areas. This action would result in a long-term, minor to moderate, adverse, localized effect on wildlife habitat.

Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for increased trail use and human activity along designated trails would increase. Increases in trail use would likely increase the frequency, degree, and duration of human disturbances, such as noise, on surrounding habitat values. This potential new allowed use could result in a long-term, minor, adverse, regional effect on wildlife habitat.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include designing a better horse trail system that would minimize wildlife habitat degradation by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 60 miles of designated equestrian trails, including approximately 23 miles of existing and approximately 35 miles of newly designated trails). Much of the newly designated trail mileage would follow alignments of existing undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase impacts to wildlife habitat or wildlife behavior beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional wildlife habitat fragmentation from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, regional effect on wildlife habitat.

The proposed equestrian management could result in some new river crossing points. These new crossings could introduce human activity to previously undisturbed riparian habitat and disturbances to riverbeds and aquatic habitat, producing increased turbidity and nutrient loading. In addition, horse camping may be allowed in designated sites under this alternative. Horse camping activities could further disturb wildlife habitat in areas around the designated site. These actions could result in a long-term, minor to moderate, adverse, localized effect on fish and wildlife habitat.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated equestrian river crossings and undesignated river access points in the National Riverways. These trail restoration efforts would reduce levels of habitat fragmentation in the park unit from dispersed human use and minimize sensitive riparian and wetland habitat disturbances. In addition, better management of horse access and crossing points along the rivers would result in reduced levels of nutrient loading and horse-generated sediment in the rivers, which would likely improve aquatic habitat conditions. These improved equestrian management actions would result in a long-term, minor to moderate, beneficial, regional effect on fish and wildlife habitat.

This alternative would include the establishment of an equestrian permitting system that would help manage horse use levels and allow park staff to monitor resource impacts against established standards. This new permitting program and resource monitoring approach would help protect against habitat degradation from horse use, which would result in a long-term, minor to moderate, beneficial, localized to regional effect on fish and wildlife habitat.

The planned increased access to discovery sites in the parks could generate the need for additional trail development in some areas. An additional mile of trails that were

accessible to people with disabilities would also occur under this alternative. These trail developments could result in the localized fragmentation of wildlife habitat and introduced noise/presence disturbances from human activity on the trails. This action would result in a long-term, minor to moderate, adverse, localized effect on wildlife habitat.

The proposed designation of approximately 3,430 acres of wilderness at Big Spring under alternative B would have a long-term, minor to moderate, beneficial, localized effect on wildlife habitat. Approximately 4 acres in the wilderness study area (existing utility corridor) would be proposed as potential wilderness addition, pending eventual decommissioning of the utility line. Although the lands and habitat of the proposed designation would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), the land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management.

With the proposed wilderness designation, the NPS training range would be removed and restored to a natural condition. Also, motorized vehicle use of the access road to the fire tower, NPS training range, and barn would be prohibited. These roads would be evaluated to determine if they should be rehabilitated to a natural condition or restored to Civilian Conservation Corps-era condition. These restoration efforts and changes in allowed use would reduce disturbances to wildlife and fragmentation of wildlife habitat, allowing for the restoration of an intact, large habitat area in the Big Spring area.

Federally and State-listed Species

The aforementioned fish and wildlife habitat effects from actions in alternative B would also result in both adverse and beneficial impacts to federally and state-listed threatened and endangered species of the National Riverways.

The adverse impacts of alternative B on listed species could result from the continuation of various current uses and effects noted under the no-action alternatives, as well as some new impacts. For more information on continued uses and impacts, also see the impact analysis of federally and state-listed species under the no-action alternative. The new adverse impacts would primarily result from replacement of road or trace alignments in primitive areas with hiking trails, potentially allowing mountain biking as a new trail use, and installing new access points for nonmotorized watercraft users.

The beneficial impacts would primarily result from the stronger emphasis on managing natural resources in the National Riverways, land management zones (with 88% of the park unit being managed as primitive or natural), river management zones (with year-round nonmotorized stretches (34%) and seasonality and horsepower limits on other stretches (14%)), improved vehicular access management, closure and restoration of undesignated roads, improvements to the National Riverways' equestrian management, closure and restoration of undesignated equestrian trails and crossings, and the establishment of an equestrian permitting system.

To pursue compliance with section 7 of the Endangered Species Act, the National Park Service must disclose the anticipated potential impacts from the proposed alternatives on federally listed species. The specific impacts from alternative B on federally listed species are described below.

Ozark Hellbender. At the time of printing of this document, existing data regarding the existing effects of NPS Riverways management on hellbender habitat was limited. Thus, the following analysis on the Ozark hellbender is based on potential effects from National Riverways uses and management. The noted potential effects are derived from past and ongoing interagency hellbender research in the basin and region (as cited in the analysis of the no-action alternative).

Adverse impacts to the hellbender could result from the continuation of various current uses and activities in the NPS Riverways, as described under the no-action alternative. Most notably, contributions to water quality degradation from various ongoing recreation activities (e.g., equestrian use, motor vehicle use, boating, etc.) and park development could have negative impacts on hellbenders and their habitat. Likewise, potential adverse impacts could also relate to direct disturbances to aquatic habitat from permitted and unpermitted recreational activities in the rivers, and on sandbars and shorelines (e.g., motorboating, floating, equestrian crossings, etc.). See the impact analysis under the no-action alternative for a more detailed explanation.

The potential new adverse impacts from alternative B could be long-term, minor, adverse, and localized (relative to the no-action alternative), resulting from the development of some new river access points for floaters and equestrians. These points would degrade the aquatic habitat in the vicinity of the access and would allow for ongoing water quality degradation in the area from equestrian and human access.

However, relative to the no-action alternative, the park management strategies under alternative B could potentially have beneficial impacts to the Ozark hellbender. These beneficial impacts would be short- and long-term, minor to moderate, and localized to regional. The effects would relate to a stronger emphasis on managing natural resources in the National Riverways, river management zones (with year-round nonmotorized stretches and seasonality and horsepower limits on other stretches), improved vehicular access management, improvements to the National Riverways' equestrian management, closure and restoration of undesignated equestrian trails and crossings, and the establishment of an equestrian permitting system. All of these actions of alternative B should help reduce the amount of direct disturbances to aquatic habitat for hellbender foraging and breeding. These actions could also help reduce water quality degradation relative to the no-action alternative, which could help meet a critical need of the hellbender.

In addition, under alternative B, the National Park Service would continue consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act to develop and implement a conservation plan for the Ozark hellbender. This would enhance the beneficial impacts of proactive resource management on the Ozark hellbender.

Overall, alternative B would likely provide for an improvement in Ozark hellbender habitat relative to the no-action alternative as a result of a variety of resource management strategies noted in the fish and wildlife habitat analysis above.

Indiana Bat and Gray Bat. Relative to the no-action alternative, the park management strategies under alternative B would have both beneficial and adverse impacts to the Indiana bat and gray bat.

The beneficial impacts would be long-term, minor to moderate, and localized to regional, primarily resulting from a stronger emphasis on managing natural resources in the National Riverways, land management zones (with 88% of the park unit being managed as primitive or natural), river management zones (with year-round nonmotorized stretches and stretches with seasonal

restrictions), improved vehicular access management, closure and restoration of undesignated roads, improvements to the National Riverways' equestrian management, closure and restoration of undesignated equestrian trails and crossings, the establishment of an equestrian permitting system, and enhanced protection of karst caves. These actions would help reduce disturbances to natural vegetation, riparian areas, and caves and, thus, would improve foraging habitat and hibernacula for the Indiana bat and gray bat. For example, some undesignated equestrian trails currently exist near cave entrances. As these undesignated trails were closed and restored under this alternative, the negative effects on bat activity should decrease. Likewise, the primitive and natural zones under this alternative would help ensure that human activities were more consistent with bat habitat protection.

In addition, under alternative B, the National Park Service would continue consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act to develop and implement a conservation plan for the gray bat and Indiana bat. This would enhance the beneficial impacts of proactive resource management on both bat species.

However, the potential threat of white-nose syndrome would remain for these bat species, as described in the impact analysis of the Indiana bat and gray bat under the no-action alternative. Cave management under alternative B would be the same as the no-action alternative. This management would include the continuation of the public tours of Round Spring cave, as described under the no-action alternative.

Overall, alternative B would likely provide for an improvement in bat habitat relative to the no-action alternative as a result of a variety of resource management strategies noted in the fish and wildlife habitat analysis above.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on fish and wildlife.

When the beneficial and adverse effects of alternative B actions are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on fish and wildlife. Alternative B would contribute a small, long-term, beneficial increment to the cumulative effect.

Conclusion

Alternative B would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, minor to moderate, localized to regional, adverse impacts on fish and wildlife habitat. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on fish and wildlife. Alternative B would contribute a small, long-term, beneficial increment to the cumulative effect.

For alternative B, the determination of effect on federal threatened and endangered species protected under the Endangered Species Act would be may affect / not likely to adversely affect.

ALTERNATIVE C

When compared to the no-action alternative, alternative C would place a stronger emphasis on monitoring water quality, aquatic ecology, and terrestrial ecology to ensure the protection of these natural

resources in response to the higher levels of visitor use associated with this alternative. This management approach would also increase habitat restoration efforts. Collectively, and relative to the no-action alternative, these management actions would result in a long-term, minor, beneficial, regional effect on fish and wildlife habitat.

The following zoning would be applied to NPS Riverways lands: 6.5% primitive, 28.2% natural, 59.6% resource-based recreation, and 5.7% developed. Establishment of land management zones (with approximately 34% of the park unit being managed as primitive or natural) would help minimize negative effects from recreational use, facility development, and park operations on wildlife behavior and wildlife habitat in areas zoned for protection. However, with roughly 6% of the park unit zoned as developed and 60% as resource-based recreation, many large areas of undisturbed and unfragmented habitat would be exposed to increased development and visitor uses. As a result, the quality, connectivity, and size of wildlife habitat in the National Riverways could be reduced under this alternative. Although the application of zoning would help contain adverse effects on resources, the degradation of resources from the large amount of developed and recreation zoning in alternative C would offset the benefits of land use zoning on wildlife and wildlife habitat. The proposed management zoning would result in a short- and long-term, moderate, adverse, regional effect on fish and wildlife habitat.

The Current and Jacks Fork rivers would have the following zoning based on river mileage: 21% nonmotorized river, 20% seasonal mixed-use river, and 59% mixed-use river. Establishment of river management zones that provide for year-round nonmotorized stretches and stretches with seasonal restrictions would help reduce motorboat disturbances to aquatic habitat (such as displaced aquatic vegetation, fish spawning impacts, and petroleum-based water pollution) and motorboat noise disturbance to riparian habitat and wildlife behavior (such as bird nesting and bird communication). The most notable changes would occur on the Current River upstream of Akers, where no motorized boating would be allowed under this alternative. Reductions in disturbances to fish and wildlife habitat along the rivers would also result from seasonal restrictions to motorboats between Round Spring and Akers on the Current River, and between Bay Creek and Rymers on the Jacks Fork. These management zones would collectively result in a long-term, minor to moderate, beneficial, regional effect on fish and wildlife habitat.

Under this alternative, approximately 20 access points (dropoff and pickup) for nonmotorized watercraft users would be closed, restored, and relocated to better distribute watercraft use on the rivers. The closure and restoration of access points would benefit riparian and aquatic habitat values by minimizing human disturbances on riparian habitat (for example, high volumes of nonmotorized watercraft traffic and high levels and persistence human noise) at these sites. However, the development of new access points would introduce human disturbances to currently undisturbed habitat areas along the rivers. These visitor management actions would have long-term, minor, localized effects that are both beneficial and adverse to fish and wildlife habitat.

Vehicular access and circulation in the National Riverways would be managed by zoning prescriptions and with an increase in law enforcement staff to monitor and enforce vehicle access compliance. This could reduce the creation and continuation of undesignated roads in the National Riverways and, thus, reduce negative effects on wildlife habitat, such as habitat fragmentation and direct disturbances to wildlife behavior. In addition, the closure of approximately 40 miles of undesignated roads and traces in the park unit would help eliminate existing disturbances to wildlife habitat. The closure of undesignated vehicle

accesses and crossings along the rivers would also reduce degradation of riparian habitat (such as by noise and vegetation trampling) and aquatic habitat (such as from turbidity, riverbed disturbances). Collectively, these actions related to vehicle and access management would have a long-term, minor to moderate, beneficial, localized to regional effect on wildlife habitat.

Although vehicular access on designated sites would remain unchanged (same as no-action alternative), this alternative would limit gravel bar camping to designated gravel bars away from the river. This would reduce disturbances to riparian and aquatic habitat in many gravel bar areas. These management actions would result in a long-term, minor, beneficial, localized effect on fish and wildlife.

About 5 miles of the approximately 40 restored miles of undesignated roads and traces would occur in the proposed primitive zones and relate to backcountry hiking. Although this elimination of motor vehicle access to these backcountry areas would benefit wildlife habitat, some of these of benefits would be offset by hiking trail development. This alternative would replace these road and trace alignments in primitive areas with hiking trails. The pedestrian activity along these trail corridors would introduce human disturbances to wildlife and possibly lead to localized fragmentation of habitat (depending on frequency and volume of hiking use). Generally, wildlife tend to be more averse to pedestrians than to motor vehicles. This trail development action could result in a long-term, minor, adverse, localized effect on wildlife habitat.

This alternative would include an increase in the area of NPS Riverways land developed with park facilities from the 1% in the no-action alternative to the proposed 6% development zone). A portion of this increased area of development would provide for two new developed campgrounds (along the upper Current River near Akers and the upper Jacks Fork near Blue Spring) and a 25-site horse camping area along the Jacks Fork. Although some of the proposed campground developments would occur in existing disturbed areas (for example, day use areas), the expansion would likely result in an area increase of the disturbance zone to surrounding wildlife habitat and an increase in the volume and duration of human activity in these areas. This increase in human activity and development would result in a long-term, moderate, adverse, localized effect on surrounding wildlife habitat.

The establishment of a 25-campsite horse campground along the Jacks Fork (and the associated concentration of equestrian activity in this area) would also increase the likelihood for water quality degradation in nearby water features from horse manure, including the Jacks Fork. This could alter aquatic habitat conditions for native species that are dependent on high water quality, and could result in a long-term, minor to moderate, adverse, localized effect on fish and wildlife habitat.

Mountain biking may become a new, allowed trail use under this alternative (only on designated trails that are yet to be determined). The potential for increased trail use and human activity along designated trails would increase, which would increase the frequency, degree, and duration of human disturbances, such as noise, on surrounding habitat values. This potential new allowed use could result in a long-term, minor, adverse, regional effect on wildlife habitat.

This alternative would include improvements to the National Riverways' equestrian management. These changes would include designing a better horse trail system that would minimize wildlife habitat degradation by removing trails from sensitive areas, better managing equestrian access to the rivers and shorelines, and providing higher-quality, sustainable trails. The proposed equestrian trail system of this alternative would result in nearly 70 miles of designated equestrian trails, including approximately 23 miles of

existing and up to approximately 45 miles of newly designated trails. Much of the newly designated trail mileage would follow alignments of existing undesignated trails. Thus, most new designated equestrian trails would not be expected to directly increase impacts to wildlife habitat or wildlife behavior beyond what exists under the no-action alternative. However, there is a potential for indirect adverse effects if some equestrians use new designated trails as avenues to create other undesignated trails. This could increase demands on park enforcement staff to control undesignated trail creation in new "opened up" areas, and could result in additional wildlife habitat fragmentation from new off-trail use. Overall, this new equestrian management would result in a long-term, minor, beneficial, and localized to regional effect on wildlife habitat.

The proposed equestrian management could result in some new river crossing points. These new crossings could introduce human activity to previously undisturbed riparian habitat and cause disturbances to riverbeds and aquatic habitat from turbidity and nutrient loading. This could result in a long-term, minor to moderate, adverse, localized effect on fish and wildlife habitat.

This alternative would include the closure and restoration of approximately 65 miles of undesignated equestrian trails, as well as several undesignated river crossings and undesignated river access points in the National Riverways. These trail restoration efforts would reduce levels of habitat fragmentation in the park unit from dispersed human use and minimize sensitive riparian and wetland habitat disturbances, In addition, better management of horse access and crossing points along the rivers would result in reduced levels of nutrient loading and horse-generated sediment in the rivers, which would improve aquatic habitat conditions in the rivers. Collectively, these improved equestrian management actions would result in a long-term, minor to moderate, beneficial, regional effect on fish and wildlife habitat.

An additional mile of trails that were accessible to people with disabilities would occur under this alternative. These trail developments could result in the localized fragmentation of wildlife habitat and introduced noise/presence disturbances from human activity on the trails. This action would result in a long-term, minor, adverse, localized effect on wildlife habitat.

The proposed designation of 1,779 acres of wilderness at Big Spring under alternative C would have a long-term, minor, beneficial, localized effect on wildlife habitat. Although the land and wildlife resources of this area would be managed in a way that is compliant with the Wilderness Act (as well as being managed under the primitive zone of this plan), land management would not be notably different than what would occur under the no-action alternative. However, the primitive zone and wilderness designation would further limit the potential for future facility development and/or types of use relative to what is allowed under current management.

Federally and State-listed Species

The aforementioned fish and wildlife habitat effects from actions in alternative C would also result in both adverse and beneficial impacts to the federally and state-listed threatened and endangered species of the National Riverways.

The adverse impacts of alternative C on listed species could result from the continuation of various current uses and effects noted under the no-action alternatives as well as some new impacts. For more information on continued uses and impacts, also see the impact analysis of federally and state-listed species under the no-action alternative. The new adverse impacts would primarily result from the following; recreational use/development associated with the proposed land management zones that could further fragment undisturbed habitat areas in the National Riverways (roughly 6% of the

park unit zoned as developed and 60% as resource-based recreation), the replacement of road and trace alignments in primitive areas with hiking trails, the potential to allow mountain biking as a new trail use, and the establishment of new access points for nonmotorized watercraft users.

However, in comparison to the no-action alternative, the beneficial impacts would primarily result from new river management zones (with year-round nonmotorized stretches with seasonal restrictions), improved vehicular access management, closure and restoration of undesignated roads, improvements to the National Riverways' equestrian management, and closure and restoration of undesignated equestrian trails and crossings.

To pursue compliance with section 7 of the Endangered Species Act, the National Park Service must disclose the anticipated impacts from the proposed alternatives on federally listed species that are protected under the act.

Ozark Hellbender. At the time of printing of this document, existing data regarding the existing effects of NPS Riverways management on hellbender habitat was limited. Thus, the following analysis on the Ozark hellbender is based on potential effects from park uses and management. The noted potential effects are derived from past and ongoing interagency hellbender research in the basin and region (as cited in the analysis of the no-action alternative).

Adverse impacts to the hellbender could result from the continuation of various current uses and activities in the NPS Riverways, as described under the no-action alternative. Most notably, contributions to water quality degradation from various ongoing recreation activities (e.g., equestrian use, motor vehicle use, boating, etc.) and park development could have negative impacts on hellbenders and their habitat. Likewise, potential adverse impacts could also relate to direct disturbances to aquatic habitat from permitted and unpermitted recreational activities in the rivers, and on sandbars and shorelines (e.g., motorboating, floating, equestrian crossings, etc.). See the impact analysis under the no-action alternative for a more detailed explanation.

The potential new adverse impacts from alternative C relative to the no-action alternative could be long-term, minor, adverse, and localized, and would result from the development of new river access points for floaters and equestrians. These points would degrade the aquatic habitat in the vicinity of the access and would allow for ongoing water quality degradation from turbidity and nutrient loading from horse manure.

The potential beneficial effects relative to the no-action alternative could be short- to long-term, minor, and localized to regional. The effects would primarily relate to new river management zones (with year-round nonmotorized stretches and stretches with seasonal restrictions), improved vehicular access management, improvements to the National Riverways' equestrian management, and closure and restoration of undesignated equestrian trails and crossings. All of these actions of alternative C should help reduce the amount of direct disturbances to aquatic habitat for hellbender foraging and breeding. These actions could also help reduce water quality degradation relative to the no-action alternative, which could help meet a critical need of the hellbender.

In addition, under alternative C, the National Park Service would continue consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act to develop and implement a conservation plan for the Ozark hellbender. This would enhance the beneficial impacts of proactive resource management on the Ozark hellbender.

Overall, alternative C would likely provide for an improvement in Ozark hellbender habitat relative to the no-action alternative as

a result of a variety of resource management strategies noted in the fish and wildlife habitat analysis above.

Indiana Bat and Gray Bat. Relative to the no-action alternative, the park management strategies under alternative C would have both beneficial and potential adverse impacts to the Indiana bat and the gray bat.

The adverse impacts of alternative C would be long-term, minor, and localized to regional. Recreational use and development associated with the proposed land management zones could further fragment undisturbed foraging habitat and disturb hibernacula (with roughly 6% of the park unit being zoned as developed and 60% as resource-based recreation). The replacement of road and trace alignments in primitive areas with hiking trails, potentially allowing mountain biking, and developing new access points for nonmotorized watercraft users could also negatively affect habitat for the Indiana bat and gray bat.

In addition, under alternative C, the potential threat of white-nose syndrome would remain for these bat species, as described in the impact analysis of the Indiana bat and gray bat under the no-action alternative. Cave management under alternative C would be the same as the no-action alternative. This management would include the continuation of the public tours of Round Spring cave, as described under the no-action alternative.

The beneficial impacts would be long-term, minor, and localized to regional. They primarily would result from a stronger emphasis on managing natural resources in the National Riverways, land management zones (with over 34% of the park unit being managed as primitive or natural), river management zones (with year-round nonmotorized stretches and stretches with seasonal restrictions), improved vehicular access management, closure and restoration of undesignated roads, improvements to the National Riverways' equestrian management, and closure and restoration of undesignated equestrian trails and crossings. In some areas, these actions would help reduce disturbances to natural vegetation, riparian areas, and caves and, thus, could improve foraging habitat and hibernacula for the Indiana bat and gray bat. For example, some undesignated equestrian trails currently exist near cave entrances. As these undesignated trails were closed and restored under this alternative, the negative effects on bat activity should decrease.

In addition, under alternative C, the National Park Service would continue consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act to develop and implement a conservation plan for the gray bat and Indiana bat. This would enhance the beneficial impacts of proactive resource management on both bat species.

Overall, alternative C would likely provide for an improvement in bat habitat relative to the no-action alternative as a result of a variety of resource management strategies noted in the fish and wildlife habitat analysis above.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, moderate, adverse, localized to regional impacts on fish and wildlife.

When the beneficial and adverse effects of alternative C actions are added to the effects of these past, present, and reasonably foreseeable future actions, there would be a long-term, moderate, adverse, localized to regional, cumulative impact on fish and wildlife. Alternative C would contribute a small, long-term, adverse increment to the cumulative effect.

Conclusion

Alternative C would have long-term, minor to moderate, localized to regional, beneficial impacts, and short- to long-term, minor to moderate, localized to regional, adverse impacts on fish and wildlife habitat. Impacts of this alternative, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in a long-term, moderate, adverse, localized to regional, cumulative impact on fish and wildlife. Alternative C would contribute a small, long-term, adverse increment to the cumulative effect.

NATURAL SOUNDSCAPES

INTRODUCTION

Natural sounds are inherent components of "the scenery and the natural and historic objects and the wild life" protected by the NPS Organic Act. They are vital to the visitor experience of many parks and provide valuable indicators of the health of ecosystems.

Intrusive sounds are of concern because they can impede ecological function and diminish the National Park Service's ability to accomplish its resource protection mission. Intrusive sounds are also a matter of concern to park visitors.

The following analysis of impacts examines the components of each alternative and their potential effects on the acoustic environment of the NPS Riverways.

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

Impacts on soundscapes were evaluated by comparing projected changes resulting from the action alternatives (A, B, and C) to those of the no-action alternative. The impact intensities for natural soundscape are as follows:

- **Negligible:** Noise is generally not detectable; when noise is detectable it is only for very brief periods of time. Noises louder than natural ambient sounds would be extremely rare.
- **Minor:** Noise is detectable for a small fraction of the time. Noises louder than natural ambient sounds would rarely occur.
- **Moderate:** Noise is detectable for a substantial fraction of the time at low levels, or is present at high levels for short durations. Noise in a specific area would periodically be louder than natural ambient sounds in the same area
- **Major:** Noise appreciably masks other sounds for a substantial fraction of the time, or regularly exceeds high levels. Noise in a specific area would frequently be louder than natural ambient sounds in the same area.
- Duration
  - Short term: Impacts would last less than five years.
  - Long term: Impacts would persist for five or more years, or may be permanent.

NO-ACTION ALTERNATIVE

Many of the components of the no-action alternative would result in adverse impacts to the natural soundscape. These impacts would include degradation of the acoustic environment and resulting effects on visitors and wildlife.

Noise levels in parks can have a variety of effects on visitors. The primary effect on visitors is a reduction in opportunities to hear the sounds of nature and enjoy the peaceful and quiet conditions that many visitors seek in national parks. Research also shows that inappropriate sounds can diminish visitors' appreciation of scenic beauty in park settings (Mace et al. 2003). Numerous studies indicate that hearing natural sounds is a very important reason for visiting national parks (Haas and Wakefield 1998).

Depending on the location, duration, sound level, and other characteristics of the noise source, many elements of the no-action alternative would adversely impact visitors by interfering with opportunities to hear the sounds of nature. At some locations and times, exposure to noise generated by the no-action alternative could contribute to other adverse impacts, including sleep disturbance and irritability. Other long-term effects of chronic exposure to noise include hypertension and an

increased risk of heart attack and stroke (Pilcher and Turina 2006).

Scientific research also illustrates that noise can result in impacts to wildlife (Barber et al., 2010). For example, noise can lead to weakened avian pair preferences (Swaddle and Page 2007), reduced pairing success (Habib et al. 2007), and a reduction in bird densities (Bayne et al. 2008).

Under current management, acoustic analyses indicate that one of the most commonly heard noise sources at the acoustic monitoring sites was vehicle traffic. Vehicles were audible 49.1% of the time at Sinking Creek, 44% of the time at Rymers, and 23% of the time at Raft Yard. High levels of vehicle traffic at these monitoring sites occurred because they were near roads. Other areas of the National Riverways farther from roadways would experience less vehicle noise. Aircraft were audible 9% of the time at Sinking Creek, 22% of the time at Rymers, and 8.6% of the time at Raft Yard. Watercraft were audible 5% of the time at Sinking Creek and 29% of the time at Raft Yard. Motorized boats were not audible at Rymers.

Under the no-action alternative, especially during weekdays and other low-use periods, wildlife would continue to experience periods of quiet and visitors would have opportunities to enjoy the natural sounds. However, the following elements of the no-action alternative would have adverse impacts on the soundscapes and would result in negative effects on visitors and wildlife:

- Crowding and higher volumes of motorized and nonmotorized watercraft would result in much more social interaction and higher noise levels, particularly during peak-season weekends.
- The National Riverways would continue to require concessioners to limit nonmotorized watercraft rentals to adhere to the 1989 river management plan guidance for managing visitor numbers on the river. However, current methods of nonmotorized watercraft rental and distribution of these users (drop off and pick up locations) are not achieving desired visitor use concentrations during peak visitation, and crowding and related conflicts occur increasing anthropogenic sound levels.
- The National Riverways would continue to manage nonmotorized watercraft levels through concessions management. In recent years, increasing numbers of visitors are utilizing nonmotorized watercraft on the riverways bringing their own watercraft. The National Riverways does not regulate private watercraft levels, and as a result managing nonmotorized watercraft use only through concessions operations is becoming less effective.
- Motorboat horsepower limitations would not apply outside the National Riverways boundary within the Eminence and Van Buren gaps.
- The National Riverways would continue to allow use of motorized boats with up to 60/40 horsepower motors in several locations.
- The National Riverways waterways would continue to be available for night fishing and gigging activities consistent with applicable restrictions as set forth by the park unit or state. The use of motorized boats and generators to power lights would continue to affect nighttime acoustic environments when ambient conditions are often lower and wildlife are more sensitive to disruptions.
- In some locations throughout the National Riverways, loud sounds from passing boat motors would continue to exceed current NPS regulations for maximum noise level for an operating water vessel (36 CFR 3.15(a)(1)).

As a result, high levels of nonmotorized watercraft use and frequent passing of boats would continue to effect local wildlife and mask important natural sounds. Noise levels and the amount of time that noise is audible in the

National Riverways would likely increase over the life of the plan. Impacts from anthropogenic (human-caused) sounds are also likely to increase due to additional development and recreational use within and adjacent to the NPS Riverways. Overall, the no-action alternative would result in moderate, long term, adverse impacts to soundscapes.

Cumulative Impacts

Several past, present, and foreseeable future actions are likely to affect the National Riverways' acoustic environment. Recreational use within and adjacent to the NPS Riverways is expected to continue to increase, particularly as state and local highways between St. Louis and other metropolitan areas and the NPS Riverways are improved. Completion of the Old Tram Road Trail, a 10.2-mile-long, multiuse trail along the Current River, would also lead to increased visitation. This increased use would likely result in an increase in noise within the National Riverways.

Urban encroachment and large-scale industrial development may occur adjacent to the National Riverways and could result in minor to moderate increases in noise levels. U.S. Highway 67 from St. Louis to Poplar Bluff has been expanded to a four-lane highway, which is expected to increase tourist traffic near and in the NPS Riverways. Other transportation projects that could affect National Riverways acoustics include expansion of U.S. Highway 60 through Van Buren and the proposed Missouri Highway 19 bridge over Sinking Creek. These projects could result in increased noise levels in areas of the National Riverways near the roadways.

These effects in addition to the moderate, long-term, adverse impacts resulting from the no-action alternative would result in moderate, adverse, cumulative impacts.

Conclusion

The no-action alternative would continue to provide visitors and wildlife with some opportunities to experience the sounds of nature with minimal human noise intrusions. However, the amount of human-caused noise is likely to increase over time. Visitation, development within and near the National Riverways, and current management of the NPS Riverways have resulted in adverse impacts to the acoustic environment and associated effects on visitors and wildlife. Continuation of these trends under the no-action alternative would result in moderate, long-term, adverse impacts. These effects, combined with past, current, and future actions, would result in moderate long-term, adverse, cumulative impacts.

ALTERNATIVE A

Many of the actions included in alternative A would reduce human-cause noise levels and result in a beneficial effect on the acoustic environment of the NPS Riverways. Visitors would experience increased opportunities to experience sounds of nature and enjoy the soundscape of the NPS Riverways. Wildlife would be exposed to less anthropogenic noise and there would be less interference with their acoustic signals, with important ecological consequences such as inter- and intra-species communication and predator/prey interactions. Components of alternative A that would have beneficial impacts on the acoustic environment include the following:

- Park management would emphasize greater opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter, less crowded, and slower paced.
- The National Riverways would close approximately 50 miles of undesignated NPS roads, traces, crossings, and access points and restore the areas to natural conditions.
- Park zoning would be applied to include large areas in primitive and natural

zones and in nonmotorized river sections. More than a quarter of the park unit would be zoned primitive, roughly 69% would be zoned natural, about 50% of the river miles would be designated nonmotorized river year-round.

- Park management would substantially enhance visitor opportunities to experience the sights and sounds of nature and learn about early river recreational activities when the National Riverways was being established
- The National Riverways would redistribute concession dropoff and pickup locations for nonmotorized watercraft users to reduce peak-season crowding between motorized and nonmotorized watercraft users. This would require an estimated closure and restoration of about 20 access points. Some new access may be needed, but the total number of designated access points would go down.
- Specific river areas would be set aside for low-density nonmotorized watercraft use at peak times to provide an opportunity for solitude on the river. Opportunities to experience solitude are currently limited during peak weekends.
- Locations where motorized boats could operate would be reduced, thereby enhancing opportunities to hear natural sounds. The river sections where motorized boats would and would not be allowed to operate would be different from the no-action alternative:
  - Upper Current River: No motorized boats would be allowed year-round from northern park unit boundary to Round Spring; no motors during peak summer season from Round Spring to Two Rivers; and 25-horsepower limit in this area during off-peak season.
  - Lower Current River: National Riverways would pursue a rule change to reduce allowable horsepower from unlimited to 40 horsepower from Two Rivers to southern boundary.
  - Jacks Fork: No motorized boats would be allowed year-round.
- Approximately 65 miles of undesignated horse trails would be closed and restored to natural conditions.
- The National Riverways would eliminate vehicular access to all park unit gravel bars.
- The National Park Service would continue to provide backcountry and primitive campsites in designated areas in the National Riverways. Some campsites would be reduced based on desired future conditions for the management zone. Only primitive campsites would be allowed in the primitive zone. Vehicular access to primitive campsites would be removed in primitive zones.
- The NPS training range in the Big Spring tract would be closed and rehabilitated, and this function would be relocated to another NPS training range in the National Riverways within an appropriate zoning prescription.

Several of the actions in alternative A would have minor to moderate, adverse impacts on the acoustic environment of the NPS Riverways including continuation of fishing and gigging activities. Although noise from motors would be reduced as a result of limitations on motorized boating, noise from generator use during night fishing for gigging would continue to adversely affect the night acoustic environment.

Alternative A also includes construction of three multioperational facilities. The facilities would improve park sustainability, efficiency, and support and provide additional space for field staff. However, this action would result in short-term construction noise.

Overall, alternative A would result in moderate, long-term, beneficial impacts to the acoustic environment of the NPS Riverways.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in moderate, long-term, adverse impacts on the acoustic environment.

These effects, in addition to the moderate, long-term, beneficial impacts resulting from alternative A, would result in minor cumulative impacts.

Conclusion

Alternative A includes several actions that would improve the acoustic environment and provide visitors and wildlife with increased opportunities to experience the sounds of nature with fewer human noise intrusions. Under alternative A, park management would emphasize greater opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter, less crowded, and slower paced. Locations where motorized boats could operate would be reduced and the size of motors would be limited. These and other actions would improve the acoustic environment, protect wildlife, and provide visitors with a quieter experience. Implementation of alternative A would result in moderate, long-term, beneficial impacts to the acoustic environment of the NPS Riverways. These effects combined with past, current, and future actions would result in minor cumulative impacts.

ALTERNATIVE B (NPS PREFERRED)

Under the preferred alternative, park management would provide a high level of protection of natural and cultural resources, while expanding ways for visitors to experience and learn about these resources in interesting and enjoyable ways. This alternative includes several actions that would result in reduced noise levels and increased opportunities to experience the natural sounds of the NPS Riverways. Visitor experience would be enhanced and disruptions to wildlife from noise would be diminished. As a result, the preferred alternative would result in beneficial impacts to the acoustical environment. Specific components of alternative B that would have beneficial impacts on the acoustic environment include the following:

- The National Riverways would close approximately 48 miles of undesignated NPS roads, traces, crossings, and access points and restore the areas to natural conditions.
- A river access study would be conducted to fully document locations of undesignated vehicular access points at rivers and develop restoration strategies.
- Park management would substantially enhance visitor opportunities to experience the sights and sounds of nature and learn about early river recreational activities when the National Riverways was being established.
- The National Riverways would redistribute concession dropoff and pickup locations for nonmotorized watercraft users to reduce peak-season crowding effects among motorized and nonmotorized watercraft. This would require the closure and restoration of about 20 designated access points and the careful design and opening of up to 20 new designated access points. Total designated access points would stay the same or go down in number.
- Specific river areas would be set aside for low-density nonmotorized watercraft use at peak times to provide an opportunity for solitude on the river. Opportunities to experience solitude are currently limited during peak weekends.
- Locations where motorized boats could operate would be reduced and opportunities to hear natural sounds would increase. Alternative B would designate 34% of the NPS Riverways as nonmotorized. The river sections where

motorized boats would and would not be allowed to operate would include:

- Upper Current River: No motorized boats would be allowed year-round from northern park unit boundary to Round Spring; no motors during peak summer season from Round Spring to Two Rivers and 25-horsepower limit in this area during the off season.
- Lower Current River: Maximum 40 horsepower would be allowed year-round from Two Rivers south to southern boundary. The National Riverways would pursue a rule change to reduce allowable horsepower from unlimited to 60/40 horsepower motors from south Van Buren to the park unit boundary.
- Jacks Fork: No motorized boats would be allowed year-round from west boundary to Alley Spring; no motors during peak summer season from Alley Spring to west of Eminence with a 25-horsepower limit during the off season; maximum 40 horsepower would be allowed from east of Eminence to Two Rivers.

- Approximately 65 miles of undesignated horse trails would be closed and restored to natural conditions.
- The National Riverways would designate and reduce the number of gravel bars accessible to vehicles and require designated campsites on gravel bars away from the river.
- The National Riverways would continue to provide backcountry and primitive campsites in designated areas in the park in unit. Some sites would be reduced based on desired future conditions for the management zone. Only primitive campsites would be allowed in the primitive zone. Vehicular access to these primitive campsites would be removed.
- The NPS training range in the Big Spring tract would be closed and rehabilitated. This function would be relocated to another NPS training range in the National Riverways with an appropriate zoning prescription.

Several of the actions in the preferred alternative would have minor to moderate adverse impacts on the acoustic environment of the NPS Riverways:

- Night fishing and gigging activities could continue. Although noise from motors would be reduced as a result of limitations on motorized boating, noise from generator use during night gigging or fishing would continue to adversely affect the nighttime acoustic environment.
- The National Riverways would reopen old access roads to vehicles to some discovery sites.

The preferred alternative includes several construction projects, including three multioperational facilities, expansion of the curatorial facility, and campground development at existing day use areas in the vicinity of Upper Current (Akers) and upper Jacks Fork (Blue Spring). The facilities would improve park services, sustainability, efficiency, and support and provide additional space for field staff. However these actions would result in short-term construction and vehicle noise and possible long-term impacts from increased access and visitor use in these areas.

Overall, the preferred alternative would result in moderate, long-term, beneficial impacts to the acoustic environment of the NPS Riverways.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in moderate, long-term, adverse impacts on the acoustic environment.

These effects, in addition to the moderate, long-term, beneficial impacts resulting from the preferred alternative, would result in minor cumulative impacts.

Conclusion

The preferred alternative includes several actions that would improve the acoustic environment and provide visitors and wildlife with increased opportunities to experience the sounds of nature with fewer human noise intrusions. Locations where motorized boats could operate would be reduced and the size of motors would be limited. These and other actions would improve the acoustic environment, protect wildlife, and provide visitors with a quieter experience. This alternative also includes several actions that could have localized adverse impacts on the acoustic environment. Overall, implementation of the preferred alternative would result in moderate, long-term, beneficial impacts to the acoustic environment of the NPS Riverways. These effects, combined with past, current, and future actions, would result in minor cumulative impacts.

ALTERNATIVE C

Under alternative C, park management would provide a diversity of river recreational opportunities and experiences similar to what is provided in the no-action alternative. In addition, park management would offer more quality land-based recreational opportunities that can be supported by park resources while maintaining the highly scenic natural setting. This is reflected in the increased amount of acreage for the resource-based recreation zone and the developed zone.

This alternative includes several actions that, compared to the no-action alternative, would result in reduced noise levels and increased opportunities to experience the natural sounds of the NPS Riverways. These actions would enhance opportunities for visitor experience and diminish potential disruptions to wildlife.

As a result, alternative C would result in beneficial impacts to the acoustical environment, although it would provide fewer beneficial impacts than alternatives A and B. Components of alternative C that would have beneficial impacts on the acoustic environment include the following:

- The National Riverways would close approximately 40 miles of undesignated NPS roads, traces, crossings, and access points and restore the areas to natural conditions.
- The National Riverways would redistribute concession dropoff and pickup locations for nonmotorized watercraft users to reduce peak-season crowding effects among motorized and nonmotorized watercraft.
- Locations where motorized boats could operate would be reduced. Alternative C would designate 21% of the NPS Riverways as nonmotorized. The river sections where motorized boats would and would not be allowed to operate would include the following:
  - Upper Current River: No motorized boats would be allowed year-round from northern park unit boundary to Akers; no motors during the peak summer season from Akers to Round Spring and 25-horsepower limit during the off season; maximum 40 horsepower would be allowed from Round Spring to Two Rivers.
  - Lower Current River: Maximum 40 horsepower would be allowed year-round from Two Rivers to the park unit boundary north of Van Buren; maximum 40 horsepower from south Van Buren gap to the southern park unit boundary. The National Riverways would pursue a rule change to reduce allowable horsepower from unlimited to 60/40 horsepower motors from south Van Buren to the park unit boundary.

  - Jacks Fork: No motorized boats would be allowed year-round from the west boundary to Rymers; no motors during peak summer season from Rymers to Bay Creek with a 25-horsepower limit during the off season; maximum 25 horsepower from Bay Creek to west Eminence to Two Rivers, Maximum of 40 horsepower from east Eminence to Two Rivers.
- Approximately 65 miles of undesignated horse trails would be closed and restored to natural conditions.
- Only primitive campsites would be allowed in the primitive zone. Vehicular access to these primitive campsites would be prohibited.

A 25-site horse camping area would be developed to allow for wider distribution of horse riders and less concentrated use. Several of the actions in alternative C would have minor to moderate adverse impacts on the acoustic environment of the NPS Riverways, including continuation of night fishing and gigging activities. Although noise from motors would be reduced as a result of limitations on motorized boating, noise resulting from generator use during night gigging or fishing would continue to adversely affect the acoustic environment.

Alternative C provides for possibly one or two additional visitor contact locations and continuation of relatively high levels of social interaction among boaters on the river during peak season. This alternative also retains current vehicular access on designated sites to designated park unit gravel bars. These actions could maintain or increase the levels of noise.

Alternative C includes several construction projects, including three multioperational facilities, campground development at existing day use areas in the vicinity of Upper Current [Akers] and upper Jacks Fork (Blue Spring), and four new housing duplex units to support additional seasonal or term staffing needs. The facilities would improve park services, sustainability, efficiency, and support and provide additional space for field staff. However, these actions would result in short-term construction and vehicle noise in addition to possible long-term impacts from increased access and visitor use in these areas. This alternative also includes the potential for additional campground facilities and higher concentrations of visitors in developed zones, and an additional camp store.

When compared to the no-action alternative, alternative C would result in minor, long-term, beneficial impacts to the acoustic environment of the NPS Riverways.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in moderate, long-term, adverse impacts on the acoustic environment.

These effects, in addition to the minor long-term beneficial impacts resulting from the alternative C would result in minor cumulative impacts.

Conclusion

Under alternative C, park management would provide a diversity of river and land based recreational opportunities. This alternative includes several actions that would improve the acoustic environment and provide visitors and wildlife with increased opportunities to experience the sounds of nature with fewer human noise intrusions. For example, locations where motorized boats could operate would be reduced and the size of motors would be limited. The alternative would close and restore 43 miles of undesignated roads. These and other actions would improve the acoustic environment, protect wildlife, and provide visitors with a quieter experience. This alternative also includes actions that could have adverse impacts on the acoustic environment.

These include several construction projects and increased development. Overall, implementation of the alternative C would result in minor, long-term, beneficial impacts to the acoustic environment of the NPS Riverways. These effects, combined with past, current, and future actions, would result in minor cumulative impacts.

CULTURAL RESOURCES

INTRODUCTION

This analysis of the environmental consequences of the no-action alternative and alternatives A, B, and C on cultural resources within Ozark National Scenic Riverways is based on the professional judgment of park staff, NPS planners, and other specialists in the field of cultural resources management. To provide a thorough analysis of cultural resources of the NPS Riverways, this section has been organized by the following four impact topics, which correspond to the cultural resources topics described in chapter 4:

- archeological resources
- historic buildings, structures, and cultural landscapes
- ethnographic resources
- museum collections

SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT AND IMPACTS TO CULTURAL RESOURCES

In this environmental impact statement, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA). These impact analyses are intended, however, to also comply with the requirements of section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing section 106 of the National Historic Preservation Act (36 CFR 800, *Protection of Historic Properties*), impacts to cultural resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected national register-eligible or national register-listed cultural resources; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either adverse effect or no adverse effect must be made for affected national register-listed or -eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register of Historic Places, such as diminishing the integrity (or the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5, Assessment of Adverse Effects). A determination of no adverse effect means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the national register.

Council on Environmental Quality regulations and the National Park Service Director's Order 12: *Conservation Planning, Environmental Impact Analysis and Decision-making* also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, such as reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Cultural resources are nonrenewable

resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under section 106 may be mitigated, the effect remains adverse.

For alternatives A, B and C, a section 106 summary is included following the impact analysis sections for archeological resources; historic buildings, structures, and cultural landscapes; and ethnographic resources. The section 106 summary is an assessment of the effect of the undertaking (implementation of the alternative), based on the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

Potential impacts to contributing elements or character-defining features of a resource are described in terms of type (beneficial or adverse), intensity, duration, and context (localized, parkwide or regional). From a National Environmental Policy Act standpoint, the following definitions and context apply to all of the cultural resources being analyzed:

- Type
  - Beneficial: Beneficial impacts are those resulting from actions that preserve or protect significant cultural resources and do not diminish the attributes and qualities that contribute to their eligibility for listing in the National Register of Historic Places.
  - Adverse: Adverse impacts are those resulting from actions that disturb or threaten the loss of character-defining attributes and qualities of significant cultural resources, potentially diminishing their eligibility for listing in the National Register of Historic Places.
- Intensity
  - The threshold definitions used to describe the intensity of impacts precede the analysis for each cultural resources topic.
- Duration
  - Short term: Changes would occur to cultural resources during project implementation.
  - Long term: Changes would occur after (and extend beyond) project completion.
- Context
  - Local: Effects would occur to specific cultural resources (for example, archeological sites, historic structures and districts, or cultural landscape features) that exist within the boundaries of Ozark National Scenic Riverways.
  - Parkwide or Regional: Effects on cultural resources would broadly extend throughout the National Riverways and possibly beyond the park unit boundaries.

ARCHEOLOGICAL RESOURCES: METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

The impacts on archeological resources are described in terms of the potential to diminish or protect the ability of archeological resources to yield information important in prehistory or history. The impact intensities for archeological resources are as follows:

- **Negligible:** Impact is at the lowest level of detection with no perceptible consequences. For purposes of section 106, the determination of effect would be no adverse effect.
- **Minor:** Impacts would be detectable and measurable but would not diminish the integrity of the resource.

For purposes of section 106, the determination of effect would be no adverse effect.

- **Moderate:** Impacts would result in loss of integrity that would consequently jeopardize a site's national register eligibility. For purposes of section 106, determination of effect would be adverse effect.
- **Major:** Impacts would result in the loss of most or all of the site, to the extent that it would no longer be eligible for national register listing. For purposes of section 106, the determination of effect would be adverse effect.

NO-ACTION ALTERNATIVE

No substantial changes in visitor use activities or proposed construction of new park facilities would occur under the no-action alternative. Consequently, there would be little potential for impacts to archeological resources as a result of ground-disturbing construction activities. NPS archeologists would continue to monitor the condition of known archeological sites and would undertake appropriate protection measures as necessary to reduce or avoid adverse impacts to sites from natural erosion (such as flooding and wave scouring affecting the riverbanks and terraces), visitor use (such as vehicle and boat access points along the rivers and horseback riding), the illegal removal of artifacts, and other factors. However, inadequate staffing presently limits the National Riverways' effectiveness in implementing comprehensive site protection measures.

Although substantial information has been compiled from previous archeological investigations, additional sites would likely be recorded and added to the existing database as a result of future surveys and mitigation carried out in fulfillment of section 106 compliance requirements. Archeological site information would continue to be entered in the Archeological Site Management Information System maintained by the NPS Midwest Archeological Center in Lincoln, Nebraska. Additional testing may be conducted for selected sites to assist in determinations of site eligibility for listing in the National Register of Historic Places.

Continuation of archeological resource management actions under existing laws and policies would assist the documentation and protection of the National Riverways' archeological resources, resulting in a long-term, beneficial impact. Potential disturbance of sites from erosion or other impacts associated with visitor use and other factors would have long-term or permanent, localized, negligible to minor, adverse impacts on archeological resources.

Cumulative Impacts

Past, present and reasonably foreseeable actions have adversely impacted, or have the potential to impact, archeological resources at Ozark National Scenic Riverways. Proposed NPS projects that include improvement or expansion of campgrounds, improvements to the Chilton Creek boat ramp and parking area, and new trail construction would entail ground-disturbing actions that have the potential to affect subsurface archeological resources. However, these and other NPS Riverways undertakings are assessed by NPS cultural resources staff to ensure that significant sites, if identified in project areas, are avoided by project redesign and/or are clearly identified for avoidance during construction. In the rare instances that sites could not be avoided, data recovery measures or other mitigation would be carried out in accordance with section 106 requirements to ensure the recovery of significant archeological information.

Non-NPS actions outside the National Riverways, such as regional urban and industrial development, road construction,

and mining operations also pose potential threats to archeological resources because of ground disturbance. The actions presented above would have long-term or permanent, minor to moderate, adverse impacts on archeological resources.

The impacts associated with the no-action alternative would have long-term or permanent, beneficial and negligible to minor, adverse impacts on the National Riverways' archeological resources. Past, present and reasonably foreseeable actions would result in long-term or permanent, minor to moderate, adverse impacts. The adverse impacts of the other actions described above, in combination with the impacts of the no-action alternative, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on archeological resources. The impacts associated with the no-action alternative would represent a small component of the adverse cumulative impact.

Conclusion

Long-term or permanent, localized, beneficial and negligible to minor, adverse impacts on archeological resources would occur from ongoing resource management, visitor use, and other factors. There would also be long-term or permanent, minor to moderate, adverse, cumulative impacts on archeological resources from implementation of the no-action alternative in conjunction with past, present, or reasonably foreseeable actions.

ALTERNATIVE A

Under alternative A (in common with the no-action alternative) NPS archeologists would continue to monitor the condition of known archeological sites and would undertake appropriate protection measures as necessary to reduce or avoid adverse impacts to sites possibly occurring from natural erosion (such as flooding and wave scouring affecting the riverbanks and terraces), visitor use (such as vehicle and boat access points along the rivers and horseback riding), the illegal removal of artifacts, and other factors. As funding permits, the National Riverways would employ additional archeological staff or contracted services in increased efforts to document, protect, and monitor archeological resources. Implementation of the archeological resource management actions identified above would assist in the documentation and protection of the park unit's archeological resources, resulting in a long-term, beneficial impact. Potential disturbance of sites from erosion or other impacts associated with visitor use and other factors would have long-term or permanent, localized, negligible to minor, adverse impacts on archeological resources.

New NPS facilities that would be constructed include three multiuse district facilities, four new housing units, and visitor parking and camping areas. The construction of designated visitor parking and camping areas away from the river shoreline would assist the protection of archeological resources along the river terraces from disturbance, erosion, or other impacts associated with visitor use activities.

Additional hiking and horseback riding trails would be constructed. Disturbed areas would be closed and restored to natural conditions, including approximately 50miles of NPS roads and traces, approximately 65 miles of undesignated horse trails, and all undesignated river access points and crossings. All proposed actions with the potential to affect archeological resources because of ground disturbance would be assessed and the project areas would be surveyed to ensure archeological resources, if present within the areas of potential effects, are avoided to the greatest extent possible. Any adverse effects would be negligible to minor and permanent.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term or permanent, minor to moderate, adverse impacts on archeological resources.
The impacts associated with implementation of alternative A would have long-term or permanent, beneficial and negligible to minor adverse impacts on the National Riverways' archeological resources. Past, present and reasonably foreseeable actions would result in long-term or permanent, minor to moderate, adverse impacts. The adverse impacts of other actions, in combination with the impacts of alternative A, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on archeological resources. The impacts associated with alternative A would represent a small component of the adverse cumulative impact.

Conclusion

Long-term or permanent, localized, negligible to minor, adverse impacts on archeological resources would occur from visitor use, potential construction disturbance of presently unidentified sites, and other factors. Locating facility development away from the river shoreline and terraces and other protection measures would benefit the preservation of archeological resources. Cumulatively, there would be long-term or permanent, minor to moderate, adverse impacts on archeological resources from implementation of alternative A in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative A would result in no adverse effect on archeological resources.

ALTERNATIVE B (NPS PREFERRED)

Under alternative B (in common with the no-action alternative) NPS archeologists would continue to monitor the condition of known archeological sites and would undertake appropriate protection measures as necessary to reduce or avoid site impacts possibly occurring from natural erosion (such as flooding and wave scouring affecting the riverbanks and terraces), visitor use (such as vehicle and boat access points along the rivers and horseback riding), the illegal removal of artifacts, and other factors. Potential disturbance of sites from erosion or other impacts associated with visitor use and other factors would have long-term or permanent, localized, negligible to minor, adverse impacts on archeological resources.

As funding permits, the National Riverways would employ additional archeological staff or contracted services in increased efforts to document, protect, and monitor archeological resources. Implementation of the archeological resource management actions identified above would assist the documentation and protection of the park unit's archeological resources, resulting in a long-term, beneficial impact.

New NPS construction would include three multiuse district facilities and visitor parking and camping areas. The construction of designated visitor parking and camping areas away from the river shoreline would assist in the protection of archeological resources along the river terraces from disturbance, erosion, or other impacts associated with visitor use activities.

Additional hiking and horseback riding trails would be constructed, and disturbed areas would be closed and restored to natural conditions. This would include

approximately 45 miles of NPS roads and traces, approximately 65 miles of undesignated horse trails, and all undesignated river access points and crossings.

All proposed actions with the potential to affect archeological resources because of ground disturbance would be assessed and project areas would be surveyed to ensure archeological resources, if present within the areas of potential effects, are avoided to the greatest extent possible. Any adverse effects would be negligible to minor and permanent.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term or permanent, minor to moderate, adverse impacts on archeological resources.

The impacts associated with implementation of alternative B would have long-term or permanent, beneficial and negligible to minor adverse impacts on the National Riverways' archeological resources. Past, present, and reasonably foreseeable actions would result in long-term or permanent, minor to moderate, adverse impacts. These impacts, in combination with the impacts of alternative B, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on archeological resources. The impacts associated with alternative B would represent a small component of the adverse cumulative impact.

Conclusion

Long-term or permanent, localized, negligible to minor adverse impacts on archeological resources would occur from ongoing visitor use, potential construction disturbance of presently unidentified sites, and other factors. Locating facility development away from the river shoreline and terraces and other protection measures would benefit the preservation of archeological resources. There would be long-term or permanent, minor to moderate, adverse cumulative impacts on archeological resources from implementation of alternative B in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative B would result in no adverse effect on archeological resources.

ALTERNATIVE C

Alternative C proposes a substantial increase in the amount of park unit lands under resource-based recreation zoning (59.6%) and in the developed zone (5.7%). Although this could potentially place archeological resources in these areas at increased risk of disturbance by inadvertent visitor use and park operations, NPS archeologists would continue to monitor the condition of known archeological sites, and would undertake appropriate protection measures as necessary to reduce or avoid site impacts possibly occurring from natural erosion (such as flooding and wave scouring affecting the riverbanks and terraces), visitor use (such as vehicle and boat access points along the rivers and horseback riding), the illegal removal of artifacts, and other factors.

As funding permits, the National Riverways would employ additional archeological staff or contracted services in increased efforts to document, protect, and monitor archeological resources. Implementation of the archeological resource management actions identified above would assist the documentation and protection of the

National Riverways' archeological resources, resulting in a long-term, beneficial impact. Potential disturbance of sites from erosion or other impacts associated with visitor use and other factors would have long-term or permanent, localized, negligible to minor, adverse impacts on archeological resources.

New NPS construction would include three multiuse district facilities, four housing units, and visitor parking and camping areas. The construction of designated visitor parking and camping areas away from the river shoreline would assist the protection of archeological resources along the river terraces from disturbance, erosion or other impacts associated with visitor use activities.

Additional hiking and horseback riding trails would be constructed, and disturbed areas would be closed and restored to natural conditions. Closed facilities would include approximately 40 miles of NPS roads and traces, approximately 65 miles of undesignated horse trails, and all undesignated river access points and crossings.

All proposed actions with the potential to affect archeological resources because of ground disturbance would be assessed and project areas would be surveyed to ensure archeological resources, if present within the areas of potential effects, are avoided to the greatest extent possible. Any adverse effects would be negligible to minor and permanent.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term or permanent, minor to moderate, adverse impacts on archeological resources.
The impacts associated with implementation of alternative C would have long-term or permanent, beneficial and negligible to minor adverse impacts on the National Riverways' archeological resources. Past, present and reasonably foreseeable actions would result in long-term or permanent, minor to moderate, adverse impacts. The adverse impacts of the other actions, in combination with the impacts of alternative C, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on archeological resources. The impacts associated with alternative C would represent a small component of the adverse cumulative impact.

Conclusion

Long-term or permanent, localized, negligible to minor, adverse impacts on archeological resources would occur from ongoing visitor use, potential construction disturbance of presently unidentified sites, and other factors. Locating facility development away from the river shoreline and terraces and other protection measures would benefit the preservation of archeological resources. There would also be long-term or permanent, minor to moderate, adverse cumulative impacts on archeological resources from implementation of alternative C in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative C would result in no adverse effect on archeological resources.

HISTORIC BUILDINGS, STRUCTURES, AND CULTURAL LANDSCAPES: METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

Impacts on these cultural resources were assessed by analyzing the potential to

diminish or protect their historical/ architectural integrity or character-defining features. The impact intensities for historic buildings, structures, and cultural landscapes are as follows:

- **Negligible:** Impacts would be at the lowest levels of detection with no perceptible consequences. For purposes of section 106, the determination of effect would be no adverse effect.
- **Minor:** Impacts would affect character defining features, elements, or landscape patterns but would not diminish the integrity of the resource. For purposes of section 106, the determination of effect would be no adverse effect.
- **Moderate:** Impacts would alter character defining features, elements, or landscape patterns, diminishing the integrity of the resource to the extent that its national register eligibility could be jeopardized. For purposes of section 106, the determination of effect would be adverse effect.
- **Major:** Impacts would alter character-defining features, elements or landscape patterns, diminishing the integrity of the resource to the extent that it would no longer be eligible to be listed on the national register. For purposes of section 106, the determination of effect would be adverse effect.

NO-ACTION ALTERNATIVE

Under the no-action alternative, NPS staff would, as needed, stabilize, preserve, and possibly restore/rehabilitate selected historic buildings, structures, and contributing cultural landscape features. The National Park Service actively maintains the National Riverways' historic buildings and structures on its List of Classified Structures and none are considered to be in a state of passive decay.

Preservation management actions often entail necessary repairs, minor alterations and/or replacement of deteriorated historic fabric and contributing landscape elements. The need for these actions is typically the result of natural weathering, wear and tear resulting from park and visitor use, and the adaptive use of selected historic buildings and structures for park operations and interpretation.

All preservation undertakings would be carried out in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. With particular regard to the standards and guidelines for preservation, the existing form, features, and architectural detailing of historic buildings, structures, and landscape features would be retained. Stabilization measures would be carried out to structurally reinforce, weatherize, and correct unsafe conditions.

The National Riverways would continue to adaptively use the interiors of about a third of its historic structures and buildings primarily for maintenance operations, offices, workshops, and storage. Adaptive use of these properties would be carried out in accordance with the secretary's standards with particular attention to the standards and guidelines for rehabilitation. Under the rehabilitation treatment, historic building materials and character-defining features would be protected and maintained to the extent possible, although extensively deteriorated, damaged, or missing features would be replaced with traditional or substitute materials.

Implementation of these preservation undertakings would have long-term, beneficial impacts on the National Riverways' historic buildings and structures, helping ensure their continued contribution to park interpretation, research, and preservation of the area's cultural heritage. However, long-term, negligible to minor, adverse impacts would also result from actions necessary to repair, replace, or potentially alter historic

fabric and architectural features as part of preservation and rehabilitation treatments.

NPS staff would also continue to preserve, research, and document cultural landscapes that are often associated with the National Riverways' historic structures and sites (for example, farmsteads, mills, and settlements). The National Riverways would preserve the historic patterns of farm fields and pastoral areas, family cemeteries, and other cultural landscape features that reflect the period of early Ozark farming and settlement.

Cultural landscape information would continue to be updated and included in the NPS Riverways' Cultural Landscape Inventory database. As needed, cultural landscape reports would be completed for selected properties with recommendations for appropriate treatment in accordance with the secretary's standards (with guidelines for the treatment of cultural landscapes). These reports would document the significance of cultural landscape features and support preservation management decision making. Implementation of these preservation and documentation measures would have long-term, localized, beneficial impacts on cultural landscapes.

Under the no-action alternative, the Big Spring Wilderness Study Area would not be proposed for wilderness designation and the historic Civilian Conservation Corps-constructed fire tower, the site of Civilian Conservation Corps camp1710, and the barn near the Big Spring would be preserved and protected. Associated site features and cultural landscape elements such as access roads and the remnants of building foundations and stone walls would also be preserved. The National Riverways would continue to use the access roads and barn for administrative purposes. Preservation and potential rehabilitation treatments, carried out in accordance with the secretary's standards, would have long-term, beneficial impacts on these historic structures and cultural landscape features.

Cumulative Impacts

Past, present, and reasonably foreseeable actions have affected, or have the potential to affect, historic buildings, structures, and cultural landscape features within the NPS Riverways. For instance, proposed projects at Big Spring include the removal of nonhistoric material from the Civilian Conservation Corps commissary building, cyclic maintenance and repairs of selected Civilian Conservation Corps cabins, and exterior repair and rehabilitation of the Shockley Barn. These actions entail various levels of structural intervention to preserve the integrity of properties contributing to the significance of the historic district.

Long-term, negligible to minor, adverse impacts would result from actions necessary to repair, replace, or potentially alter historic fabric, architectural features and landscape elements. However, long-term beneficial impacts would result from these and other proposed undertakings carried out in accordance with the secretary's standards and other guidance documentation to ensure the long-term preservation of historic properties in a manner that protects contributing architectural and cultural landscape elements.

Non-NPS actions outside the National Riverways such as encroaching urban and industrial development, road construction, and mining operations pose potential threats to historic structures and cultural landscapes as properties are damaged or altered to the extent that their architectural/landscape importance and historic settings are diminished.

The actions presented above would have long-term, beneficial and minor to moderate adverse impacts on historic structures and cultural landscapes.

The impacts associated with implementation of the no-action alternative would have long-term beneficial and negligible to minor adverse impacts on the National Riverways'

historic buildings, structures, and cultural landscapes. Past, present and reasonably foreseeable actions would result in long-term, beneficial, and minor to moderate adverse impacts. Consequently, the adverse impacts of the other actions described above, in combination with the impacts of the no-action alternative, would cumulatively result in long-term, minor to moderate, adverse impacts on historic buildings, structures, and cultural landscapes. The impacts associated with the no-action alternative would represent a small component of the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial, and negligible to minor adverse impacts on historic buildings, structures, and cultural landscape features would occur from ongoing visitor use, routine park operations and interpretive activities, preservation undertakings, and other factors. There would also be long-term, beneficial, and minor to moderate adverse cumulative impacts on historic buildings, structures, and cultural landscape features from implementation of the no-action alternative in conjunction with past, present, or reasonably foreseeable actions.

ALTERNATIVE A

Under this alternative, the National Riverways would increase the documentation and interpretation of Ozarks cultural history. As part of these activities, NPS staff would ensure that examples of historic structures from all significant periods in the National Riverways are protected, and that preservation treatments are carried out consistent with the secretary's standards and management zone prescriptions. To fulfill this objective, selected historic buildings in the developed and resource-based recreation zones would be preserved and restored or rehabilitated as needed to accommodate park operations and visitor interpretive purposes. Historic structure reports and other guidance documents would be completed as necessary.

The National Riverways would, as feasible, preserve and stabilize more remote and less-frequented historic buildings in the natural and primitive zones where protection of natural processes would be emphasized and more extensive restoration or rehabilitation treatment of historic structures may not be appropriate.

Implementation of these preservation undertakings would have long-term, beneficial impacts on the National Riverways' historic buildings and structures. However, long-term, negligible to minor, adverse impacts would also result from actions necessary to repair, replace, or potentially alter historic fabric and architectural features as part of preservation treatments.

Guided interpretive hikes would be conducted to selected historic sites, such as the Nichols Farm complex, Welch Cave Hospital, and the Civilian Conservation Corps buildings and camp at Big Spring. Visitors would also be provided opportunities to hike to and discover more remote historic properties. The National Riverways would not promote visitor access to sensitive sites, and would increase monitoring and resource protection efforts of historic structures and sites selected for enhanced interpretation to ensure that they are sufficiently protected from damage by inadvertent visitor use or vandalism. Historic structures could suffer wear and tear from increased visitation, continued ranger patrols and emphasis on visitor education would discourage vandalism and inadvertent damage.

Monitoring conducted to assess the visitor use of selected or sensitive historic structures could result in limiting visitor numbers or constraining use as part of efforts to stabilize or enhance the structural integrity of properties. Such measures would be implemented in a fashion that would not unduly hinder visitor interpretation.

Unstaffed or minimally staffed structures could be more susceptible to vandalism. Any adverse effects would be minor and long term.

NPS staff would increase efforts to preserve, research, and document cultural landscapes that are often associated with the National Riverways' historic structures and sites, such as farmsteads, mills, and settlements. The National Riverways would partner with preservation organizations and others to preserve the historic patterns of farm fields and pastoral areas, family cemeteries, and other cultural landscape features that reflect the early period of Ozark farming and settlement. Cultural landscape information would continue to be updated and included in the National Riverways' Cultural Landscape Inventory database. These measures would have long-term, beneficial impacts on cultural landscapes.

Rehabilitation or restoration of pastoral areas would be carried out in a manner consistent with cultural landscape management objectives and management zone prescriptions. As needed, cultural landscape reports would be completed for selected properties with recommendations for appropriate treatment in accordance with the secretary's standards (with guidelines for the treatment of cultural landscapes). Preservation of cultural landscapes and the completion of cultural landscape inventories and reports to support effective management and decision making would result in long-term, beneficial impacts to cultural landscapes.

Under this alternative, most of the Big Spring Wilderness Study Area would be recommended for wilderness designation. Ten acres that include the barn, NPS training range, and associated access road and utility corridor would be excluded from wilderness designation to allow continued administrative uses. Cultural resources in the study area would be managed in conformance with the primitive zone and natural zone prescriptions.

The historic Civilian Conservation Corps-constructed fire tower, the site of Civilian Conservation Corps camp 1710, and the barn would be preserved and protected in accordance with all relevant laws and policies. Preservation treatment and management of the fire tower would also be consistent with the preservation of wilderness character and values. Associated site features and character-defining cultural landscape elements such as access roads, and the remnants of building foundations and stone walls would also be preserved. The access road to the fire tower would be maintained for nonmotorized use and possibly restored to approximate its Civilian Conservation Corps-era condition. The barn would serve park administrative needs.

Because preservation and potential restoration/rehabilitation treatments would be carried out in accordance with the secretary's standards and NPS policies for the management of cultural resources in wilderness areas, these actions would have long-term, beneficial impacts on historic structures and cultural landscape features.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, beneficial and minor to moderate adverse impacts on historic structures and cultural landscapes.

The impacts associated with implementation of alternative A would have long-term beneficial and negligible to minor adverse impacts on the National Riverways' historic buildings, structures, and cultural landscapes. The adverse impacts of the other actions, in combination with the impacts of alternative A, would cumulatively result in long-term, minor to moderate adverse impacts on historic buildings, structures, and cultural landscapes. The impacts associated with

alternative A would represent a small component of the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial and negligible to minor, adverse impacts on historic buildings, structures, and cultural landscape features would occur from ongoing visitor use, routine park operations and interpretive activities, preservation undertakings and other factors. There would also be long-term beneficial and minor to moderate, adverse cumulative impacts on historic buildings, structures and cultural landscape features from implementation of alternative A in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative A would result in no adverse effect on historic buildings, structures and cultural landscapes.

ALTERNATIVE B (NPS PREFERRED)

Under alternative B, the National Riverways would increase the documentation and interpretation of Ozarks cultural history. As part of these activities, NPS staff would ensure that examples of historic structures from all significant periods in the park unit are protected and that preservation treatments are carried out consistent with the secretary's standards and management zone prescriptions. To fulfill this objective, selected historic buildings in the developed and resource-based recreation zones would be preserved and restored or rehabilitated as needed to accommodate park operations and visitor interpretive purposes. Historic structure reports and other guidance documents would be completed as necessary. The National Riverways would, as feasible, preserve and stabilize more remote and less-frequented historic buildings in the natural and primitive zones where protection of natural processes would be emphasized and more extensive restoration/rehabilitation treatment of historic structures may not be appropriate. Implementation of these preservation undertakings would have long-term, beneficial impacts on the National Riverways' historic buildings and structures. However, long-term, negligible to minor, adverse impacts would also result from actions necessary to repair, replace, or potentially alter historic fabric and architectural features as part of preservation treatments.

Guided interpretive hikes would be conducted to selected historic sites, such as the Nichols Farm complex, Welch Cave Hospital, and the Civilian Conservation Corps buildings and camp at Big Spring. Visitors would also be provided opportunities to hike to and discover more remote historic properties. Unstaffed or minimally staffed structures could be more susceptible to vandalism. The National Riverways would not promote visitor access to sensitive sites and would increase monitoring and resource protection efforts of historic structures and sites selected for enhanced interpretation to ensure that they are sufficiently protected from damage by inadvertent visitor use or vandalism. Although historic structures could suffer wear and tear from increased visitation, continued ranger patrols and emphasis on visitor education would discourage vandalism and inadvertent damage. Monitoring conducted to assess the visitor use of selected or sensitive historic structures could result in limiting visitor numbers or constraining use as part of efforts to stabilize or enhance the structural integrity of these properties. Such measures would be implemented in a fashion that did not unduly hinder visitor interpretation. Any adverse effects would be minor and long term.

NPS staff would increase efforts to preserve, research, and document cultural landscapes that are often associated with the National Riverways' historic structures and sites, such as farmsteads, mills, and settlements. The National Riverways would partner with preservation organizations and others to preserve the historic patterns of farm fields and pastoral areas, family cemeteries, and other cultural landscape features that reflect the early period of Ozark farming and settlement. Cultural landscape information would continue to be updated and included in the National Riverways' Cultural Landscape Inventory database. These measures would have long-term, beneficial impacts on cultural landscapes.

Rehabilitation or restoration of pastoral areas would be carried out in a manner consistent with cultural landscape management objectives and management zone prescriptions. As needed, cultural landscape reports would be completed for selected properties with recommendations for appropriate treatment in accordance with the secretary's standards (with guidelines for the treatment of cultural landscapes). Preservation of cultural landscapes and the completion of cultural landscape inventories and reports to support effective management and decision making would result in long-term, beneficial impacts to cultural landscapes.

Under this alternative, nearly all of the Big Spring Wilderness Study Area would be recommended for wilderness designation. Cultural resources in the study area would be managed in conformance with primitive zone prescriptions. The historic Civilian Conservation Corps-constructed fire tower, the site of Civilian Conservation Corps camp1710, and the barn would be preserved and protected in accordance with all relevant laws and policies. Associated site features and character-defining cultural landscape elements such as access roads and the remnants of building foundations and stone walls would also be preserved. Motorized vehicle use of the access roads would be prohibited and the roads would be evaluated for potential restoration to approximate Civilian Conservation Corps era conditions.

Preservation and potential restoration/ rehabilitation treatments would be carried out in accordance with the secretary's standards and NPS policies for the management of cultural resources in wilderness areas. As a result, these actions would have long-term, beneficial impacts on historic structures and cultural landscape features.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, beneficial and minor to moderate adverse impacts on historic structures and cultural landscapes.

The impacts associated with implementation of alternative B would have long-term, beneficial, and negligible to minor adverse impacts on the National Riverways' historic buildings, structures and cultural landscapes. The impacts of the other actions, in combination with the impacts of alternative B, would cumulatively result in long-term, minor to moderate, adverse impacts on historic buildings, structures, and cultural landscapes. The impacts associated with alternative B would represent a small component of the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial, and negligible to minor, adverse impacts on historic buildings, structures, and cultural landscape features would occur from ongoing visitor use, park operations, interpretive activities, preservation undertakings, and other factors. There would also be long-term, beneficial, and minor to

moderate, adverse cumulative impacts on historic buildings, structures, and cultural landscape features from implementation of alternative B in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative B would result in no adverse effect on historic buildings, structures and cultural landscapes.

ALTERNATIVE C

Under alternative C, the National Riverways would increase the documentation and interpretation of Ozarks cultural history. As part of these activities, NPS staff would ensure that examples of historic structures from all significant periods in the National Riverways are protected, and that preservation treatments are carried out consistent with the secretary's standards and management zone prescriptions. To fulfill this objective, selected historic buildings in the developed and resource-based recreation zones would be preserved and restored or rehabilitated as needed to accommodate park operations and visitor interpretive purposes. Historic structure reports and other guidance documents would be completed as necessary.

The National Riverways would, as feasible, preserve and stabilize more remote and less-frequented historic buildings in the natural and primitive zones where protection of natural processes would be emphasized and more extensive restoration or rehabilitation treatment of historic structures may not be appropriate. Implementation of these preservation undertakings would have long-term, beneficial impacts on the National Riverways' historic buildings and structures. However, long-term, negligible to minor, adverse impacts would also result from actions necessary to repair, replace, or potentially alter historic fabric and architectural features as part of preservation treatments.

Guided interpretive hikes would be conducted to selected historic sites, such as the Nichols Farm complex, Welch Cave Hospital, and Civilian Conservation Corps buildings and camp at Big Spring. Visitors would also be provided opportunities to hike to and discover more remote historic properties. Unstaffed or minimally staffed structures could be more susceptible to vandalism. The National Riverways would not promote visitor access to sensitive sites and would increase monitoring and resource protection efforts of historic structures and sites selected for enhanced interpretation to ensure that they are sufficiently protected from damage by inadvertent visitor use or vandalism. Although historic structures could suffer wear and tear from increased visitation, continued ranger patrols and emphasis on visitor education would discourage vandalism and inadvertent damage.

Monitoring conducted to assess visitor use of selected or sensitive historic structures could result in limiting visitor numbers or constraining use as part of efforts to stabilize or enhance the structural integrity of these properties. Such measures would be implemented in a fashion that would not unduly hinder visitor interpretation. Any adverse effects would be minor and long term.

NPS staff would increase efforts to preserve, research, and document cultural landscapes that are often associated with the National Riverways' historic structures and sites, such as farmsteads, mills, and settlements. The National Riverways would partner with preservation organizations and others to preserve the historic patterns of farm fields and pastoral areas, family cemeteries, and other cultural landscape features that reflect the early period of Ozark farming and settlement. Cultural landscape information

would continue to be updated and included in the National Riverways' Cultural Landscape Inventory database. These measures would have long-term, beneficial impacts on cultural landscapes.

Rehabilitation or restoration of pastoral areas would be carried out in a manner consistent with cultural landscape management objectives and management zone prescriptions. As needed, cultural landscape reports would be completed for selected properties with recommendations for appropriate treatment in accordance with the secretary's standards (with guidelines for the treatment of cultural landscapes). Preservation of cultural landscapes and the completion of cultural landscape inventories and reports to support effective management and decision making would result in long-term, beneficial impacts to cultural landscapes.

Under this alternative, approximately 52 % of the Big Spring Wilderness Study Area would be recommended for wilderness designation. The historic Civilian Conservation Corps-constructed fire tower, the site of Civilian Conservation Corps camp 1710, and the barn would be outside the area proposed for wilderness designation. These properties would be preserved and protected in accordance with all relevant laws, policies, and the cultural resource management prescription for the natural zone. Associated site features and character-defining cultural landscape elements such as access roads and the remnants of building foundations and stone walls would also be preserved. Structures and access roads would be used for park administrative purposes. Because preservation and potential rehabilitation treatments would be carried out in accordance with the secretary's standards these actions would have long-term, beneficial impacts on historic structures and cultural landscape features.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, beneficial, and minor to moderate adverse impacts on historic structures and cultural landscapes.

The impacts associated with implementation of alternative C would have long-term, beneficial, and negligible to minor, adverse impacts on the National Riverways' historic buildings, structures, and cultural landscapes. The adverse impacts of the other actions, in combination with the impacts of alternative C, would cumulatively result in long-term, minor to moderate, adverse impacts on historic buildings, structures, and cultural landscapes. The impacts associated with alternative C would represent a small component of the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial, negligible to minor, adverse impacts on historic buildings, structures, and cultural landscape features would occur from ongoing visitor use, park operations, interpretive activities, preservation undertakings, and other factors. There would be long-term, beneficial, and minor to moderate, adverse cumulative impacts on historic buildings, structures, and cultural landscape features from implementation of alternative C in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative C would result

in no adverse effect on historic buildings, structures and cultural landscapes.

ETHNOGRAPHIC RESOURCES: METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

Impacts on ethnographic resources were analyzed by examining changes in the potential to diminish or protect the integrity of (and access to) resources and places having particular importance and value to traditionally associated peoples. The impact intensities for ethnographic resources are as follows:

- **Negligible**: Impacts would be at or below the lowest levels of detection or barely perceptible. Impacts would neither alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. For purposes of section 106, the determination of effect would be no adverse effect.
- **Minor**: Impacts would be slight but noticeable and would neither appreciably alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the group's body of beliefs and practices. For purposes of section 106, the determination of effect would be no adverse effect.
- **Moderate**: Impacts would be apparent and would alter resource conditions or interfere with traditional access, site preservation, or the relationship between the resource and the affiliated group's beliefs and practices, even though the group's practices and beliefs would survive. For purposes of section 106, the determination of effect would be adverse effect.
- **Major**: Impacts would alter resource conditions. Proposed actions would block or greatly affect traditional access, site preservation, or the relationship between the resource and the group's body of beliefs and practices to the extent that the survival of a group's beliefs and/or practices would be jeopardized. For purposes of section 106, the determination of effect would be adverse effect.

NO-ACTION ALTERNATIVE

Many of the National Riverways' archeological resources and historic sites are likely to retain ethnographic importance for associated tribal groups and others, such as descendants of early Scots/Irish settlers, with traditional cultural connections to park lands. Because no substantial changes in visitor use activities or proposed construction of new park facilities would occur under the no-action alternative, there would be little potential for impacts to ethnographic resources as a result of ground-disturbing construction activities.

NPS archeologists would continue to monitor the condition of known sites, and would undertake appropriate protection measures as necessary to reduce or avoid site impacts possibly occurring from erosion, visitor use (such as hiking or horseback riding), the illegal removal of artifacts, and other factors. However, inadequate staffing would continue to limit the National Riverways' effectiveness in implementing comprehensive site protection measures.

Continuation of ethnographic resource management actions under existing laws and policies would enhance the documentation and protection of the National Riverways' ethnographic resources, resulting in a long-term, beneficial impact. Potential disturbance of sites and resources from erosion or other impacts associated with visitor use and other factors would have long-term or permanent,

localized, negligible to minor, adverse impacts on ethnographic resources.

The National Riverways would continue to consult on a government-to-government basis with traditionally associated tribes that were listed in chapter 4. Information acquired from these consultations would assist the National Riverways in efforts to protect ethnographic resources and places of cultural importance, and ensure continued tribal access to these places and resources. As recommended in a cultural affiliation study (Zedeno and Basaldu 2003) the NPS Riverways would, as feasible, conduct ethnographic investigations to document the cultural use and importance of features such as plants, animals, and landforms for traditionally associated tribal groups. Information acquired from these investigations could be incorporated as appropriate into park interpretive and educational programs and would benefit efforts to protect ethnographic resources.

In accordance with NPS *Management Policies 2006*, the National Park Service would permit the consumptive use of park resources by tribal members, such as hunting, fishing and the gathering of certain plants and berries to the extent that these activities are compatible with park purposes, do not adversely affect park wildlife or the reproductive potential of plant species, or otherwise do not adversely affect park resources.

Also in accordance with NPS *Management Policies 2006*, the American Indian Religious Freedom Act (1996), and other laws and policies, the National Park Service would permit tribal access to National Riverways areas for traditional religious, ceremonial, and other customary activities at places historically used for such purposes. In consultation with the tribes and consistent with tribal goals, the National Park Service would protect sacred sites and other ethnographic resources, should these be identified. The location and character of sites/resources would not be disclosed to the general public if disclosure would result in significant invasion of privacy, risk harm to historic resources, or impede traditional religious use and access by tribal members.

Implementation of the above management actions for protecting and retaining access to places and resources important to traditionally associated groups would have a long-term, localized, beneficial impact on ethnographic resources.

Cumulative Impacts

Past, present and reasonably foreseeable actions have adversely impacted, or have the potential to impact, ethnographic resources at the NPS Riverways. Proposed projects that include improvements or expansions of campgrounds, improvements to the Chilton Creek boat ramp and parking area, and new trail construction would entail ground-disturbing actions that have the potential to affect subsurface archeological/ethnographic resources. However, these and other National Riverways undertakings are assessed by NPS cultural resources staff to ensure that significant sites, if identified in project areas, are avoided by project redesign and/or are clearly identified for avoidance during construction. In the rare instances that sites could not be avoided, data recovery measures or other mitigation would be carried out in accordance with section 106 requirements to ensure the recovery of significant archeological/ethnographic information.

Non-NPS actions outside the park unit such as regional urban and industrial development, road construction, and mining operations also pose potential threats to ethnographic resources because of ground disturbance.

The actions presented above would have long-term or permanent, minor to moderate, adverse impacts on ethnographic resources.

The impacts associated with implementation of the no-action alternative would have long-

term or permanent, beneficial, and negligible to minor, adverse impacts on the National Riverways' ethnographic resources. Past, present and reasonably foreseeable actions would result in long-term or permanent, minor to moderate adverse impacts. The adverse impacts of the other actions described above, in combination with the impacts of the no-action alternative, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on ethnographic resources. The impacts associated with the no-action alternative would represent a small component of the adverse cumulative impact.

Conclusion

Long-term or permanent, localized, beneficial, and negligible to minor, adverse impacts on ethnographic resources would occur from ongoing resource management, visitor use, and other factors. There would be long-term or permanent, minor to moderate, adverse cumulative impacts on ethnographic resources from implementation of the no-action alternative in conjunction with past, present, or reasonably foreseeable actions.

ALTERNATIVE A

NPS management of ethnographic resources would generally be conducted as outlined above for the no-action alternative. In addition, under this alternative the National Riverways would increase interpretive opportunities for visitors to gain greater understanding of the park unit's traditional and culturally associated peoples (American Indian inhabitants and early Scots/Irish settlers) and their adaptations to the lands along the Current and Jacks Fork Rivers.

Further ethnographic overviews and assessments, oral histories, and other studies would be conducted as necessary to supplement available information and expand park interpretive programs. Continuation and expansion of ethnographic resource management actions and research efforts would have long-term, localized, beneficial impacts on ethnographic resources. The long-term protection of ethnographic resources would also benefit by increasing public awareness of the cultural importance of these resources through interpretive and educational programs.

Long-term or permanent, negligible to minor, adverse impacts to ethnographic resources may also be expected to occur primarily from disturbances associated with inadvertent visitor use, park operations, or other factors.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term or permanent, minor to moderate, adverse impacts on ethnographic resources.

Implementation of alternative A would have long-term or permanent, beneficial, and negligible to minor, adverse impacts on the National Riverways' ethnographic resources. Past, present and reasonably foreseeable actions would result in long-term or permanent, minor to moderate adverse impacts. The adverse impacts of the other actions, combined with the impacts of alternative A, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on ethnographic resources. The impacts associated with alternative A would represent a small component of the cumulative impact.

Conclusion

Long-term or permanent, localized, beneficial, and negligible to minor, adverse impacts on ethnographic resources would occur from enhanced interpretation, ongoing visitor use, and other factors. There would also be long-term or permanent, minor to

moderate adverse cumulative impacts on ethnographic resources from implementation of alternative A in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative A would result in no adverse effect on ethnographic resources.

ALTERNATIVE B (NPS PREFERRED)

NPS management of ethnographic resources would generally be conducted as outlined above for the no-action alternative. In addition, the National Riverways would increase interpretive opportunities for visitors to gain greater understanding of the park unit's traditional and culturally associated peoples (American Indian inhabitants and early Scots/Irish settlers) and their adaptations to the lands along the Current and Jacks Fork Rivers.

Further ethnographic overviews and assessments, oral histories, and other studies would be conducted as necessary to supplement available information and expand park interpretive programs. Continuation and expansion of ethnographic resource management actions and research efforts would have long-term, localized, beneficial impacts on ethnographic resources. The long-term protection of ethnographic resources would also benefit by increasing public awareness of the cultural importance of these resources through interpretive and educational programs.

Long-term or permanent, negligible to minor, adverse impacts to ethnographic resources may also be expected to occur primarily from disturbances associated with inadvertent visitor use, park operations, or other factors.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term or permanent, minor to moderate, adverse impacts on ethnographic resources.

The impacts associated with implementation of alternative B would have long-term or permanent, beneficial, and negligible to minor, adverse impacts on the National Riverways' ethnographic resources. Past, present and reasonably foreseeable actions would result in long-term or permanent, minor to moderate adverse impacts. The adverse impacts of other actions, in combination with the impacts of alternative B, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on ethnographic resources. The impacts associated with alternative B would represent a small component of the adverse cumulative impact.

Conclusion

Long-term or permanent, localized, beneficial, and negligible to minor, adverse impacts on ethnographic resources would occur from ongoing visitor use, enhanced interpretation, and other factors. There would also be long-term or permanent, minor to moderate, adverse, cumulative impacts on ethnographic resources from implementation of alternative B in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative B would result

in no adverse effect on ethnographic resources.

ALTERNATIVE C

NPS management of ethnographic resources would generally be conducted as outlined above for the no-action alternative. In addition, the National Riverways would increase interpretive opportunities for visitors to gain greater understanding of the park unit's traditional and culturally associated peoples (American Indian inhabitants and early Scots/Irish settlers) and their adaptations to the lands along the Current and Jacks Fork Rivers.

Further ethnographic overviews and assessments, oral histories, and other studies would be conducted as necessary to supplement available information and expand park interpretive programs. The National Riverways would conduct cultural demonstrations, workshops, and living history at selected historic sites and farms, such as Big Spring, Alley Spring, and Powder Mill to enhance understanding of Ozark folklife and customs.

Continuation and expansion of ethnographic resource management actions and research efforts would have long-term, localized, beneficial impacts on ethnographic resources. The long-term protection of ethnographic resources would also benefit by increasing public awareness of the cultural importance of these resources through interpretive and educational programs.

Long-term or permanent, negligible to minor, adverse impacts to ethnographic resources may also be expected to occur, primarily from disturbances associated with inadvertent visitor use, park operations, or other factors.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term or permanent, minor to moderate, adverse impacts on ethnographic resources.

The impacts associated with implementation of alternative C would have long-term or permanent, beneficial, and negligible to minor, adverse impacts on the National Riverways' ethnographic resources. Past, present, and reasonably foreseeable actions would result in long-term or permanent, minor to moderate, adverse impacts. The adverse impacts of other actions, in combination with the impacts of alternative C, would cumulatively result in long-term or permanent, minor to moderate, adverse impacts on ethnographic resources. The impacts associated with alternative C would represent a small component of the adverse cumulative impact.

Conclusion

Long-term or permanent, localized, beneficial, and negligible to minor, adverse impacts on ethnographic resources would occur from ongoing visitor use, enhanced interpretation, and other factors. There would also be long-term or permanent, minor to moderate, adverse, cumulative impacts on ethnographic resources from implementation of alternative C in conjunction with past, present, or reasonably foreseeable actions.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative C would result

in no adverse effect on ethnographic resources.

MUSEUM COLLECTIONS: METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

The impacts on museum collections were assessed by examining how the collections would be protected, stored, and managed in accordance with applicable NPS curatorial policies. The impact intensities for museum collections are as follows:

- **Negligible:** Impact is at or below the lowest levels of detection with no perceptible consequences, either adverse or beneficial, to museum collections.
- **Minor:** Impacts would affect the integrity of few items in the museum collection but would not change the usefulness of the collection for future research and interpretation.
- **Moderate:** Impacts would affect the integrity of many items in the museum collection and diminish the usefulness of the collection for future research and interpretation.
- **Major:** Impacts would affect the integrity of most items in the museum collection and destroy the usefulness of the collection for future research and interpretation.

NO-ACTION ALTERNATIVE

Under the no-action alternative, archeological artifacts and associated reports and records (which represent most of the National Riverways' museum collections) would continue to be stored and managed at facilities of the NPS Midwest Archeological Center in Lincoln, Nebraska. The National Riverways' onsite collection storage facility near Big Spring would continue to provide secure, climate-controlled storage of some archeological artifacts (typically pending long-term transfer to the Midwest Archeological Center), reports, documentary sources, historic objects, and biological specimens. Office and curatorial work space for the use of researchers and NPS staff would continue to be provided in the facility. Ongoing storage and curatorial management of the National Riverways' museum collections in accordance with NPS policies and guidelines would have long-term, beneficial impacts on museum collections.

Cumulative Impacts

Although the overall condition of the National Riverways' museum collection is good, some items sustained minor damage and deterioration that occurred before construction of the National Riverways' present collection storage facility in 1994. Prior to the new facility, collections were stored at locations and outbuildings throughout the NPS Riverways under inadequate conditions and were susceptible to pest damage and deterioration resulting from a lack of environmental controls. These past conditions resulted in long-term, minor, adverse impacts.

The impacts associated with implementation of the no-action alternative would have long-term, beneficial impacts on the National Riverways' museum collections. Past actions have resulted in long-term, minor, adverse impacts. The adverse impacts of the other actions described above, in combination with the impacts of the no-action alternative, would cumulatively result in long-term, minor, adverse impacts on museum collections. The impacts associated with the no-action alternative would not appreciably contribute to the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial impacts on museum collections would occur from ongoing curatorial management and storage at the NPS Midwest Archeological Center

and the National Riverways' collection storage facility. There would be long-term, minor, adverse cumulative impacts on museum collections from implementation of the no-action alternative in conjunction with other primarily past actions.

ALTERNATIVE A

NPS management of museum collections would be conducted as outlined above for the no-action alternative. The National Riverways would enhance its capability to provide proper curation of archival and other collection items. Ongoing storage and curatorial management of the National Riverways' museum collections in accordance with NPS policies and guidelines would have long-term, beneficial impacts on museum collections.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, minor, adverse impacts on the museum collection.

The impacts associated with implementation of alternative A would have long-term, beneficial impacts on the National Riverways' museum collections. Past actions have resulted in long-term, minor, adverse impacts. The adverse impacts of the other actions, in combination with the impacts of alternative A, would cumulatively result in long-term, minor, adverse impacts on museum collections. The impacts associated with alternative A would not appreciably contribute to the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial impacts on museum collections would occur from ongoing curatorial management and storage at the NPS Midwest Archeological Center and the National Riverways' collection storage facility. There would be long-term, minor, adverse cumulative impacts on museum collections from implementation of alternative A in conjunction with other primarily past actions.

ALTERNATIVE B (NPS PREFERRED)

Under this alternative, the National Riverways would proceed with recommendations from the NPS Midwest Region's Museum Collection Storage Plan (2006) that call for consolidating museum collections from several parks at selected multipark facilities. Towards this objective, the NPS Riverways' current collection storage facility would be expanded to accommodate collections from other smaller NPS regional parks that lack or have inadequate curatorial facilities. The National Riverways would also consider partnering with other agencies, such as the U.S. Forest Service for the Mark Twain National Forest, to jointly address curatorial storage and management needs.

Because the expanded collection storage facility would be constructed and operated to address all NPS curatorial requirements with regard to proper security, environmental control systems, accessibility for researchers, and adequate staffing, its construction and operation would have long-term, beneficial impacts on museum collections. The National Park Service would implement special handling procedures to ensure museum collections are not damaged or misplaced during transit or temporary storage prior to completion of the new facility.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under

this alternative, resulting in long-term, minor, adverse impacts on the museum collection.

The impacts associated with implementation of alternative B would have long-term beneficial impacts on the National Riverways' museum collections. Past actions have resulted in long-term, minor, adverse impacts. The adverse impacts of the other actions, in combination with the impacts of alternative B, would cumulatively result in long-term, minor, adverse impacts on museum collections. The impacts associated with alternative B would not appreciably contribute to the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial impacts on museum collections would occur from construction and operation of an expanded, multipark collection storage facility within the National Riverways, and ongoing curatorial management and storage at the NPS Midwest Archeological Center. There would be long-term, minor, adverse cumulative impacts on museum collections from implementation of alternative B in conjunction with past actions.

ALTERNATIVE C

NPS management of museum collections would be conducted as outlined above for the no-action alternative. The National Riverways would enhance its capability to provide proper curation of archival and other collection items. Ongoing storage and curatorial management of the National Riverways' museum collections in accordance with NPS policies and guidelines would have long-term, beneficial impacts on museum collections.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, minor, adverse impacts on the museum collection.

The impacts associated with implementation of alternative C would have long-term, beneficial impacts on the National Riverways' museum collections. Past actions have resulted in long-term, minor, adverse impacts. The adverse impacts of the other actions, in combination with the impacts of alternative C, would cumulatively result in long-term, minor, adverse impacts on museum collections. The impacts associated with alternative C would not appreciably contribute to the adverse cumulative impact.

Conclusion

Long-term, localized, beneficial impacts on museum collections would occur from ongoing curatorial management and storage at the NPS Midwest Archeological Center and the National Riverways' collection storage facility. There would be long-term, minor, adverse cumulative impacts on museum collections from implementation of alternative C in conjunction with past actions.

VISITOR USE AND EXPERIENCE

INTRODUCTION

This section describes the effect of the no-action alternative and alternatives A, B, and C on visitor use and experience within Ozark National Scenic Riverways. Analysis of these components is based on the professional judgment of park staff, NPS planners, and other specialists in the field of visitor use and experience.

To provide a thorough analysis of visitor use and experience of the NPS Riverways, this section has been organized by the following four impact elements:

- ability to access the Riverways
- recreational opportunities and experiences
- opportunities to understand the significant stories of the Ozark National Scenic Riverways
- visitor safety

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

The analysis is primarily qualitative rather than quantitative due to the conceptual nature of the alternatives. Impacts on visitor use and experience were determined considering the best available information. Information on visitor use and opinions was taken from recent surveys of visitors conducted by the University of Missouri and Southern Illinois University (Morgan 2007; Park 2011).

Visitor studies were conducted by Brown and Chilman in 1999 and 2002, and Chilman and Vogel in 2001that examined the use of the NPS Riverways across several user groups. The work done by Chilman served as the template for the study conducted by Park (2011). By repeating the study design of Chilman, it is possible to analyze trends of use and visitor attitudes over time.

Another relevant study analyzed horse use patterns in and around the NPS Riverways (Chilman and Vogel 2001). The NPS Riverways' annual reporting of visitor use levels, including overnight stays, to the NPS' Public Use Statistics Office, along with local and regional travel and tourism data, were also considered in the analysis. All of this background data was supplemented by information gathered during the planning process for this management plan, including opinions from NPS Riverways visitors and neighbors and information from Riverways staff.

The impact intensities for visitor use and experience are as follows:

- **Negligible:** Most visitors would be unaware of any changes associated with implementation of the alternative.
- **Minor:** Changes in visitor opportunities and/or setting would be slight but detectable, would affect few visitors, and would not appreciably limit or enhance experiences identified as fundamental to the NPS Riverways' purpose and significance.
- **Moderate:** Changes in visitor opportunities and/or setting would be noticeable, would affect many visitors, and would result in some changes to experiences identified as fundamental to the NPS Riverways' purpose and significance.
- **Major:** Changes in visitor opportunities and/or setting would be highly apparent, would affect most visitors, and would result in several changes to experiences identified as fundamental to the NPS Riverways' purpose and significance.

- Duration
  - Short term: Impact would be temporary, lasting less than a year, such as the impacts associated with construction.
  - Long term: Impact would last more than a year and could be permanent in nature. An impact may occur only one time, but if it repeatedly occurs over a longer period to time, the impact may have a long-term impact.

Impact elements for analysis include:

- **Ability to Access the National Riverways (including universal access).** Due to the remote nature and cost in reaching this region, access to the Ozark National Scenic Riverways is an important issue for visitors. During scoping for this plan, many visitors noted the need for improved access to the riverways, observing that put-ins are crowded at times and more boat landings are needed to access certain areas. Other visitors were concerned that increased opportunities for access would reduce the quality of visitor experiences by leading to increased crowding. These same visitors felt there should be fewer access points to the riverways in order to achieve the objectives of the enabling legislation for the park unit. Accessibility of facilities and programs is another issue that could affect visitor use. Any changes in the ability to access and use the riverways would be of concern to visitors, the public, and NPS Riverways managers.
- **Recreational Opportunities and Experiences.** Ozark National Scenic Riverways provides a wide range of recreational opportunities and experiences. During scoping and recent visitor surveys, most respondents acknowledged their enjoyment of the NPS Riverways' recreational opportunities and suggested the amount of opportunities should be maintained close to current levels. Because the alternatives would result in changes in these opportunities, such as adding, removing, or improving facilities like trails or river access points, this impact topic would be of concern to visitors, the public, and NPS Riverways managers. Two types of recreational opportunities are identified and analyzed as impact topics. They include the following:
  - river-based recreational opportunities and experiences
  - land-based recreational opportunities and experiences
- **Opportunities to Understand the Significant Stories of the Ozark National Scenic Riverways.** Ozark National Scenic Riverways has many stories about the cultural and natural resources within the NPS Riverways, covering a wide range of topics. Many visitors seek out and enjoy opportunities to hear these stories and learn about the local history. NPS staff provides a number of interpretive facilities and programs for visitors. Alternatives in this plan could affect visitor understanding and appreciation of these resources, including interpretive and educational opportunities. Any changes in interpretive and educational opportunities would be of concern to visitors, the public, and NPS Riverways managers.
- **Visitor Safety.** Because the Ozark National Scenic Riverways presents many potential hazards and risks to visitors and employees, safety is an important concern. Access to sections of the NPS Riverways and response to accidents are critical elements to visitor safety on the riverways and are important considerations when evaluating the impacts of each of the proposed alternative. Another important consideration to visitor

safety is the proposed horsepower limits on portions of the riverways.

NO-ACTION ALTERNATIVE

Ability to Access the Riverways

The riverways have numerous access points both on the Jacks Fork and Current Rivers. An important aspect of access is the presence of boat launches and landings. In this alternative, existing launches and landings would be maintained and would continue to serve most of the visitors to the NPS Riverways' at most desired visitor locations. In addition, the current concessioner services would continue to provide an alternative means of access to the NPS Riverways.

During scoping for this plan and as feedback during visitor use studies, visitors noted the need for improved access to certain parts of the riverways. For example, members of the public said launches and landings are not deep enough, put-ins are crowded at times, and more boat launches and landings are needed to adequately access certain areas. Under this alternative, the desire for improved access would not be addressed and crowding at access points would continue to negatively affect visitors in a few locations.

The NPS Riverways would continue to maintain existing facilities that are accessible to visitors with disabilities. This includes the visitor contact facilities at the NPS Riverways headquarters; several seasonal visitor contact facilities throughout the NPS Riverways; and an offsite, multiagency information facility. No change would be made in the type or number of facilities and programs that support the needs of visitors with disabilities.

Recreational Opportunities and Experiences

River-based Recreation Opportunities and Experiences. In this alternative, visitors would continue to access high-quality river recreation opportunities, including boating, swimming, camping along the riverways, fishing, sightseeing, accessing historic sites, and participating in interpretive programs. It is likely the most popular activities on the rivers would continue to be tube floating, day hikes, and camping.

During scoping and visitor surveys, most respondents acknowledged their enjoyment of the NPS Riverways' recreational opportunities and suggested the amount of opportunities be maintained close to current levels. The no-action alternative would continue to promote existing opportunities for river-based recreation.

The NPS Riverways provides visitors opportunities for solitude, quiet, connections with nature, and first-hand discovery of the NPS Riverways history. The continuation of these types of visitor opportunities are highly valued by the public. Under this alternative, protection of natural resources and natural settings, access opportunities via rustic trail systems, and primitive camping opportunities would continue.

The no-action alternative would continue to allow boats to use 60/40 horsepower motors on certain portions of the Current and Jacks Fork Rivers. The continuation of this management approach is in violation with existing federal regulations. The no-action alternative is characterized this way to provide a baseline for comparison in evaluating the changes and impacts of the other alternatives. Under this alternative, the NPS Riverways would continue to use horsepower limits on motorboats and maximum numbers for canoes set forth in the 1989 river use management plan.

Some of the current impacts to opportunities for recreation are related to crowding and congestion at high-use boat launches and landings, as well as crowding and conflicts on popular stretches of the rivers, these issues would most likely continue under the no-action alternative. In addition, increasing use levels and noise associated with motorized

use on the rivers may also continue to adversely affect natural soundscapes and views of the NPS Riverways for visitors who desire opportunities to experience natural settings and solitude. For more information on how natural soundscapes may affect visitor experience at the riverways, please see the "Natural Soundscape" sections in chapters 4 and 5.

Despite issues of crowding and congestion, horsepower limits on river sections would remain at their current level. Also, the proliferation of gravel bar campsite activity and continued allowance of vehicle access on gravel bars might continue to cause noise impacts and increase the perception of crowding for visitors floating the rivers. All of these impacts would continue under this alternative and may increase over time if use levels and types of use change. This alternative would not take measures to mitigate these impacts on visitors' recreational experiences.

Land-based Recreational Opportunities and Experiences. Under the no-action alternative, visitors would continue to access high-quality land-based recreational opportunities, including hiking, boat launching, sightseeing, visiting historic sites, horseback riding, guided cave tours at Round Spring, and participating in interpretive programs. During scoping and recent visitor surveys, most respondents acknowledged their enjoyment of the NPS Riverways' recreational opportunities and suggested the amount of opportunities should be maintained close to current levels. This alternative would continue to provide these existing land-based recreational opportunities.

The Big Spring tracts would continue to be maintained in their primitive, natural state, limiting visitor opportunities for a wilderness experience. Mountain biking is currently not allowed and this status would not change under this alternative.

Under this alternative, six developed fee campgrounds at Big Spring, Powder Mill, Two Rivers, Alley Spring, Round Spring, and Pulltite would continue to provide a total of 450 sites. Backcountry and primitive campsites would continue to be provided in designated areas throughout the NPS Riverways. The NPS Riverways would continue to allow visitors to create their own campsites on gravel bars.

Opportunities to Understand the Significant Stories

There is one year-round visitor contact facility associated with the NPS Riverways where NPS staff members provide education and orientation programs and services. There are also several seasonal visitor contact facilities where visitors can learn about rules, regulations, and opportunities at the NPS Riverways. Although not run by the National Park Service, there is a multiagency information facility in Salem, Missouri, in which the NPS Riverways staff participates. The operation of these visitor contact facilities would continue under the no-action alternative.

There are concerns related to these facilities that would continue in this alternative. The visitor contact facility associated with headquarters in the Town of Van Buren has limited, inflexible space for exhibits and direct interaction between visitors and NPS staff/volunteers. This building is located in the town of Van Buren, but not along major transportation routes through town, so it has limited visibility to out-of-town visitors. Also, the current location is not adjacent to concession operators, so few visitors using concessions are aware of or ever access the visitor contact facility.

Other visitor contact facilities dispersed throughout the NPS Riverways offer limited opportunities for visitors to fully understand the diverse interpretative themes and the significance of the natural and historic resources within the NPS Riverways. These

visitor contact issues create some challenges for visitors being able to understand the significant stories of the NPS Riverways and would not be addressed in this alternative.

Additional education and orientation is provided to visitors via nonpersonal services such as trailhead bulletin boards, wayside exhibits, trail signs, and NPS Riverways brochures. These services are considered satisfactory and would continue to be available.

Many of the NPS Riverways' significant cultural sites and resources have visitor access and interpretation that is highly valued and sought after by the public, such as the Alley Spring Mill. However, many cultural sites at the NPS Riverways have limited or no visitor access or associated interpretive programs and materials. The public has expressed an interest in increased access to educational opportunities related to these resources. Further, the National Park Service believes major aspects of the NPS Riverways' significant stories are not effectively communicated due to the lack of access to and interpretation of these sites. Under the no-action this portion of the visitor experience would remain unchanged and these visitor concerns would not be addressed.

Visitor Safety

Information available to visitors regarding how to safely navigate the riverways and interact with wildlife would continue to be available at visitor contact facilities, on-line, and through roving contacts with NPS staff. These services would continue at their current levels.

Under current staffing and facility conditions, potentially hazardous factors, including limited staff contact with visitors at congested river access points, and limited ability of NPS Riverways staff to provide adequate emergency response in crowded river sections, have led to safety concerns.

Under this alternative, no additional contact locations would be provided. Staffing levels under this alternative would remain at the Operation of the National Park Service currently authorized level of 95 full-time equivalent positions, and visitor safety would like remain the same.

Cumulative Impacts

Due to the noncontiguous nature of the Ozark National Scenic Riverways boundaries and the towns of Eminence and Van Buren being situated between NPS Riverways segments, there is potential that development or actions in or around these towns could impact visitor experiences. Located roughly half way between Saint Louis, Missouri, to the north and Little Rock, Arkansas, to the south, changes in regional growth, regional development, and the potential for increased visitation are possible effects that could impact visitor experiences on the riverways.

Changes in recreation trends, such as the observed increase in tubing as a river-based recreation activity, may result in social conflicts among visitors. For example, if tubing use continues to grow, areas congested with tubers may frustrate motorboat users. At this time, uncertainty prevents accurate descriptions of the associated impacts that may exist with alterations in recreation trends.

The overall effects of this alternative would not account for a gradual increase in use over time with no new implementation strategies to address growing demands on visitor use and experiences.

Conclusion

The no-action alternative would have long-term, localized, minor to moderate, adverse impacts on visitor use and experiences at Ozark National Scenic Riverways. River and land-based recreational opportunities would continue in their current form and would not

take into account new recreational opportunities or experiences. River access, visitor contact facilities, and interpretive opportunities would not be improved, remaining at their current levels of service. Continued high volumes of use and congestion at popular river access points and along sections of the riverways would not be addressed, leading to crowding and conflicts between users. Impacts of this alternative, combined with the impacts of past, present, and foreseeable future actions, would result in long-term, regional, minor, adverse impacts on visitor use and experiences throughout the entire NPS Riverways.

ALTERNATIVE A

Ability to Access the NPS Riverways

Alternative A focuses on providing more opportunities for visitors to experience traditional, nonmechanized, river-oriented recreation and education programs unique to Ozark National Scenic Riverways. This would be achieved through the enforcement of revised horsepower limits on river sections in order to promote nonmotorized use in particular zoned areas of the NPS Riverways. Alternative A would also close some access areas and possibly create new ones to better distribute use and improve access to the river across the entire NPS Riverways. All undesignated roads, traces, and crossings would be restored to natural conditions.

Over the past 30 years, river use dynamics have changed from the majority of people using canoes to the current dominant activity now being tubing. Tubing is generally a highly social activity. Tubers typically travel in medium to large groups and frequently connect their tubes in order to travel at the same speed. This use may sometimes conflict with those visitors seeking solitude and a connection with nature. During public scoping, some visitors explained they no longer frequent the NPS Riverways due to the increasing amount of tube use, which can sometimes result in high levels of crowding and noise. Roughly 22% of all visitors surveyed in a 2006, reported the amount of recreation use they encountered detracted from the quality of their experience at the NPS Riverways (Morgan 2007). Of all nonmotorized watercraft users surveyed in 2010, nearly 40% commented they would have preferred to encounter fewer visitors on the river (Park 2011).

Under alternative A, sections of the riverways would be set aside for low density nonmotorized watercraft use during peak times to provide an opportunity for solitude on the riverways that is not currently available during weekends and holidays during the summer months. Concession contracts and operating plans may be modified to better distribute and manage the numbers of nonmotorized watercraft use. These modifications would alter patterns of use along the riverways to reduce congestion and conflicts. In addition, some designated access points would be closed, others restored, and new access points may be constructed to better distribute river users along the riverways. Overall, the total number of designated access points within the boundaries of the NPS Riverways would decrease when compared to the no-action alternative.

Changes to the schedule of dropoffs by concessioners and to access point locations would more effectively distribute the number of nonmotorized watercraft in certain river sections, reducing volumes of use at any one time. During scoping for this plan and recent visitor surveys, the public expressed concerns about high volumes of use and conflicts between user groups during peak times. The public also voiced the need for reduced crowding at access points. Redistribution of use to less-congested parts of the riverways would likely lead to long-term, moderate, beneficial impacts to visitors from reductions in crowding and conflict among user groups. However, many visitors enjoy the social nature of the NPS Riverways and have strong connections to certain locations, so these management actions may also have long-

term, minor, adverse effects on repeat visitors' ability to use favorite sites along the riverways.

Alternative A would add an additional one mile of accessible trails. The existing number of accessible facilities and program opportunities for visitors with disabilities on the rivers would remain the same.

Recreational Opportunities and Experiences

River-based Recreational Opportunities and Experiences. This alternative would focus on providing traditional, river-oriented recreation and education opportunities. Existing river recreational opportunities would continue to be available, but emphasis would be on providing more opportunities for traditional nonmechanized forms of recreation, such as canoeing, and on visitor connections to natural experiences. The desired conditions under this alternative would promote solitude-seeking, slower-paced types of recreation experiences that connect visitors with nature. Implementation of horsepower limits and education and interpretation programs focusing on nonmechanized forms of river recreation would improve opportunities for visitors seeking these traditional, slower paced types of experiences. This alternative would eliminate all vehicular access to gravels bars along the riverways. Gravel bar access would be by boat or walk-in only. Camping on gravel bars would be allowed only in designated campsites. These sites would be established and placed away from the river's edge.

For some visitors, the quality of their camping experience would be enhanced by not having noise and pollution from vehicles on the gravel bars. This would also reduce safety concerns from vehicles driving where people are camping and recreating. The removal of motor vehicles would enhance the scenic and natural qualities of the NPS Riverways camping experience. Designated sites would help minimize crowding and conflict amongst gravel bar campers. These actions would combine to help reduce crowding, safety concerns, noise, and pollution and would result in long-term, moderate, beneficial impacts for visitors who prefer a quiet camping experience in more natural settings.

However, gravel bars are popular for many repeat visitors, and the location of the campsites along the shoreline is considered highly desirable due to great views and close proximity to the rivers. This proposal would likely detract from visitors seeking these types of experiences on the gravel bars, especially for repeat visitors who enjoy staying at a particular site. In addition, some visitors who enjoy car camping and ease of access to the gravel bars would be adversely affected by the removal of auto access to these areas. Visitors who prefer to use their vehicles to access camping and enjoy creating their own site along the river may experience long-term, moderate adverse impacts from campsite designation and removal of auto access.

Opportunities to experience quiet and connection with nature would be enhanced by enforcement of revised horsepower regulations and nonmotorized river zones. Under alternative A, existing regulations prohibiting the use of motors rated higher than 40 horsepower by the manufacturer would be enforced on certain sections of the Current and Jacks Fork rivers. No sections of the riverways would allow the use of 60/40 horsepower motors. Year-round nonmotorized areas would include the Jacks Fork River from the western boundary to Two Rivers. Year-round nonmotorized areas on the Current River would be established from the northern boundary to Round Spring, and during peak season the zone would extend to Two Rivers. Although restricting horsepower use in certain areas may result in long-term, moderate, adverse impacts to motorboat users who prefer unrestricted access, many restricted areas

would be sections of the river often inaccessible to motorized watercraft due to low water levels.

However, for visitors who seek slower-paced types of recreation and solitude, the greater emphasis on nonmechanized use under alternative A would decrease motor noise and waves from motorboats, resulting in long-term, minor to moderate, beneficial impacts. The majority of river users, regardless of their preferred recreational type, would experience long-term, moderate, beneficial impacts from reductions in crowding resulting from redistribution of river access under alternative A.

Land-based Recreational Opportunities and Experiences. Under alternative A, land-based opportunities would primarily occur in the primitive and natural zones. This zoning pattern would encourage high use of educational opportunities and interpretive activities in the existing developed areas, while promoting values of nature-based recreation and contemplation in primitive and natural zoned areas. This supports much of the desired conditions voiced by the public during scoping regarding recreational and interpretive opportunities.

This alternative also includes specific strategies to improve the high-quality, land-based recreational opportunities, such as increasing hiking trail access in primitive and natural zones when compared to the no-action alternative. The proposed Big Spring wilderness designation would include 3,424 acres and would provide visitors with increased opportunities for a wilderness experience. Increased access to primitive areas would provide more opportunities for visitors to enjoy the natural environment and natural areas of the NPS Riverways under low-density use conditions, resulting in long-term, moderate, beneficial impacts to visitors who desire more natural recreational opportunities and experiences.

Horseback riding at the NPS Riverways would continue to be a popular activity. The closure of undesignated horse trails would be accompanied by the addition of designated horse trail mileage. Approximately 25 miles of additional designated horse trails would be provided, but there would be no new stream crossings. Approximately 65 miles of undesignated horse trails would be closed and restored. The designated horse trail system would be designed to withstand anticipated use levels and to discourage the proliferation of social trails. Management efforts would aim to decrease impacts of horses on sensitive areas, including streams and riparian areas, and also reduce trail damage, erosion, manure pollution, and conflicts with other users. Horse camping would not be allowed. A permit system might be implemented to achieve desired social and natural conditions for this recreational activity. These trails would be well marked to improve visitor wayfinding.

These improvements would provide a safer and higher-quality rider experience, while also reducing impacts from horses on natural resources and other trail users. Improvements to safety from better management of erosion and clearer trail delineation and signage would result in long-term, moderate, beneficial impacts for equestrian users. Reduction of trail degradation from horses and manure would improve trail experiences for other users, such as hikers, resulting in long-term, minor, beneficial impacts for these types of users.

Under this alternative mountain biking may become a permissible form of recreation on designated trails. The use of mountain bikes at the NPS Riverways would provide an additional opportunity for visitors seeking this type of recreational experience, resulting in long-term, minor, beneficial impacts for visitors who desire to mountain bike at the NPS Riverways.

Under alternative A, six developed fee campgrounds at Big Spring, Powder Mill, Two Rivers, Alley Spring, Round Spring, and

Pulltite would continue to provide a total of 450 sites. Backcountry campsites would continue to be provided throughout the NPS Riverways and would require a fee, and these campsites would continue to provide some basic amenities such as restrooms, tables, fire rings, and/or lantern posts. Backcountry campsites would be removed from primitive zones. Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. Roads to primitive campsites in primitive zones would be removed. Primitive campsites would have no amenities. The diversity of camping opportunities would continue to be popular overnight activities for visitors to the NPS Riverways.

Under alternative A, guided cave tours at Round Spring would continue. These tours would provide opportunities for visitors to continue to experience and learn about the sights, sounds, and natural processes of the NPS Riverways unique karst features, such as caves, resulting in long-term, minor, beneficial impacts to visitors.

Opportunities to Understand the Significant Stories

This alternative places emphasis on increasing visitor awareness and opportunities to connect with Ozark culture and history. Under alternative A, additional historic structures and cultural sites would be restored and open to visitors as interpretive exhibits. Additional education and orientation materials, such as trailhead and boat launch kiosks, trail signs, and NPS Riverways brochures would be developed. The NPS Riverways staff would assess the need for additional locations and types of information to support the desired conditions of increasing exposure of visitors to the unique history of the NPS Riverways.

More interpretive staff would be added and programs created to provide visitors with a better understanding of traditional, subsistence ways of life in the Ozarks. These programs could include living history programs, guided three-day floats trips on the river, and johnboat trips in replica wooden craft. For example, an interpretive float trip may be developed to let visitors experience what river recreation was like in the past. Additionally, cultural demonstrations and artist-in-residence programs may be implemented.

Providing opportunities to experience and learn about the cultural history in the NPS Riverways is considered a fundamental value of the NPS Riverways and was frequently identified as a need during public scoping for this plan. Increased access to educational opportunities from additional programs and services would help increase visitor opportunities for connections with and appreciation of NPS Riverways' resources. This would result in long-term, minor, beneficial impacts for many visitors of the NPS Riverways.

Visitor Safety

Information available to visitors regarding how to safely navigate the riverways and interact with wildlife would continue to be available at visitor contact facilities, on-line, and through roving contacts with NPS staff. These services would continue at their current levels and would not be improved in this alternative.

Under alternative A, three multioperational facilities would be constructed, one for each management district, to consolidate field and maintenance staff closer to the districts they manage. Additional law enforcement rangers would also be added under this alternative in order to improve enforcement of visitor compliance with regulations. The consolidation and increase of staff under alternative A would help address concerns regarding visitor safety at congested river access points and improve response times to reduce visitor conflicts on the rivers.

Under this alternative, the dispersal of use across the NPS Riverways and limits on motorized use in certain zones of the NPS Riverways would help mitigate some crowding and safety concerns. These actions, along with the consolidation of operational facilities and addition of law enforcement staff, would provide long-term, moderate, beneficial impacts for visitor safety in the NPS Riverways.

Cumulative Impacts

Due to the noncontiguous nature of the Ozark National Scenic Riverways boundaries and the towns of Eminence and Van Buren situated between NPS Riverways segments, there is potential that development or actions in or around these towns could impact visitor experiences. Located roughly between Saint Louis, Missouri, to the north and Little Rock, Arkansas, to the south, changes in regional growth, regional development, and the potential for increased visitation are possible effects that could impact visitor experiences on the riverways.

Increased visitation and changes in recreation trends, such as the observed increase in tubing as a river-based recreation activity, might result in social conflicts among visitors. For example, if tubing use continues to grow, areas congested with tubers may frustrate motorboat users. If this were to occur, it might cause a slight increase in existing visitor use concerns such as crowding and conflicts at popular, high-use river access points. At this time, uncertainty prevents accurate descriptions of the associated impacts that might exist with alterations in recreation trends.

The effects of alternative A would account for a gradual increase in use over time and provide implementation strategies to address growing demands for more traditional, nonmotorized visitor uses and experiences on the riverways.

Conclusion

Alternative A would have long-term, minor to moderate, beneficial impacts for visitor uses and experiences focused on traditional river-oriented recreation, providing a more natural, wilderness oriented visitor experience. More dispersed river use and access points, concessioner patterns, and gravel bar camping would improve river-based recreational opportunities by more evenly distributing user density; increasing visitor safety; and reducing crowding, noise, and potential for conflicts between users. Improved designation of trails, additional trail and road access, along with increased land-based recreational opportunities, would also improve visitor experiences by increasing trail user safety. The enforcement of horsepower regulations and nonmotorized zones would have the greatest adverse impacts to visitors under this alternative. However, the improvements to visitor experience and safety, and the variety of new opportunities, would outweigh some of the negative impacts to visitors.

This alternative would have long-term, moderate, adverse impacts as well as long-term, minor to moderate, beneficial impacts. Alternative A, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in long-term, regional, minor, beneficial impacts on visitors. Alternative A would contribute substantially to these effects.

ALTERNATIVE B (NPS PREFERRED)

Ability to Access the NPS Riverways

Alternative B provides opportunities for more visitors to better understand the riverways of the past, including traditional river recreation activities similar to those that existed when the National Riverways was established. Major emphasis under alternative B would be placed on improving visitor appreciation of NPS Riverways' resources. NPS Riverways management

would provide increased opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter, less crowded, and slower paced. To achieve this type of visitor experience, all undesignated roads, traces, crossings, and access points would be closed and returned to more natural conditions.

Over the past 30 years, river use dynamics have changed from the majority of people using canoes to the current dominant activity now being tubing. Tubing is generally a highly social activity. Tubers typically travel in medium to large groups and frequently connect their tubes in order to travel at the same speed. This use may sometimes conflict with those visitors seeking solitude and a connection with nature. During public scoping, some visitors explained they no longer frequent the riverways due to the increasing amount of tube use, which can sometimes result in high levels of crowding and noise. Roughly 22% of visitors surveyed in a 2006, reported the amount of recreation use they encountered detracted from the quality of their experience at the NPS Riverways (Morgan 2007). Of all nonmotorized watercraft users surveyed in 2010, nearly 40% commented they would have preferred to encounter fewer visitors on the river (Park 2011).

Under alternative B, sections of the riverways would be set aside for low-density nonmotorized watercraft use during peak times to provide an opportunity for solitude on the riverways that is not currently available during weekends and holidays during the summer months. Concession contracts and operating plans may be modified to better distribute and manage the numbers of nonmotorized watercraft. These modifications would alter patterns of use along the riverways to reduce congestion and conflicts. In addition, some designated access points would be closed, others restored, and new access points may be constructed to better distribute river users along the riverways. Overall, under alternative B, the total number of designated access points within the boundaries of the NPS Riverways would decrease or remain constant when compared to the no-action alternative.

Changes to the schedule of nonmotorized watercraft dropoffs by concessioners and to access point locations would more effectively distribute the number of these watercraft in certain river sections, reducing the volumes of use at any one time. During scoping for this plan and recent visitor surveys, the public expressed concerns about the high volumes of use and conflicts between user groups during peak times. The public also voiced the need for reduced crowding at river access points. Redistribution of use to less-congested parts of the riverways would likely lead to long-term, moderate, beneficial impacts to visitors from reductions in crowding and conflict among user groups. However, many visitors enjoy the social nature of the NPS Riverways and have strong connections to certain locations, so these management actions may also have long-term, minor, adverse effects on repeat visitors' ability to use favorite sites along the riverways.

This alternative would add an additional one mile of accessible trails. The existing number of accessible facilities and program opportunities for visitors with disabilities on the rivers would remain the same.

Recreational Opportunities and Experiences

River-based Recreational Opportunities and Experiences. Alternative B would focus on providing more people with opportunities to intimately experience conditions reminiscent of those that existed when the NPS Riverways was established. This would include additional opportunities for visitors to experience the sights and sounds of nature and nonmotorized use of the riverways. Horsepower limits on portions of the riverways would promote nonmotorized use in certain zoned portions of the riverways.

Existing river-related recreation opportunities such as gigging, fishing, and wildlife watching would continue to be available and additional education and interpretation programs would be created. This alternative would reduce the number of gravel bars accessible to vehicles, and designate some gravel bars accessible by foot or boat only. Camping on gravel bars would be allowed only in designated campsites. These sites would be established and placed away from the river's edge.

For some visitors, the quality of their camping experience would be enhanced by not having noise and pollution from vehicles on the gravel bars. This would also reduce safety concerns from vehicles driving where people are camping and recreating. The removal of motor vehicles on some gravel bars would enhance the scenic and natural qualities of the NPS Riverways camping experience. Designated sites would help minimize crowding and conflict amongst gravel bar campers. These actions would combine to help reduce crowding, safety concerns, noise, and pollution and would result in long-term, moderate, beneficial impacts for visitors who prefer a quiet camping experience in more natural settings.

However, gravel bars are popular for many repeat visitors, and the location of the campsites along the shoreline is considered highly desirable due to great views and close proximity to the rivers. This proposal would likely detract from visitors seeking these types of experiences on the gravel bars, especially for repeat visitors who enjoy staying at a particular site. In addition, some visitors who enjoy car camping and ease of access to the gravel bars would be adversely affected by the removal of auto access to some of these areas. Visitors who prefer to use their vehicles to access camping and enjoy creating their own site along the river may experience long-term, moderate adverse impacts from campsite designation and reduction of auto access.

Opportunities for solitude and connection with nature would be enhanced by enforcement of revised horsepower regulations and nonmotorized river zones Year-round, nonmotorized areas would include the Jacks Fork River from the western boundary to Bay Creek and the Current River from the northern boundary to Pulltite. Peak season nonmotorized areas would include the Jacks Fork River from the western boundary to West Eminence and the Current River from the northern boundary to Round Spring. Although restricting horsepower use in certain areas may result in long-term, moderate, adverse impacts to motorboat users, many restricted areas would be sections of the river often inaccessible to motorized watercraft due to low water levels.

Under this alternative, motorboat users may feel limited by the enforcement of new nonmotorized zones. However, under alternative B, the National Park Service would pursue rule-making to change the existing regulation to allow 60/40 horsepower motors on other portions of the Current and Jacks Fork rivers. The pursuit of rulemaking to allow 60/40 horsepower motors under this alternative would have a long-term, moderate, beneficial impact to boaters who prize less restricted motor access.

Land-based Recreational Opportunities and Experiences. Comments received during the scoping process demonstrated the public values much about the NPS Riverways, especially protection of scenery and water quality, interpretation of local history and heritage, and access to trails. In this alternative, land-based recreation such as hiking, horseback riding, camping, and hunting would primarily occur in the natural and primitive zones. This zoning pattern would promote concentration of high-use and educational opportunities in the existing developed areas, while promoting values of nature-based recreation and physical challenge, reduced motorized vehicle activity,

and natural sights and sounds in the other land zones.

The amount of hiking trail access would increase when compared to the no-action alternative. The condition of hiking trails within the NPS Riverways would also be improved under this alternative. Additional hiking trails may be added to provide access to certain discovery sites, such as remote homesteads or unique natural areas. In other places, existing old traces to these sites may be upgraded to allow visitors drive-in access to hiking trails and backcountry campsites. Under this alternative, 3,430 acres of the Big Spring area would be recommend for wilderness designation and some intrusions would be removed, allowing for a more primitive visitor experience. Increased access to natural and primitive areas would provide more opportunities for visitors to enjoy the natural environment and natural areas of the NPS Riverways under low-density use conditions, resulting in long-term, moderate, beneficial impacts to visitors who desire more natural recreational opportunities and experiences.

Horseback riding at the NPS Riverways would continue to be a popular activity under alternative B. The closure of undesignated horse trails would be accompanied by the addition of designated horse trail mileage. Approximately 23 miles of additional designated horse trails would be provided, including some new stream crossings. Approximately 65 miles of undesignated horse trails would be closed and restored. The designated horse trail system would be designed to withstand anticipated use levels and to discourage the proliferation of social trails. Management efforts would aim to decrease impacts of horses on sensitive areas, including streams and riparian areas, and also reduce trail damage, erosion, manure pollution, and conflicts with other users. These trails would be well marked to improve visitor wayfinding. A permit system might be implemented to achieve desired social and natural conditions for this recreational activity. Under this alternative horse camping may be allowed in designated sites.

These improvements would provide a safer and higher-quality rider experience, while also reducing impacts from horses on natural resources and other trail users. The addition of horse camping opportunities under this alternative would increase the availability and options to users for this popular recreation activity. Further these opportunities would be in designated areas sited to minimize resource impacts and conflicts with other user groups. In the future, as sites are considered for horse camping additional compliance would be needed to assess site specific impacts. Improvements to safety from better management of erosion and clearer trail delineation and signage along with designated horse camping would result in long-term, moderate, beneficial impacts for equestrian users. Reduction of trail degradation from horses and manure would improve trail experiences for other users, such as hikers, resulting in long-term, minor, beneficial impacts for these types of users.

Under this alternative mountain biking may become a permissible form of recreation on designated trails. The use of mountain bikes at the NPS Riverways would provide an additional opportunity for visitors seeking this type of recreational experience, resulting in long-term, minor, beneficial impacts for visitors who desire to mountain bike at the NPS Riverways.

Under this alternative, two additional developed campgrounds would be provided at existing day use areas: Upper Current River (Akers) and Upper Jacks Fork (Blue Spring). This greatly increases the supply of overnight developed camping opportunities, which is a highly sought after opportunity for visitors to the NPS Riverways. The addition of two developed campgrounds would result in a long-term, moderate, beneficial impact for visitors.

Backcountry campsites would continue to be provided in designated areas throughout the

NPS Riverways and would require a fee. These campsites would continue to provide some basic amenities such as restrooms, tables, fire rings, and/or lantern posts. Backcountry campsites would be removed from primitive zones. Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. Roads to primitive campsites within primitive zones would be removed. Primitive campsites would have no amenities. The diversity of camping opportunities would continue to be popular overnight activities for visitors to the NPS Riverways.

Under alternative B, guided cave tours at Round Spring would continue. These tours would provide opportunities for visitors to continue to experience and learn about the sights, sounds, and natural processes of the NPS Riverways unique karst features, such as caves, resulting in long-term, minor, beneficial impacts to visitors. This alternative would also promote the cultural history of the NPS Riverways and interpretive programs highlighting traditional Ozark values. This alternative supports much of the desired conditions heard from the public during scoping for this plan.

Opportunities to Understand the Significant Stories

This alternative aims to enhance Ozark heritage educational opportunities. A small learning center with educational and interpretive programs and exhibits would be developed to better orient and inform visitors about NPS Riverways' resources. This facility would adaptively reuse Powder Mill and may include classrooms and might provide some limited quarters for visiting experts. At the Powder Mill facility, the NPS Riverways staff would develop and lead programs to provide more structured onsite cultural and natural education and interpretive programs for all visitors, but especially for school-aged children. Converting the Powder Mill area would increase visitor opportunities for high-quality interpretation programs and would improve the visitor experience at this location.

Under alternative B, additional historic structures and cultural sites would be restored and open to visitors as interpretive exhibits. An oral history program would be restarted. Self-guided interpretive opportunities would be created to provide visitors with a sense of being the first to discover remote, hard-to-find places, such as an old cabin or a secluded spring. Additional education and orientation materials, such as kiosks, trails signs, and brochures might be created to support self-guided tours. Guided opportunities would include ranger-led tours of special features, such as old settlements, springs, and river environments. Development of these types of programs would help reach visitors who are looking for different or additional activities to the traditional float trip. Resource management staff would develop opportunities for visitors and volunteers to engage in hands-on resource management projects.

Providing the opportunity to experience and learn about both the natural and cultural history of the Ozarks is considered a fundamental value of the NPS Riverways and was proven highly desired by the public during scoping for this plan. The addition of a wide breadth of interpretive programs and materials would increase educational access about NPS Riverways' resources to multiple types of learners and ability levels. The development of a learning center, additional educational programs, and tours would help increase opportunities for visitor connections with and understanding of resources throughout different areas of the NPS Riverways. These additional learning opportunities might help increase visitor appreciation of NPS Riverways' resources. Combined, the actions mentioned above would result in long-term, moderate, beneficial impacts to visitors of various ages, and learning abilities.

Visitor Safety

Information on how to safely navigate the riverways and interact with wildlife would continue to be available at visitor contact facilities, on-line, and through roving contacts with NPS staff. These services would continue at their current levels and would not be improved in this alternative.

Under alternative B, one multioperational facility would be constructed, one for each management district, to consolidate field and maintenance staff closer to the districts they manage. Additional law enforcement rangers would also be added under this alternative in order to improve enforcement of visitor compliance with regulations. The consolidation of an increase in staff under alternative B, would help address concerns regarding visitor safety at congested river access points and improve response times to reduce visitor conflicts on the rivers.

In this alternative, one additional visitor contact location might be provided as part of the learning center at Powder Mill. Addition of this contact facility would increase opportunities for visitors to interact with NPS Riverways' staff and obtain safety information relevant to the Powder Mill area and to the visitor's desired type of recreational activity.

Under alternative B, the dispersal of use across the NPS Riverways and limits on motorized use in certain zones of the NPS Riverways would help mitigate some crowding and safety concerns. These actions, along with the consolidation of operational facilities and addition of law enforcement staff, would provide long-term, moderate, beneficial impacts for visitor safety in the NPS Riverways.

Cumulative Impacts

Due to the noncontiguous nature of the Ozark National Scenic Riverways boundaries and the towns of Eminence and Van Buren situated between NPS Riverways segments, there is potential that development or actions in or around these towns could impact visitor experiences. Located roughly between Saint Louis, Missouri, to the north and Little Rock, Arkansas, to the south, changes in regional growth, regional development, and the potential for increased visitation are possible effects that could impact visitor experiences on the riverways.
Increased visitation and changes in recreation trends, such as the observed increase in tubing as a river-based recreation activity, might result in social conflicts among visitors. For example, if tubing use continues to grow, areas congested with tubers may frustrate motorboat users. If this were to occur, it may cause a slight increase in existing visitor use concerns such as crowding and conflicts at popular, high-use river access points. At this time, uncertainty prevents accurate descriptions of the associated impacts that might exist with alterations in recreation trends.

The effects of alternative B would account for a gradual increase in use over time and would provide implementation strategies to address growing demands for visitor uses and experiences on the riverways.

Conclusion

Alternative B would have long-term, minor to moderate, beneficial impacts for river users seeking experiences in more natural settings with a lower-density of other NPS Riverways users, and for visitors seeking more opportunities to learn about and connect with natural and cultural resources of Ozark National Scenic Riverways. More dispersed river access points, concessioner patterns, and gravel bar camping would improve river-based recreational opportunities by more evenly distributing user density; increasing visitor safety; and reducing crowding, noise, and potential for conflicts between users. Improved designation of trails, additional trail and road access, along with increased land-based recreational opportunities would

also improve visitor experiences by increasing trail user safety, access to certain trail and camping areas, and from the addition of designated trails for new uses. The enforcement of horsepower regulations, nonmotorized zones would have the greatest adverse impacts to visitors under this alternative. However, the pursuit of rulemaking to allow 60/40 horsepower motors, along with other improvements to visitor experience and safety, and the variety of new opportunities, would outweigh most of the negative impacts to visitors.

This alternative would have long-term, minor to moderate, adverse impacts as well as long-term, moderate, beneficial impacts. Alternative B, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in long-term, regional, moderate, beneficial impacts on visitors. The NPS preferred alternative would contribute substantially to these effects.

ALTERNATIVE C

Ability to Access the NPS Riverways

In this alternative, the focus would be on providing more recreation opportunities and experiences while maintaining the highly scenic natural setting and cultural resources. The National Riverways would be managed to support higher levels and diverse types of recreational opportunities, with a focus on more intensive management to ensure that excessive impacts on resources or public safety would not occur. Visitors would experience higher levels of social interaction with other visitors, especially during the peak season. Additional facilities and trails would be developed to accommodate increased levels and different types of visitor use.

Under alternative C, existing boat launches and landings would be maintained and would continue to service the majority of visitors to the NPS Riverways' most desired visitor locations. These existing public access points would be maintained and possibly improved and more public access points may be provided where appropriate and needed. All undesignated roads, traces, and crossings would be restored to natural conditions. This alternative would increase access to the riverways.

Although there would still be opportunities for visitors to pursue solitude at the NPS Riverways, this alternative would provide for relatively high levels of social interaction among motorized and nonmotorized users on the rivers, especially during peak season. The increase in recreational opportunities would provide for more social interactions and may lead to an increase in potential conflicts between visitors. The potential increase in visitor use levels, access, and the potential for larger group sizes in some locations may exacerbate some of the current impacts related to crowding and noise impacts at high-use locations, including boat launches and landings. There would be fewer opportunities for visitors to experience the natural setting or traditional solitude of the NPS Riverways.

Over the past 30 years, river use dynamics have changed from the majority of people using canoes to the current dominant activity now being tubing. Tubing is generally a highly social activity. Tubers typically travel in medium to large groups and frequently connect their tubes in order to travel at the same speed. This use may sometimes conflict with those visitors seeking solitude and a connection with nature. During public scoping, some visitors explained they no longer frequent the riverways due to the increasing amount of tube use, which can sometimes result in high levels of crowding and noise. Roughly 22% of visitors surveyed in a 2006, reported the amount of recreation use they encountered detracted from the quality of their experience at the NPS Riverways (Morgan 2007). Of all nonmotorized watercraft users surveyed in 2010, nearly 40% commented they would have preferred to encounter fewer visitors on the river (Park 2011).

To address these concerns, concession contracts and operating plans may be modified to better distribute and manage the numbers of nonmotorized watercrafts. These modifications would alter patterns of use along the riverways to reduce congestion and conflicts. In addition, some designated access points would be closed, others restored, and new access points may be constructed to better distribute river users along the riverways. Overall, under alternative C, the total number of designated access points within the boundaries of the NPS Riverways would decrease or remain constant when compared to the no-action alternative.

Changes to the schedule of nonmotorized watercraft dropoffs by concessioners and to access point locations would more effectively distribute the number of these users in certain river sections, reducing the volumes of use at any one time. During scoping for this plan and recent visitor surveys, the public expressed concerns about the high volumes of use and conflicts between user groups during peak times. The public also voiced the need for reduced crowding at river access points. Redistribution of use to less-congested parts of the riverways would likely lead to long-term, moderate, beneficial impacts to visitors from reductions in crowding and conflict among user groups. However, many visitors enjoy the social nature of the NPS Riverways and have strong connections to certain locations, so these management actions may also have long-term, minor, adverse effects on repeat visitors' ability to use favorite sites along the riverways.

This alternative would add an additional one mile of accessible trails. The existing number of accessible facility and program opportunities for visitors with disabilities on the rivers would remain the same.

Recreational Opportunities and Experiences

River-based Recreation Opportunities and Experiences. The opportunity to have a "river experience" is considered an important value of visitors and existing river recreational opportunities such as canoeing, fishing, and gigging would continue to be available. Most of the riverways would be zoned to protect resources while allowing for exploration of additional river-related recreation opportunities.

This alternative would continue to allow vehicular access to designated sites on gravel bars for day use and overnight camping. Camping opportunities on gravel bars would be maintained, but would only be allowed away from the river in designated sites.

For some visitors, allowing vehicles on gravel bars would continue to diminish their camping experience due to obstructed views and the presence of noise and pollution from vehicles. Safety concerns from vehicles driving where people are camping and recreating would continue to persist. This would result in a long-term continuation of minor, adverse impacts to visitors. However, designated sites would help minimize crowding and conflict amongst gravel bar campers, resulting in long-term, negligible, beneficial impacts for visitors who prefer a quiet, less crowded camping experience in more natural settings.

Gravel bars are popular for many repeat visitors, and the location of the campsites along the shoreline is considered highly desirable due to great views and close proximity to the rivers. Proposed designated campsites would likely detract from visitors seeking these types of experiences on the gravel bars, especially for repeat visitors who enjoy staying at a particular site, resulting in a long-term, minor, adverse impact. However, visitors who enjoy car camping and ease of access to the gravel bars would continue to benefit from the allowance of auto access to

these areas, resulting in long-term, minor, beneficial impacts.

Horsepower limits on portions of the riverways would promote nonmotorized use in certain zoned areas of the riverways while allowing motorized recreation in other sections. Year-round nonmotorized areas on the Current River would run from the northern boundary to Akers, and from the northern boundary to round spring during peak season. Year-round nonmotorized zones on the Jacks Fork River would be from the western boundary to Rymers and from the western boundary to Bay Creek during peak season. Although restricting horsepower use in certain areas may result in long-term, moderate, adverse impacts to motorboat users, many restricted areas would be sections of the river often inaccessible to motorized watercraft due to low water levels.

Under this alternative, motorboat users may feel limited by the enforcement of new nonmotorized zones, resulting in long-term, moderate, adverse impacts. However, under alternative C the National Park Service would pursue rule-making to change the existing regulation to allow 60/40 horsepower motors on certain portions of the Current and Jacks Fork rivers. The pursuit of rulemaking to allow 60/40 horsepower motors under this alternative would have a long-term, moderate, beneficial impacts to boaters who prize less restricted motor access.

Land-based Recreational Opportunities and Experiences. Alternative C would provide resource-based recreation zones to promote land-based recreation. The focus of these management zones would be to encourage outstanding opportunities to enjoy natural resources while promoting convenient and easy access to developed, high-use, recreational, and interpretive areas. During public scoping the public encouraged continued provision of diverse recreational opportunities.

Additional walking and hiking trails would be opened over time, at a lower level than those proposed under alternatives A and B. Under this alternative, 1,779 acres of the Big Spring area would designated as wilderness, limiting opportunities for visitors to have a wilderness experience in the NPS Riverways. This alternative would provide roughly half the natural and primitive areas as alternative A and B, but would still provide a small increase in these types of areas than currently available. A slight increase in access to natural and primitive areas would provide more opportunities for visitors to enjoy the natural environment and areas of the NPS Riverways under low-density use conditions, resulting in long-term, minor, beneficial impacts to visitors who desire more natural recreational opportunities and experiences.

Horseback riding at the NPS Riverways would continue to be a popular activity under alternative C. The closure of undesignated horse trails would be accompanied by the addition of designated horse trail mileage. Approximately 45 miles of additional designated horse trails would be provided, including some new stream crossings. Approximately 65 miles of undesignated horse trails would be closed and restored. Under alternative C, a 25-campsite horse campground along the Jacks Fork may be established. A horse trail permit system might be implemented to achieve desired social and natural conditions for this recreational activity.

The designated horse trail system would be designed to withstand anticipated use levels and to discourage the proliferation of social trails. Management efforts would aim to decrease impacts of horses on sensitive areas, including streams and riparian areas, and also reduce trail damage, erosion, manure pollution, and conflicts with other users. These trails would be well marked to improve visitor wayfinding. These improvements would provide a safer and higher-quality rider experience, while also reducing impacts from horses on natural resources and other trail users. Improvements to safety from

better management of erosion and clearer trail delineation and signage, along with development of horse specific campsites, would result in long-term, moderate, beneficial impacts for equestrian users. Reduction of trail degradation from horses and manure would improve trail experiences for other users, such as hikers, resulting in long-term, minor, beneficial impacts for these types of users.

Under this alternative mountain biking may become a permissible form of recreation on designated trails. The use of mountain bikes at the NPS Riverways would provide an additional opportunity for visitors seeking this type of recreational experience, resulting in long-term, minor, beneficial impacts for visitors who desire to mountain bike at the NPS Riverways.

Under this alternative, two additional developed campgrounds would be provided at existing day use areas: Upper Current River (Akers) and Upper Jacks Fork (Blue Spring). This greatly increases the supply of overnight developed camping opportunities, which is a highly sought after opportunity for visitors to the NPS Riverways. The addition of two developed campgrounds would result in a long-term, moderate, beneficial impact for visitors.

Backcountry campsites would continue to be provided in designated areas throughout the NPS Riverways and would require a fee. The total number of backcountry campsites might be increased, but backcountry sites would be removed from primitive zones. Backcountry campsites would continue to have some basic amenities such as restrooms, tables, fire rings, and/or lantern posts. Primitive campsites would continue to be provided in primitive and natural zones and would not require a fee. The total number of primitive campsites may be increased, but roads to primitive campsites within primitive zones would be removed. Primitive campsites would continue to offer no amenities. The diversity of camping opportunities would continue to be popular overnight activities for visitors to the NPS Riverways.

Under alternative C, guided cave tours at Round Spring would continue. These tours would provide opportunities for visitors to continue to experience and learn about the sights, sounds, and natural processes of the NPS Riverways unique karst features, such as caves, resulting in long-term, minor, beneficial impacts to visitors.

Opportunities to Understand the Significant Stories

Alternative C would continue to protect and preserve archeological resources, historic structures, and cultural landscapes. Opportunities would be expanded for visitors to access and experience historic structures and cultural landscapes throughout the National Riverways. Some additional historic structures would be restored and made available to the public as interpretive exhibits.

To accommodate more visitors, some historic structures and sites might require more intensive management actions to protect resource integrity. Furthermore, visitor services would be expanded to a 12-month visitor season at some locations along the National Riverways. More interpretive staff would be added to accommodate higher levels of visitor use. Efforts to track cultural resource conditions would be emphasized so that unacceptable conditions do not occur.

It is likely that the emphasis in this alternative on providing more recreation opportunities would create a future need for additional education and orientation via nonpersonal services such as bulletin boards and wayside exhibits, trail signs, and NPS Riverways brochures. The NPS Riverways staff would assess the need for additional locations and types of information to support the desired conditions of increasing recreation opportunities for visitors.

During scoping for this plan, the public expressed an interest in having more access and educational opportunities related to historic and cultural resources. However, there are many cultural sites at the NPS Riverways that have limited or no visitor access or associated interpretive programs and materials, and these conditions would not change under alternative C. The park believes major aspects of significant stories of the NPS Riverways are not effectively communicated due to the lack of access and interpretation of these sites. Under this alternative, these concerns would not be addressed at these sites, resulting in continuation of long-term, minor, adverse impacts to visitors.

Visitor Safety

Information on how to safely navigate the riverways and interact with wildlife would continue to be available at visitor contact facilities, on-line, and through roving contacts with NPS staff. These services would continue at their current levels and would not be improved in this alternative.

In this alternative, the sizes of current visitor contact locations at some sites might be expanded based on demand. One or two additional visitor contact locations may be provided.

Under alternative C, three multioperational facilities would be constructed, one for each management district, to consolidate field and maintenance staff closer to the districts they manage. Additional law enforcement rangers would also be added under this alternative in order to improve enforcement of visitor compliance with regulations. The consolidation of an increase in staff under alternative C, would help address concerns regarding visitor safety at congested river access points and improve response times to reduce visitor conflicts on the rivers.

However, due to the emphasis on providing more recreational opportunities under alternative C, there is potential for larger increases in visitation and recreational use than the NPS Riverways currently experience. Increased visitation could lead to more conflicts among visitors and more accidents. Despite a proposed modest increase in law enforcement personnel, it might become more difficult for NPS Riverways staff to maintain a safe atmosphere for visitors on certain sections of the river. Under this alternative, visitor safety would continue to be a concern. Under this alternative, the dispersal of use across the NPS Riverways, limits on motorized use in certain zones, the consolidation of operational facilities, and addition of law enforcement staff would help mitigate some crowding and safety concerns. However, when combined with the potential increase in visitor use, these management actions would provide long-term, minor, beneficial impacts for visitor safety in the NPS Riverways.

Cumulative Impacts

Due to the noncontiguous nature of the Ozark National Scenic Riverways boundaries and the towns of Eminence and Van Buren situated between NPS Riverways segments, there is potential that development or actions in or around these towns could impact visitor experiences. Located roughly between Saint Louis, Missouri, to the north and Little Rock, Arkansas, to the south, changes in regional growth, regional development, and the potential for increased visitation are possible effects that could impact visitor experiences on the riverways.

Increased visitation and changes in recreation trends, such as the observed increase in tubing as a river-based recreation activity, may result in social conflicts among visitors. For example, if tubing use continues to grow, areas congested with tubers might frustrate motorboat users. If this were to occur, it may cause a slight increase in existing visitor use concerns such as crowding and conflicts at popular, high-use river access points. At this time, uncertainty prevents accurate

descriptions of the associated impacts that may exist with alterations in recreation trends.

The effects of alternative C would account for a gradual increase in use over time with new implementation strategies developed to address this growing use.

Conclusion

Alternative C would have long-term, minor, beneficial impacts for those river users seeking more social experiences and a diversity of recreational opportunities. Visitors who desire less crowded environments and quiet would experience long-term, minor to moderate, adverse impacts from the emphasis on providing more recreation opportunities and access to the riverways. Increased river- and land-based recreational opportunities would provide more visitor experiences while impacting other traditional forms of recreation. Under this alternative, visitor safety would continue to be an issue. The enforcement of horsepower regulations and implementation of nonmotorized zones would have the greatest adverse impacts to repeat motorboat users under this alternative. However, the pursuit of rulemaking to allow 60/40 horsepower motors, along with other improvements to visitor experience and the variety of new opportunities would outweigh most of the negative impacts to these visitors. This alternative would have long-term, minor to moderate, adverse impacts as well as long-term, minor, beneficial impacts. Alternative C, combined with the impacts of past, present, and reasonably foreseeable future actions, would result in long-term, regional, minor, beneficial impacts on visitors. Alternative C would contribute substantially to these effects.

PARK OPERATIONS

INTRODUCTION

Information about park operations was compiled from various sources, including the park staff, National Park Service planners, and other knowledgeable individuals. Information was gathered about the National Riverways' management structure to analyze how the alternatives affect park operations. The management structure of the National Riverways is described by division in chapter 4 and includes staffing and budget data.

The analysis focuses on how NPS operations would vary based on the different management alternatives in chapter 2. Given the conceptual nature of the alternatives, the analysis is qualitative rather than quantitative. Professional judgment was used to reach reasonable conclusions as to the type, intensity, and duration of potential impacts. The effects of the alternatives on park operations are based on the following:

- changes in operational structure, including the operations budget and staffing
- changes in infrastructure, including visitor facilities
- changes in maintenance needs
- changes in park services and availability

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

Effects are classified as either adverse of beneficial.

- **Adverse** impacts would reduce the National Riverways' ability to meet its purpose, preserve resources, and provide a safe park experience for visitors.
- **Beneficial** impacts would enhance the National Riverways' ability to meet its purpose, preserve resources, and provide a safe park experience for visitors.

Impact intensity thresholds for NPS operations are defined as follows:

- **Negligible:** There would be no appreciable effect on park operational efficiency. The change would not be noticeable to the public or most staff.
- **Minor:** There would be a small change in operational efficiency that would not have an appreciable effect on park operations. The change would be noticeable to some staff, but probably not to the public.
- **Moderate:** The effects on operational efficiency would cause a notable change to park operations. The change would be noticeable to staff and possibly to the public.
- **Major:** The effects on operational efficiency would result in substantial changes that are markedly different from existing operations. The change would be obvious to staff and the public.
- Duration
  - Short term: Impacts would last for no more than two seasons or during the life of construction projects lasting longer than two seasons, but would not have permanent effects.
  - Long term: Impacts would persist for more than two seasons, or may be permanent.

Given that NPS park operations are integrally linked across the National Riverways, all actions that affect operations are considered to be NPS Riverways-wide. Actions that are local or that impact operations at the district level would affect the budget, staffing, and facility and maintenance considerations

across the National Riverways. Therefore, no additional specificity about context is included in this analysis.

NO-ACTION ALTERNATIVE

Under the no-action alternative, the National Riverways would continue to strive to provide the current range of appropriate and allowable visitor activities and services while protecting park scenic, natural, and cultural resource conditions and values. This alternative is anchored to the National Riverways' current funding and staffing, and does not assume specific, new actions other than currently approved and funded plans and activities, and a change to motorboat zones. Should additional funding become available, some management elements may be enhanced or broadened.

Under the no-action alternative, the National Riverways would continue to operate one year-round visitor contact in the lobby of park headquarters in Van Buren, Missouri, five seasonal visitor contact stations at Big Spring, Alley, Round Spring, Pulltite, and Akers, and one offsite multiagency information facility in Salem, Missouri. Due to an ongoing staffing shortfall, the need to maintain a large and dispersed set of contact stations would represent a long-term, minor, adverse impact on park operations.

National Riverways staff would continue to manage and patrol existing NPS roads while facing the challenge of attempting to close roads, traces, and access points that are not part of the NPS designated system. Due to the geographical nature of the park unit, staff must spend considerable time in transit around the National Riverways to get to where attention is required. This extensive transit time would continue to represent a long-term, moderate, adverse impact to park operations. Closure of informal roads and access points would create a short-term, minor, adverse impact from the labor required to close them, but a long-term, minor, beneficial impact to park operations from decreased visitor traffic that requires monitoring and a reduced need for resource rehabilitation.

All sections of both rivers would continue to be open to nonmotorized watercraft year-round and existing horsepower limitations for motorboats would remain in effect. The National Riverways waterways would continue to be available for fishing and gigging activities, consistent with applicable restrictions of the park or state.

High volumes of motorized and nonmotorized watercraft would continue to result in noise, crowding, and possible visitor conflicts during high-visitation periods. Exacerbating the problem is the combination of concession and private (individual) nonmotorized watercraft use, which make it difficult to achieve desired visitor use concentrations during peak periods. Park staff would continue to maintain a presence along the river to resolve conflict among river users, monitor the impacts to river resources, and work with the state to maintain healthy native game fish populations, resulting in a long-term, moderate, adverse impact to park operations.

Park staff would continue to maintain the designated hiking trail system, which is 49 miles in length. Recreational horse riding would continue in accordance with existing rules. Most peak-season riding would continue to be associated with commercial trail-ride facilities located adjacent to the National Riverways, with high traffic volumes. The absence of a permitting system makes the management of horse-use levels difficult. The impact to park operations would be long-term, minor, and adverse, as park staff would have to continue monitoring and maintenance of the trail network and designated horse use areas to contend with heavy and growing use.

The National Riverways would continue to offer a variety of camping experiences. Vehicular access to designated sites on gravel bars for both day use and overnight camping

would be continued. Developed campgrounds with recreational vehicle hookups and backcountry and primitive campsites in designated areas throughout the National Riverways would be maintained. Park staff would need to provide monitoring and maintenance at all of these campsites, as well as fee collection for developed and backcountry campgrounds. With the current staffing level, these efforts would impose a long-term, minor, adverse impact to park operations.

The National Riverways would continue to provide a wide range of interpretive and educational programs, covering public awareness of available recreation opportunities, interpretation of the natural and cultural resources in the National Riverways, and visitor safety. The National Riverways would also continue to provide guided tours at Round Spring. With current staffing levels, these programs would have a long-term, minor, adverse impact on park operations.

Park staff would continue intensive, existing natural resource management operations. Priorities include rare species and water quality monitoring, research facilitation, and technical assistance to the management and operations divisions of the National Riverways. Park staff would continue to perform the following activities:

- Conduct inventories of natural resources in the National Riverways.
- Monitor the condition of key resources.
- Plan and implement species and habitat restoration.
- Provide advice to park management and operations divisions on National Riverways projects.
- Coordinate with multiagency working groups.
- Conduct and facilitate research activities in the National Riverways to increase park knowledge of species, habitats, and processes.
- Maintain a natural resource library and resource related databases.

Day to day operations include the following:

- water quality degradation from recreational use
- resource impact and undesignated trail proliferation from horse riding and illegal off-road vehicles
- invasive plant and animal species
- visitor-related disturbances to wildlife
- activities that occur outside the park unit boundary that impact NPS Riverways' resources, including water quality

These extensive efforts represents a long-term, minor to moderate, adverse impact to park operations due to the large amount of labor required and shortage of available staff.

There are 249 structures that are on the List of Classified Structures. Some structures are now restored and serve as interpretive exhibits while others are being adaptively used for other park operations. The cultural affiliation plan implementation would continue, increasing areas managed as meadows and agricultural sites. The National Riverways would continue to maintain its historic cemeteries, manage its certified curatorial facility for park resource collections only, and monitor more than 400 archeological sites.

The impact to park operations from maintenance and management of these facilities would be long-term, moderate, and adverse, due to current staffing levels in the maintenance and cultural resources divisions. However, adaptive reuse has the potential to offer a long-term benefit due to improved efficiency of the park staff resulting from facility improvements, as well as averted

deferred maintenance the structures would have otherwise required.

The National Riverways would continue to be responsible for maintenance of 241 buildings within the park unit, including some housing units. Park maintenance operations would continue to be managed out of the current maintenance facilities, many of which are old and may not meet current health and safety requirements. Both the maintenance requirements of the buildings in the National Riverways, as well as the safety and efficiency costs that result from operating out of substandard maintenance facilities, would result in long-term, moderate, adverse impacts to park operations.

The National Riverways would continue to share office space at the current Van Buren headquarters with other federal and state agencies, and continue to share visitor contact space at Salem, Missouri. Eastern National Association would continue to provide bookstore services at park visitor contact facilities such as the Van Buren headquarters, Round Spring, and Alley Mill contact facilities.

The National Riverways currently has few formal partnerships, and unlike many national park units, does not have a friends group. The purpose of the group would be to support National Riverways projects by helping to raise funds and organize events. The lack of support from a friends group represents a long-term, minor, adverse impact to park operations from both a funding and staffing perspective.

Under the no-action alternative, the Big Spring tract, approximately 3,434 acres in size, would not be proposed for wilderness designation. This area would, however, be managed for primitive qualities. Developments that diminish those qualities would be discontinued or not allowed. Management related to the primitive designation would require staff time and, thus, have a long-term, minor, adverse impact on park operations.

Cumulative Impacts

Management of the NPS Riverways requires awareness of external as well as internal impacts to park resources, including park operations. The National Riverways must maintain awareness of activities outside the park unit that could have a major impact on water quality, such as improper waste disposal, agriculture, and industrial activities. There are also mining operations that take place near park unit boundaries, which, combined with historic logging in the area, have caused considerable streambank erosion. These factors result in a long-term, minor to moderate, adverse impact on park operations due to increased remediation needs, as well as monitoring and outreach efforts outside the National Riverways.

Past, present, and reasonably foreseeable future actions would require increasing amount of staff time and operational funding just for the National Riverways to remain at its current operational level. With existing staff, it would be difficult for the National Riverways to accomplish many of its current management objectives, including closure of unauthorized traces and access points, sufficient patrolling and monitoring of recreational activities, and maintenance of historic buildings, resulting in a long-term, moderate, adverse cumulative impact on park operations.

Conclusion

When the likely effects of implementing the already-approved actions contained in the no-action alternative are added to the effects of past, present, and reasonably foreseeable actions, there would be a long-term, minor to moderate, adverse cumulative impact on park operations. The actions contained in this alternative would contribute a long-term,

minor to moderate, adverse impact to this cumulative impact.

ALTERNATIVE A

Under alternative A, park management would focus on providing improved resource protection and visitor experiences, including opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter, less crowded, and slower paced. The additional funding, staff, and facilities provided by alternative A would result in a long-term, moderate, beneficial impact to park operations by addressing a variety of needs that have not been addressed due to budget shortfalls and inadequate staffing.

Compared to the no-action alternative, alternative A would manage by new zoning prescriptions that place greater emphasis on natural resource protection and restoration. Fifty-three miles of undesignated NPS roads and traces, and numerous access points, would be closed and restored to natural conditions. A comprehensive study of river access points would be prepared to document locations of undesignated access points and develop restoration strategies. Additional law enforcement staff would be hired to enforce compliance. Closure of these undesignated access points and improved patrolling would have a long-term, moderate, beneficial impact on park operations due to reduced resource impact and burden on law enforcement staff.

The general management plan would update guidance from the river use management plan related to visitor use management and examine how nonmotorized watercraft affect visitors use. Concession floating dropoff and pickup locations would be redistributed to reduce peak-season crowding and user conflicts. Approximately 20 access points would be closed and restored, and the total number of access points would decrease.

The river sections where motorized boat use is allowed would decrease and a rule change would be implemented to lower the allowable motor horsepower distribution in the National Riverways. Horsepower limits on specific river stretches are shown in table 4 (see chapter 2).

These changes would have a long-term, moderate, beneficial impact from reduced resource impact due to new rules restricting motorized boat use and fewer user conflicts requiring park staff intervention.

The revised park unit zoning of alternative A would increase the amount of hiking trails. An additional mile of trails that were accessible to people with disabilities would be provided, and mountain biking may be allowed in the National Riverways on designated trails to be determined.

A recreational horse use and trail management plan would be prepared. Approximately 65 miles of undesignated horse trails would be closed and restored to natural conditions. The design of the current approximately 23-mile-long, designated horse trail system would be improved. Creation of social trails, impact on streams and riparian areas, conflicts with other users, and trail damage and pollution would all be reduced.

As part of the improvements to the day use trail system, approximately 25 miles of horse trail could be added, in coordination with other land owners who maintain existing trails outside the National Riverways. A horse permitting system may be established to manage horse use levels and achieve desired visitor experience and resource conditions.

The combined effects of riders adhering to an improved designated trail network and creation of a permitting system would reduce resource impacts and the need for subsequent rehabilitation for a long-term, minor, beneficial impact on park operations. Alternative A would eliminate vehicular access to all park unit gravel bars and would

allow gravel bar camping only in designated campsites on gravel bars. The new management zoning system would reduce some backcountry and primitive campsites based on desired future conditions. Backcountry campsites would continue to be provided in designated areas, and would be removed from primitive zones. Primitive campsites would continue to be provided in primitive and natural zones, with no vehicular access. The result would be a long-term, minor, beneficial impact on park operations from reduced resource impact and subsequent need for rehabilitation.

Substantially more interpretive and educational programs would be offered. Possible concepts include living history programs, and ranger-guided multiday float trips. The availability of these interpretive programs would provide a long-term, minor, beneficial impact, as they improve the ability to ensure that visitors enjoy the National Riverways responsibly and safely, and reduce resource impact and visitor safety issues requiring additional staff attention.

The National Riverways would manage resources to ensure desired conditions are met for the management zones. This alternative would provide additional geographic information system management and applied biological expertise. This would allow substantial improvement of current programs, particularly in the areas of aquatic resource monitoring, managing the karst system, monitoring and protecting rare terrestrial plant and wildlife habitat, and restoring damaged and fragmented habitats.

The National Riverways would increase monitoring of land uses and activities that occur outside the boundary that impact National Riverways resources, including water quality. The National Riverways would work with outside entities to improve these conditions.

The proposed staff increase would allow the National Riverways to implement this more aggressive monitoring regime, which offers a long-term, minor, beneficial impact to park operations by providing early warning of resource-related problems.

Cedar Grove low-water bridge would be replaced with a high-water bridge. This effort would require natural resources staff assistance with planning and compliance. Funding sources for this effort have not yet been determined. The Cedar Grove bridge replacement represents a long-term, moderate, beneficial impact from offset deferred maintenance and improved safety.

The National Riverways would restore and make additional historic structures available to the public for interpretation. Additional cultural resource staff would ensure the cultural affiliation plan adheres to management zones, enable restoration of five additional cemeteries, and monitor and apply protective measures to the more than 400 archeological sites in the park unit. Restoration of historic structures presents a long-term, minor, beneficial impact to park operations due to a reduction in deferred maintenance.

Three multioperational facilities would be constructed, one for each management district, to remove maintenance operations from current Civilian Conservation Corps structures and consolidate maintenance and field staff operations. Approximately ten obsolete structures would be removed and the sites restored. Approximately four new housing duplex units would be built to support additional need for seasonal or term staff. Undesignated roads and trails would be closed and sites restored. Adding new buildings to the park asset inventory offers a long-term, minor, beneficial impact from a reduction of deferred maintenance, and a long-term, minor, beneficial impact from staff operating out of a modern building, improvements in energy efficiency, and a reduction in staff travel time.

There are potential concession opportunities under this alternative for overnight river activities, such as guided floats trips and

guided (hike-in) backcountry trips in the natural and primitive zones. New concessions would require a feasibility study. Impacts on park operations would be negligible because the new concessions would be handled under the NPS' well-established concessions program.

A priority for the National Riverways would be to develop a friends group. This goal potentially has a moderate, long-term, beneficial impact on park operations by offering a means to increase revenue available for National Riverways needs and reducing the burden on park staff to provide interpretive programs and other visitor services.

Under this alternative, 3,424 out of 3,434 acres within the Big Spring Wilderness Study Area would be recommended for wilderness designation. Ten acres would be excluded as a small developed area and its narrow access corridor, sometimes called a cherry stem, from the proposed wilderness designation to allow for continued administrative use of the access roads, barn, NPS training range, and utility corridor. Most of the wilderness study area would be zoned primitive with the exception of the cherry-stemmed areas, which would be zoned natural. Designation would represent a negligible, adverse impact to park operations.

Cumulative Impacts

The general management goals and external management factors are the same as in the no-action alternative. The effect of these factors on park operations is long-term, moderate, and adverse.

The significant increase in staffing and budget proposed by this alternative would have a long-term, moderate, beneficial impact on park operations by reducing resource impacts through limits placed on recreational activities and increasing the ability to monitor and rehabilitate park resources.

When the likely effects of implementing alternative A are added to the impacts from past, present, and reasonably foreseeable future actions, there would be a long-term, adverse, minor cumulative impact to park operations. Alternative A would contribute a beneficial increment to this cumulative impact and would enable the National Riverways to better respond to external adverse threats than would the no-action alternative.

Conclusion

Alternative A would have a long-term, moderate, beneficial impact on park operations, by providing the National Riverways with the increase in staffing and operating budget necessary to address the many management challenges in the park unit while also providing significantly better protection of park resources.

ALTERNATIVE B (NPS PREFERRED)

Under the preferred alternative, park management would focus on providing improved resource protection and visitor experiences, but would place more emphasis on recreation and access to sites throughout the National Riverways. The additional funding, staff, and facilities provided by alternative B would result in a long-term, minor, beneficial impact to park operations by addressing a variety of needs that have not been addressed due to budget shortfalls and inadequate staffing.

The preferred alternative would manage by zoning prescriptions that emphasize a balance between recreation and resource protection. Approximately 45 miles of undesignated NPS roads, traces, and access would be closed and restored to natural conditions, although some old access roads would be reopened to allow vehicular access to discovery sites. A comprehensive study of river access points would document locations of undesignated access points and develop

restoration strategies. Additional law enforcement staff would be hired to enforce compliance. Closure of these undesignated access points and improved patrolling would have a long-term, moderate, beneficial impact on park operations due to reduced resource impact and burden on law enforcement staff.

The general management plan would update guidance from the river use management plan related to visitor use management and examine how nonmotorized watercraft affect visitors use. Concession floating dropoff and pickup locations would be redistributed to reduce peak-season crowding and user conflicts. About 20 designated access points would be closed and restored and a similar number of new access points opened, keeping the number of total designated access points either the same or smaller.

The river sections where motorized boat use is permitted would decrease, and a proposed rule change would lower the allowable motor horsepower distribution in the National Riverways to the levels shown in table 4 (see chapter 2).

These changes would have a long-term, moderate, beneficial impact from reduced resource impact and fewer user conflicts requiring park staff intervention.

The revised National Riverways zoning of the preferred alternative would increase the amount of hiking trails. As needed, additional trails would be developed to allow access to some discovery sites and may link to the Ozark Trail. An additional mile of trails that are accessible to people with disabilities would be provided, and mountain biking may be allowed in the National Riverways on designated trails to be determined.

A recreational horse use and trail management plan would be prepared. Approximately 65 miles of undesignated horse trails would be closed and restored to natural conditions, and the design of the current approximately 23-mile-long, designated horse trail system would be improved. Creation of social trails, impacts on streams and riparian areas, conflicts with other users, and trail damage and pollution would all be reduced.

As part of the improvements to the day use horse trail system, approximately 36 miles of horse trail could be added, as well as some new stream crossings, in coordination with other land owners who maintain existing trails outside the National Riverways. A horse permitting system may be established to manage horse use levels and achieve desired visitor experience and resource conditions.

The combined effects of riders adhering to an improved designated trail network and creation of a permitting system would reduce resource impacts and the need for subsequent rehabilitation for a long-term, minor, beneficial impact on park operations.

The preferred alternative would restrict vehicular access to designated sites on gravel bars and require designated campsites on gravel bars away from the river. The new management zoning system would provide development zoning at some day use areas for potential future campground development needs, and reduce some backcountry and primitive sites based on desired future conditions. Only primitive sites would be allowed in primitive zones, with no to these sites. This limited access to and construction of fixed campsites would result in a long-term, minor, beneficial impact from reduced resource impact and subsequent need for rehabilitation.

The preferred alternative would restrict vehicular access to gravel bars and require the use of designated campsites on gravel bars. The new management zoning system would provide development zoning at some day use areas for potential future campground development needs, and reduce some backcountry and primitive campsites based on desired future conditions. Backcountry campsites would continue to be provided in designated areas, and would be removed from primitive zones. Primitive

campsites would continue to be provided in primitive and natural zones, with no vehicular access. Two new campgrounds would be installed at current day use areas. This limited access to and construction of fixed campsites would result in a long-term, minor, beneficial impact from reduced resource impact and subsequent need for rehabilitation.

The National Riverways would manage resources to ensure desired conditions are met for the management zones. This alternative would provide additional geographic information system management and applied biological expertise. This would allow substantial improvement of current programs, particularly in the areas of aquatic resource monitoring, spring protection, and restoration of damaged and fragmented habitats. Information transfer projects would improve management capabilities and ensure delivery of accurate information to the public.

The National Riverways would increase monitoring of land uses and activities that occur outside the boundary that impact National Riverways resources, including water quality. The National Riverways would work with outside entities to improve conditions.

The proposed staff increase would allow the National Riverways to implement this more intense, new monitoring regime, which offers a long-term, minor, beneficial impact to park operations by providing early warning of resource-related problems.

Cedar Grove low-water bridge would be replaced with a high-water bridge, requiring natural resources staff assistance with planning and compliance. Funding sources for this effort have not yet been determined. The Cedar Grove bridge replacement represents a long-term, moderate, beneficial impact from offset deferred maintenance and improved safety.

The National Riverways would restore and make additional historic structures available to the public for interpretation. Additional cultural resource staff would ensure the cultural affiliation plan adheres to management zones, enable restoration of five additional cemeteries, and monitor and apply protective measures to the more than 400 archeological sites in the park unit. Restoration of historic structures presents a long-term, minor, beneficial impact to park operations due to a reduction in deferred maintenance.

The National Riverways would expand the current curatorial facility to provide additional storage space for smaller national park units in the region, and facilitate information transfer projects to enhance cultural resource management capabilities and deliver accurate information to the public. The proposed expansion represents a long term, negligible, adverse impact from staff time required to provide curatorial support to other regional park units.

One multioperational facility would be constructed to remove maintenance operations from current Civilian Conservation Corps structures and consolidate maintenance and field staff operations. Ten obsolete structures would be removed and the sites restored. Two sustainable sanitary systems would be installed Akers and Pulltite to improve park water quality. Adding new buildings to the park asset inventory offers a long-term, minor, beneficial impact from a reduction of deferred maintenance, provision of a modern building, and improvements in energy efficiency. The new sanitary systems would provide a long-term, minor beneficial impact from improved water quality.

There are potential concession opportunities under this alternative for shuttle services for nonmotorized watercraft users, overnight river activities such as guided floats trips, and guided (hike-in) backcountry trips in the natural and primitive zones. New campground development could require an

additional camp store. New concessions would have a negligible impact on park operations because they would be handled under the NPS' well-established concessions program.

A priority for the National Riverways would be to develop a friends group. This goal has a potential moderate, long-term, beneficial impact on park operations by offering a means to increase revenue available for National Riverways needs and reducing the burden on park staff to provide interpretive programs and other visitor services.

Under this alternative, 3,430 out of 3,434 acres within the Big Spring Wilderness Study Area would be recommended for wilderness designation. The entire Big Spring Wilderness Study Area would be zoned primitive. The fire tower, incinerator, barn, and Civilian Conservation Corps era camp would be retained. The NPS training range would be removed and the area restored. Motorized vehicle use of the access roads to the fire tower, NPS training range, and barn would be prohibited, which would prevent staff from reaching the fire tower by motor vehicle. The utility corridor would be administratively converted to wilderness once the cable fails or another utility route is designated outside the wilderness. Impaired fire tower access and general management activities related to this designation would require staff time and, thus, have a negligible, adverse impact on park operations.

Cumulative Impacts

The general management goals and external management factors are the same as in the no-action alternative. The effect of these factors on park operations is long-term, moderate, and adverse. The modest increase in staffing and budget proposed by this alternative would have a long term, minor, beneficial cumulative impact on park operations by reducing resource impacts through limits placed on recreational activities and increasing the ability to maintain and rehabilitate National Riverways resources.

When the likely effects of implementing the preferred alternative are added to impacts from past, present, and reasonably foreseeable future actions, there would be a long-term, minor, adverse cumulative impact to park operations. The preferred alternative would contribute a minor, beneficial increment to this cumulative impact, and leave the National Riverways better able to respond to external adverse threats than would the no-action alternative, while still allowing abundant recreational opportunities.

Conclusion

The preferred alternative would have a long-term, minor, beneficial impact on park operations through an increased staffing and operations budget that would allow park staff to better address some of their management challenges, striking a balance between enhanced resource protection and providing a wide variety of recreational opportunities.

ALTERNATIVE C

Under alternative C, park management would focus on providing river recreational opportunities and experiences similar to those in the no-action alternative, as well as more quality land-based recreational opportunities. The large increase in funding and staff provided by this alternative would represent a moderate, long term, beneficial impact to park operations.

Zoning prescriptions for alternative C place significantly more park unit area in the resource-based recreation and developed zones. Forty-three miles of undesignated NPS roads, traces, and access would be closed and restored to natural conditions. A comprehensive study of river access points would be needed to document locations of undesignated access points and develop

restoration strategies. Additional law enforcement staff would be hired to enforce compliance. Closure of these undesignated access points and improved patrolling would have a long-term, moderate, beneficial impact on park operations due to reduced resource impact and reduced burden on law enforcement staff.

The general management plan would update guidance from the river use management plan related to visitor use management and examine how nonmotorized watercraft affect visitors use. Concession floating dropoff and pickup locations would be redistributed to reduce peak-season crowding and user conflicts. About 20 designated access points would be closed and restored and a similar number of new access points would be opened, keeping the total number of designated access points either the same or smaller.

The river sections where motorized boat use is permitted would decrease compared with the no-action alternative. A rule change would lower the allowable motor horsepower distribution in the National Riverways to the levels shown in table 4 (see chapter 2) for river segments in the National Riverways.

These changes would have a long-term, moderate, beneficial impact from reduced resource impact due to new rules restricting motorized boat use and fewer user conflicts requiring park staff intervention.

The number of hiking trails would be increased, consistent with the zoning emphasis on recreation throughout park unit lands. An additional mile of trails that were accessible to people with disabilities would be provided. Mountain biking may be allowed in the National Riverways on designated trails to be determined.

A recreational horse use and trail management plan would be prepared. Approximately 65 miles of undesignated horse trails would be closed and restored to natural conditions, and the design of the current, approximately 23-mile-long, designated horse trail system would be improved. Creation of social trails, impacts on streams and riparian areas, conflicts with other users, and trail damage and pollution would all be reduced.

To better spread out horse use, a 25-campsite horse campground and approximately 45 miles of horse trail and stream crossing sites would be established to allow for longer-distance riding supported by horse camping. Trail additions would be coordinated with other landowners who maintain existing trails outside the National Riverways. A horse permitting system might be established to manage horse-use levels and achieve desired visitor experience and resource conditions.

The combined effects of riders adhering to an improved designated trail network and creation of a permitting system would reduce resource impacts and the need for subsequent rehabilitation for a long-term, minor, beneficial impact on park operations.

Alternative C would maintain existing vehicular access to designated sites on gravel bars, but would require the use of designated campsites on gravel bars. Two new campgrounds would be installed at current day use areas. There could be an increase in backcountry and primitive campsites to support resource-based recreation activities. Backcountry campsites would continue to be provided in designated areas, and would be removed from primitive zones. Primitive campsites would continue to be provided in primitive and natural zones, with no vehicular access. Construction of fixed campsites would result in a long-term, minor, beneficial impact from reduced resource impact and subsequent need for rehabilitation.

A number of new interpretive and educational programs would be offered, with a focus on developing the outdoor recreation skills of visitors. An Ozark Highlands Folkways Institute would be established and

a living history farm would be developed. The availability of these interpretive programs would have a long-term, minor, beneficial impact, as they offer the chance to ensure that visitors enjoy the National Riverways responsibly and safely, reducing resource impact and safety issues requiring staff attention.

The National Riverways would manage resources to ensure that desired conditions are met for the management zones. This alternative would provide additional geographic information system management and applied biological expertise. This would allow substantial improvement of current programs, particularly in the areas of aquatic resource monitoring, karst system management, intensified efforts to monitor and protect rare terrestrial plants and wildlife habitat, and restoration of damaged and fragmented habitats.

The National Riverways would increase monitoring of land uses and activities that occur outside the boundary that impact National Riverways resources, including water quality. The National Riverways would work with outside entities to improve conditions.

The large staff increase would allow the National Riverways to implement this more aggressive monitoring regime, which offers a long-term, moderate, beneficial impact to park operations by providing early warning of resource-related problems. This capability is especially important given the higher levels of visitor use and distribution envisioned in alternative C.

Cedar Grove low-water bridge would be replaced with a high-water bridge, requiring staff assistance with planning and compliance. Funding sources for this effort have not yet been determined. The Cedar Grove bridge replacement represents a long-term, moderate, beneficial impact from offset deferred maintenance and improved safety.

The National Riverways would restore and make additional historic structures available to the public for interpretation. Additional cultural resource staff would ensure the cultural affiliation plan adheres to management zones, enable restoration of five additional cemeteries, and monitor and apply protective measures to the more than 400 archeological sites in the park unit. Restoration of historic structures presents a long-term, minor, beneficial impact to park operations due to a reduction in deferred maintenance.

Three multioperational facilities would be constructed, one for each management district, to remove maintenance operations from current Civilian Conservation Corps structures and consolidate maintenance and field staff operations. Approximately ten obsolete structures that are both part of the National Riverways' deferred maintenance backlog and a health and safety concern would be removed and the sites restored. Four new housing duplex units would be built to support the additional need for seasonal or term staff. The initial demolition and construction costs would be covered by project funds. Adding new buildings to the park asset inventory offers a long-term, minor, beneficial impact from a reduction of deferred maintenance, and a long-term, negligible, beneficial impact from staff operating out of a modern building, improvements in energy efficiency, and a reduction in staff travel time.

There are potential new concession opportunities under this alternative for shuttle services for nonmotorized watercraft users, overnight river activities such as guided floats trips, and guided (hike-in) backcountry trips in the natural and primitive zones. New campground development could require an additional camp store. New concessions would have a negligible impact on park operations because they would be handled under the NPS' well-established concessions program.

A priority for the National Riverways would be to develop a friends group. This goal has a potential moderate, long-term, beneficial impact on park operations by offering a means to increase revenue available for National Riverways needs and reducing the burden on park staff to provide interpretive programs and other visitor services.

Under this alternative, 1,779 acres of the Big Spring Wilderness Study Area, located south of Chilton Creek, would be recommended for wilderness designation. The area recommended for wilderness designation would be zoned primitive, and the remaining area would be zoned natural. The fire tower, incinerator, barn, NPS training range, and Civilian Conservation Corps-era camp would be outside the wilderness study area and would be retained. The fire tower, barn, NPS training range, and connecting roads would continue to be used for administrative purposes. The buried utility communication cable that serves the Big Spring cabins and residents located further down the line would be maintained.

Cumulative Impacts

The general management goals and external management factors are the same as in the no-action alternative. The effect of these factors on park operations is long-term, moderate, and adverse. The large increase in staffing and budget proposed by this alternative would have a long-term, moderate, beneficial impact on park operations by reducing resource impacts through some limits placed on recreational activities and substantially increasing the ability to monitor and rehabilitate park resources.

When the likely effects of implementing alternative C are added to the impacts from past, present, and reasonably foreseeable future actions, there would be a long-term, minor, adverse cumulative impact to park operations. Alternative C would contribute a moderate, beneficial increment to this cumulative impact.

Conclusion

Alternative C would have a long-term, moderate beneficial impact on park operations through an increased staffing and operations budget that would allow park staff to better address their many management challenges while also providing significantly more recreational opportunities than the other alternatives.

SOCIOECONOMIC ENVIRONMENT

INTRODUCTION

The analysis of impacts to the socioeconomic environment from this *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* is based on research and the professional judgment of planners who have experience with similar projects. In terms of geographic scope, the impact analyses in this section primarily focus on the socioeconomic conditions of the local communities (primarily Eminence and Van Buren), and the two adjacent counties (Carter and Shannon counties) because this is where most impacts would be most noticeable.

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

The following definitions were used to assess the intensity of both adverse and beneficial impacts on socioeconomics. In the development of these definitions, it was assumed that beneficial impacts are those that most individuals or groups would recognize as increasing economic activity, either in general or for a specific group of people, businesses, organizations, or institutions. Adverse impacts are those that most individuals or groups would recognize as diminishing economic welfare, either in general or for a specific group of people, businesses, organizations, or institutions. Examples of adverse effects include a decrease in annual revenue at local business establishments, fewer job opportunities, and increases in costs of living without matching increases in income. The impact intensities for socioeconomic environment are as follows:

- **Negligible:** Very few individuals, businesses, or government entities would be impacted. Impacts would be barely detectable, or detectable only through indirect means and with no discernible impact on regional economic conditions.
- **Minor:** A few individuals, businesses, or government entities would be impacted. Impacts would be small but detectable, limited to a small geographic area, comparable in scale to typical year-to-year or seasonal variations, and not expected to substantively alter economic conditions.
- **Moderate:** Many individuals, businesses, or government entities would be impacted. Effects would be readily apparent and detectable across a wider geographic area.
- **Major:** A large number of individuals, businesses, or government entities would be impacted. Effects would be readily detectable and observed, extend across much of the study area.
- Duration
  - Short term: The impact would be temporary in nature, lasting less than one year, such as the impacts associated with construction.
  - Long term: The impact would last more than one year and could be permanent. Although an impact may occur only for a short duration at one time, if it occurs regularly over a longer period, the impact may be a long-term impact.

NO-ACTION ALTERNATIVE

Under the no-action alternative, the National Riverways would continue to provide the current range of appropriate and allowable visitor activities and services while protecting park scenic, natural, and cultural resource conditions and values. Management zoning in accordance with current NPS policy would not be applied.

This alternative would continue the existing policy of allowing motorboat use year-round, with seasonal restrictions in certain portions of the Current and Jacks Fork Rivers. The motorboat horsepower limits that would be applied in this alternative, by river segment, are shown in table 4 (see chapter 2). As a result, socioeconomic impacts related to motorboat use would be negligible.

Under alternative A, the National Park Service would continue to allow boats to use 60/40 horsepower motors on certain portions of the Current and Jacks Fork Rivers. Motors with propeller units cannot exceed a maximum of 40 horsepower. For jet units, a manufacturer-rated 60 horsepower motor cannot exceed 40 horsepower at the jet output. Changes in motorboat usage are not expected to be significant with the continued allowance of 60/40 horsepower motors on certain portions of the Current and Jacks Fork Rivers.

Currently, 23 commercial services contractors provide services to visitors. The National Riverways would continue to require concessioners to limit nonmotorized watercraft rentals during busy periods to adhere to the 1989 river management plan.

Crowded conditions with a mix of different types of users would continue, especially on weekends during late spring and summer. Management of visitors is designed to not impact commercial services. However, some visitors may choose not to visit the National Riverways during certain crowded times. A reduction in visitor use would cause a long-term, minor, adverse economic impact to concessioners and other businesses in the area that provide visitor services.

Most floating activities are conducted through concessioner services. However, more visitors are bringing their own watercraft and floating on the riverways without concessioners. Under the no-action alternative, the National Riverways would continue to not regulate private visitors.

The National Riverways would continue to provide horseback riding opportunities on the current trail system to large numbers of nonlocal visitors as well as local, year-round horseback users. It is expected that the number of individuals who travel to the area for horse riding events and activities would not change from current conditions.

The current practice of prohibiting mountain biking would continue on park unit trails.

It is likely that nonlocal visitation would remain at current or slightly reduced levels, due to crowded conditions, under the no-action alternative. Nonlocal visitor spending is an important contributor to the economy in Carter and Shannon counties and would continue to have long-term, moderate, beneficial socioeconomic effects on local communities.

Under the no-action alternative, the Big Spring tract would no longer be proposed for wilderness designation. The National Park Service would continue to maintain the area's natural, primitive character and its wilderness eligibility. The existing structures, roads, and utilities would continue to be used for administrative purposes. Maintaining current conditions at this tract would have negligible impacts on the socioeconomic environment.

Visitation to the National Riverways would continue to play an important role in the fiscal conditions of local governments under the no-action alternative. As summarized in chapter 4, sales tax revenues from visitor spending are important to the local governments within the study area. The NPS Riverways would continue to attract large numbers of visitors to the area, which would have a long-term, moderate, beneficial impact on local governments.

Cumulative Impacts

Past, present, and future actions could affect the socioeconomic resources in the region. Because the economic health of the area

depends on tourism, the trends and actions, beneficial and adverse, discussed in "Visitor Use and Experience" would have an impact on the economy of the study area.

In the future, a number of initiatives would likely affect visitation and the local economy. Future actions that result in an increase in visitation to the NPS Riverways should also have positive impacts on the local economy, while actions that decrease visitation could have negative impacts. These initiatives include the following:

- The Missouri Department of Conservation is developing a plan to reintroduce elk in an area near the National Riverways. The plan calls for releasing up to 150 elk into a 346-square-mile "restoration zone" in and around the Peck Ranch Conservation Area in Shannon, Carter, and Reynolds counties (Missouri Department of Conservation 2011).
- Efforts are under way to complete the Old Tram Road Trail, which would run from Van Buren to Chilton. Several miles of the trail would be located within Ozark National Scenic Riverways. If completed, the trail would become part of the larger Ozark Trial.
- The Town of Van Buren is developing an economic development plan for the city that, in part, would focus on increasing tourism in and around the city.
- Cross Country Trail Rides, Eminence Missouri has horse trailing riding events that take place near the NPS Riverways. Week-long events can attract between 2,000 and 2,500 riders and would be scheduled approximately six times per year, from May through October.

It is expected that these projects and activities, in combination with visitation to the NPS Riverways, would have a moderate, beneficial impact on the local economy. Development by others of additional visitor attractions or activities could increase the number of visitors to the area during off-peak seasons, encourage individuals to extend their stays, or attract a different type of visitor to the area. For instance, local businesses are currently planning to increase their services to visitors who are interested in wildlife viewing opportunities associated with the elk reintroduction at Peck Ranch Wildlife Management Area.

Current and future national economic conditions would affect the local economy as they affect the entire United States. For example, tourism is sensitive to the cost of fuel, and changes in gasoline prices can have varying effects in communities near the NPS Riverways. Because many National Riverways visitors live within a reasonable driving distance, the number of day visitors increased during the most recent economic downturn. This may indicate that visitors are choosing to take vacations closer to their home rather than taking longer, more costly trips. However, some concessioners have observed that visitors who normally visit the National Riverways for a several-day trip are shortening their stays. In general, adverse economic factors in Missouri or across the nation are expected to have minor, adverse impacts on the study area.

In the long-term, cumulative impacts from all other actions affecting the regional economy would be moderate and beneficial, based on economic growth and plans to improve visitor activities in the future. However, continued economic stagnation at the national level could cause long-term, minor, adverse impacts.

The effects of the no-action alternative would account for moderate increment of the long-term, moderate, beneficial cumulative effect on the social and economic conditions in the study area.

Conclusions

Visitation to the NPS Riverways under the no-action alternative would continue to have long-term, moderate, beneficial effects on the local economy by supporting tourism and local spending. The National Riverways would continue to play an important role in the fiscal conditions of local governments through sales tax generation. Cumulative impacts from all other actions affecting the local economy and the no-action alternative are expected to be long-term, moderate, and beneficial, with the no-action alternative accounting for a moderate increment.

ALTERNATIVE A

Under alternative A, park management would emphasize greater opportunities for traditional, nonmechanized forms of recreation and visitor experiences that are quieter and slower paced. River recreation would be modified to redistribute current peak-season visitor crowding conditions.

Under alternative A, a high percentage of National Riverways lands would be zoned as primitive (26.8%). Fifty-one percent of river mileage would be in a nonmotorized zone, and 36% would be a mixed-use zone where motorboating and floating would be allowed year-round.

The National Park Service would enforce the existing regulation that prohibits the use of motors that are rated higher than 40 horsepower by the manufacturer on certain portions of the Current and Jacks Fork Rivers. Enforcement of this regulation would prohibit 60/40 horsepower motors. Other motorboat use and horsepower limits that would apply, by river segment, are shown in chapter 2, table 4.

The motorized boating restrictions would prevent some individuals from using certain types of boats, especially during busy times of the year. This would likely affect a larger proportion of local residents that visit the NPS Riverways because of its convenient location near home. Local businesses may experience a drop in sales due to a decline in individuals visiting the NPS Riverways for motorized boat recreation.

Users of the restricted motors could continue to visit regions just south of the park unit, so the long-term, adverse impact on local economies associated with boater visitor spending would be minor. However, local businesses that sell and/or manufacture boats may experience a shift in their market, which may have long-term, moderate, adverse effects on these businesses. To the extent that these manufacturers and dealerships can adjust to the shifting market, these adverse impacts would be short-term.

This alternative would emphasize traditional nonmechanized forms of recreation and visitor experiences, activities offered are expected to be quieter, less crowded, and slower paced. This includes additional opportunities for living history programs and ranger-led interpretive hikes, walks, and educational programs. This could have a long-term, minor, beneficial economic impact on local businesses that support visitors interested in pursuing these activities in the National Riverways. In addition, some visitors might extend their stays to enjoy these activities. Extended visits would have beneficial economic effects.

Commercial services may be limited or modified along different portions of the National Riverways to achieve desired visitor experiences and resource conditions. The National Riverways would redistribute concession dropoff and pickup locations for nonmotorized watercraft users to reduce peak-season crowding. Concession contracts and operating plans may be modified to better distribute and manage the numbers of nonmotorized watercraft by altering the patterns of use along the riverways to reduce congestion and conflicts. Access points would be closed and/or rehabilitated. This action would reduce the total number of access points available to concessioners and

other visitors. As a result of this change, some visitors may choose not to visit the National Riverways during certain times.

Concession contracts may be impacted with a reduction in some recreational uses, but may realize increases in other service demands, such as ecotourism guided trips. Operators may also realize increased costs of moving operations or longer travel times, due to fewer access points and difficulties traveling in the National Riverways. Long-term, minor, adverse economic impacts on commercial services and local businesses would result from the potential decrease in visitation or change to less lucrative services. Alternative A could have a long-term, moderate, adverse impact on visitor spending within local economy.

Vehicle camping on gravel bars close to the river would be eliminated. Individuals would still be able to camp on gravel bars, but would be restricted to designated campsites accessible by boat or walk-in only. This change may lead to a decline in visitation, which could have long-term, minor, adverse economic impacts on commercial services and businesses that support these visitors.

More opportunities for traditional tent camping and backcountry camping would be offered in designated areas. These changes may lead to an increase in visitation for those seeking this experience, which could have a positive impact on commercial services and businesses that support these visitors. More hiking trails would be provided, and mountain biking may become an allowable trail use only on designated trails in the natural and resource-based recreation zones. Increased visitation and visitor spending associated with expanded or new activities would have long-term, minor, beneficial impacts on the local economies.

The number of designated trails for horseback riding could increase under alternative A by approximately 25 miles as the National Riverways redesigns the current designated horse trail system to improve trail quality, reduce erosion and land disturbance, and keep riders on designated trails. The National Riverways would close approximately 65 miles of undesignated horse trails and some access points and river crossings used by horse riders. In addition, the National Riverways may implement a permit system for visitors using the park unit for horse rides. These changes may deter some horseback riders from visiting the National Riverways to use the designated trails. However, the intensity of the long-term, adverse effect would be minor because many individuals travel to the area for horse riding events and activities, and other facilities and trails outside the NPS Riverways would still be available.

Under this alternative, 3,424 acres of the 3,434-acre Big Spring Wilderness Study Area would be recommended for wilderness designation and zoned as primitive. The fire tower, barn, NPS training range and CCC-era camp would be retained. The barn and NPS training range would be excluded from the recommended wilderness designation and would continue to be maintained for administrative use. Motorized access to the fire tower would be prohibited. The utility communication cable would be excluded from the proposed wilderness designation and maintained. The wilderness designation of the Big Spring track is expected to have minor, adverse, socioeconomic impacts to those that currently use or access the site for administrative functions.

A long-term, moderate, adverse impact on visitor spending under this alternative could lead to a long-term, moderate, adverse fiscal impact on local government entities. A reduction in visitor spending associated with visits to the National Riverways is likely to cause a reduction in sales tax revenues to local governments, which are highly dependent on this form of revenue.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, minor to moderate, beneficial socioeconomic impacts.

While some of the management actions under alternative A may cause a decrease in visitation to the National Riverways for some activities, visitation could increase for other types of activities both inside and outside the National Riverways. Thus, effects of alternative A would account for a minor increment of the long-term, moderate, beneficial, cumulative effect on the social and economic conditions in the study area.

Conclusions

Visitation to the NPS Riverways under the alternative A is expected to decline for some activities but increase for others. The change in visitation would lead to a long-term, moderate adverse economic effect on the local economy with changes in tourism and local spending. In addition, a decline in visitation would result in a long-term, moderate, adverse fiscal impact to local governments under alternative A.

It is likely that the enforcement of the horsepower regulations would result in reduced motorboat use on relevant river sections. Regulation of horsepower limits is likely to have a long-term, minor, adverse impact on the local economy. These impacts would occur with a reduction in visitor spending from less motorboat use and impacts to local boat manufacturers who may have to reduce their manufacturing and sales of higher-horsepower boats, retargeting to their local market.

The wilderness designation of the Big Spring track is expected to have minor, adverse socioeconomic impacts to those that currently use or access the site for administrative functions.

The effects of alternative A would account for small increment of the overall cumulative effects of all past, present, and future projects affecting socioeconomic conditions in the study area. However, continued economic stagnation at the national and regional level could dampen these beneficial effects in the short term.

ALTERNATIVE B (NPS PREFERRED)

Under alternative B, the National Riverways would provide a high level of natural and cultural resource protection, while expanding ways for visitors to experience and learn about these resources. Similar to alternative A, most of the NPS Riverways' resources would be managed for lower levels of visitors, with limited habitat fragmentation from roads, trails, and facilities. Under alternative B, 16.4%of the lands would be managed as primitive and 72% would be managed as natural. The nonmotorized zone would be applied to 34% of the river-based mileage, and 52% would be a mixed-use zone with motorboating and floating available year-round. Motorboat use and horsepower limits that would apply, by river segment, are shown in chapter 2, table 4.

Under this alternative, the National Park Service would pursue rule-making to change the existing regulation to allow 60/40 horsepower motors on certain portions of the Current and Jacks Fork rivers. Before a rule change is implemented, the National Park Service would restrict the use of boats with 60/40 horsepower motors. Therefore, it is likely that local economies would experience a short-term, minor, adverse impact associated reduced boater visits and reduce visitor spending. Local business that sell and/or manufacture boats may also experience a short-term shift in their market, which may have minor, adverse economic effect on these businesses. Local residents who use the National Riverways for

motorboating would experience a minor or negligible impact under this alternative because a large percentage of local boaters have 40 horsepower motors (Martin 2011) and would still be able to access the riverways under this alternative.

Under alternative B, the emphasis would be on a mix of recreational activities. The National Riverways would redistribute concession dropoff and pickup locations for nonmotorized watercraft users to reduce peak-seasonal crowding and would close and/or rehabilitate access points. The total number of access points available to concessioners and other visitors would remain constant or decrease, which may lead to a reduction in services provided by commercial outfitters and loss in sales to local businesses. Because float trips are a popular activity at the NPS Riverways and a larger percentage of nonmotorized river users are from outside the area, alternative B may lead to long-term, minor, adverse impacts on local economies.

Commercial services may be modified along different portions of the National Riverways to achieve desired visitor experiences and resource conditions, such as nonmotorized zones, noncommercial zones, ecotourism guided trips, and limitations and redistribution of tubes and watercraft. Concession contracts and operating plans may be modified to better distribute and manage the numbers of nonmotorized watercraft by altering the patterns of use along the riverways to reduce congestion and conflicts. Commercial activities could promote nature-based educational activities. Concession contracts may be impacted with a reduction in some recreational uses, but may realize increases in other service demands, such as ecotourism guided trips. Operators may also realize increased costs of moving operations or longer travel times with the closing of access points and the difficulties of traveling in the National Riverways. Commercial services are expected to experience long-term, minor, adverse economic effects associated with the potential decrease in visitation or the change to less lucrative services.

The National Riverways would reduce vehicular access to designated sites on gravel bars and require campers to camp at designated campsites. This would result in a slight decrease in vehicle camping, which would have a long-term, negligible, adverse impact on local economies.

Two developed campgrounds would be provided at Akers and Big Spring. Additionally, more hiking trails would be provided, and mountain biking may become an allowable trail use only on designated trails in the natural and resource-based recreation zones. Increased visitation and visitor spending associated with expanded or new activities would have long-term, minor, beneficial impacts on local economies. The number of designated trails for horseback riding may increase under alternative B by approximately 36 miles and include some new stream crossings. The design of the existing network of horse trails would be improved as in alternative A. The National Riverways would actively work to close approximately 65 miles of undesignated horse trails as well as some access points and river crossings used by horse riders. In addition, the National Riverways may implement a permit system for visitors using the park unit for horse rides. Horse camping may be allowed in designated campsites. As described for alternative A, these actions would have long-term, negligible, adverse effects on local businesses and the economy.

Increased access and visitation to cultural sites and improved interpretation of cultural sites would occur under this alternative, creating business opportunities to commercial operators and businesses that support these visitors. Visitors may extend their stay in the area with additional opportunities to visit cultural and historic sites. This could have long-term, negligible, beneficial impacts to businesses and the local economy.

A slight reduction in visitation under this alternative may result in a long-term, minor, adverse fiscal impact on government entities in the study area. A reduction in visitor spending associated with visits to the National Riverways is likely to cause a reduction in sales tax revenues to local governments, which are highly dependent on this form of revenue.

Under the alternative B, 3,430 acres out of the 3,434 acres of the Big Spring Wilderness Study Area would be recommended for wilderness designation. The entire Big Spring Wilderness Study Area would be zoned primitive. The fire tower, barn, and Civilian Conservation Corps-era camp would be retained. The NPS training range would be removed and the area restored. Motorized vehicle access of roads in this area would be prohibited. The buried utility cable that serves the Big Spring cabins and residents located further down the line would be proposed as potential wilderness and would remain in use until it fails, or until another utility route outside of wilderness is designated. Once the nonconforming use of the cable is extinguished, the utility corridor would be administratively converted to wilderness. The National Park Service's decision to recommend the Big Spring area for wilderness designation is expected to have minor adverse socioeconomic impacts with the loss in the NPS training range and to those that currently use or access the site for administrative functions.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, minor to moderate, beneficial socioeconomic impacts.

While some of the management actions under alternative B may lead to a minor decrease in visitation to the NPS Riverways for some activities, the decline in visitation may likely be overshadowed by increases in visitation for other types of activities both inside and outside the National Riverways. Thus, effects of alternative B would account for minor increment of the overall, long-term, moderate, beneficial, cumulative effect on the social and economic conditions in the study area.

Conclusions

Visitation to the National Riverways under alternative B is expected to decline for some activities but increase for others. The change in visitation would lead to a long-term, minor adverse economic effect on the local economy with changes in tourism and local spending. In addition, a decline in visitation would result in a long-term, minor, adverse fiscal impact to local governments under alternative B.

While the enforcement of horsepower regulations could result in reduced motorboat use on some river sections in the short-term, this impact would likely be minimized under alternative B if the National Park Service is able to pursue a regulation change to allow year-round use of 60/40 horsepower motors from Van Buren south to the park unit boundary.

The National Park Service's decision to recommend the Big Spring area for wilderness designation is expected to have minor adverse socioeconomic impacts with the loss in the NPS training range and to those that currently use or access the site for administrative functions.

The effects of alternative B would account for a small increment of the cumulative, long-term, moderate, beneficial effects of all past, present, and future projects affecting socioeconomic conditions in the area. While some of the management actions planned under alternative B are expected to lead to a decline in visitation to the area, these may be offset by other projects that are improving

visitor opportunities and experiences outside the National Riverways.

ALTERNATIVE C

Under alternative C, park management would provide the diversity of river recreational opportunities and experiences similar to those provided under the no-action alternative. The National Riverways would enhance the interpretive program with more opportunities for visitors to learn about traditional lifestyles and natural history of the area.

Under alternative C, 6.5% of the lands would be managed as primitive and 28.2% would be managed as natural. Additionally, 21% of the river-based recreation would be in a nonmotorized zone, while 59%would be a mixed-use zone with motorboating and floating available year-round.

Motorboat use and horsepower limits that would apply, by river segment, are shown in chapter 2, table 4.

Similar to the preferred alternative, the National Park Service would pursue rule-making to change the existing regulation to allow 60/40 horsepower motors from Van Buren south to the park unit boundary. With the ability to access the riverways using boats with a 60/40 horsepower, the adverse impacts on local and nonlocal visitors and local businesses would likely be short term and minor.

Emphasis under this alternative would be to provide a diverse range of recreational activities. This alternative may result in more nonmotorized river users (such as those using canoes, tubes, and kayaks) visiting the National Riverways due to fewer reductions in the number of access points and facilities. This may lead to an increase in traditional services provided by commercial outfitters and an increase in sales to local businesses. Since a larger percentage of nonmotorized river users are from outside the area, there would be long-term, minor, beneficial economic impacts to local economies.

Commercial services may also increase under alternative C with the increase in the number of visitors coming to the area for nonmotorized recreation. Commercial operators would benefit from increases in visitation for current nonmotorized river uses, but there could be fewer visitations associated with services for other types of recreation, such as ecotourism guided trips. Concession contracts and operating plans may be modified to better distribute and manage the numbers of nonmotorized watercraft by altering the patterns of use along the riverways to reduce congestion and conflicts. There would likely be long-term, minor, beneficial impacts associated with increases in visitation and spending impacts to local concessioners and local economies.

Vehicle and developed camping would increase under this alternative, which may result in increased sales to local businesses and positive economic impacts. There would be limited restrictions on vehicular access to designated sites on gravel bars, similar to the no-action alternative, and two developed campgrounds would be provided at Akers and Big Spring. More hiking trails would be provided, and mountain biking may become an allowable trail use only on designated trails in the natural and resource-based recreation zones. There would be fewer opportunities for primitive or semiprimitive camping under this alternative, which would result in a decline in this type of recreational use. Overall, long-term, minor, beneficial impact on local economies would be expected from increased visitation and associated visitors spending with vehicle and tent camping uses.

The number of designated trails for horseback riding may increase under alternative C by approximately 45 miles and include some new stream crossings. Additionally, a 25-site horse campground along the Jacks Fork would be developed, which is likely to increase this type of

recreation. However, illegal or social trails would be closed, similar to the other alternatives. Concessioners and business that support these activities would experience long-term, minor, beneficial impacts from additional visitation associated with horse riding in the NPS Riverways.

Visitor access and visitation to historical structures would be expanded under this alternative, which would create business opportunities for commercial operators and businesses that support these visitors. Visitors may also extend their visit to the area because of additional opportunities to visit the historical and cultural sites. This could have long-term, minor, beneficial impacts on these businesses and the local economy.

Local government entities may experience a long-term, moderate, beneficial fiscal impact under this alternative, if visitation to the area were to increase. A slight increase in visitor spending in the communities surrounding the National Riverways is likely to cause an increase in sales tax revenues to local governments, which are highly dependent on this form of revenue.

Under this alternative, 1,779 out of 3,434 acres within the Big Spring Wilderness Study Area, located south of Chilton Creek, would be recommended for wilderness designation. This amount is 52% of the total wilderness study area. The fire tower, barn, NPS training range, and Civilian Conservation Corps-era camp would be outside the area proposed for wilderness designation and would continue to be retained. The access roads to the fire tower, barn, and NPS training range would continue to be maintained for administrative uses. The utility cable that serves the Big Spring cabins and residents located further down the line would also be maintained.

Cumulative Impacts

The past, present, and reasonably foreseeable future actions described under the "Cumulative Impacts" section of the no-action alternative would be the same under this alternative, resulting in long-term, minor to moderate, beneficial socioeconomic impacts.

These projects and activities in combination with the increased visitation to the NPS Riverways under alternative C would have a moderate, beneficial impact on the local economy. Alternative C would account for a moderate increment of the long-term moderate beneficial cumulative effect.

Conclusions

Visitation to the NPS Riverways under alternative C is expected to increase for several activities but decrease for others. The change in visitation would lead to a long-term, moderate beneficial economic effect on the local economy with changes in tourism and local spending. In addition, an increase in visitation would result in a long-term moderate beneficial fiscal impact to local governments under alternative C.

While the enforcement of horsepower regulations could result in reduced motorboat use on some river sections, this impact would likely be minimized under alternative C if the National Park Service is able to pursue a regulation change to establish a year-round allowance of 60/40 horsepower motors from Van Buren south to the park unit boundary under this alternative.

With approximately half of the wilderness study area excluded from the wilderness designation proposal and the retention of all structures used for administrative purposes, the designation is expected to have negligible impacts on the socioeconomic environment.

The effects of alternative C would account for moderate increment of the overall cumulative effects of all past, present and future projects affecting socioeconomic conditions in the area.

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CONSULTATION AND COORDINATION

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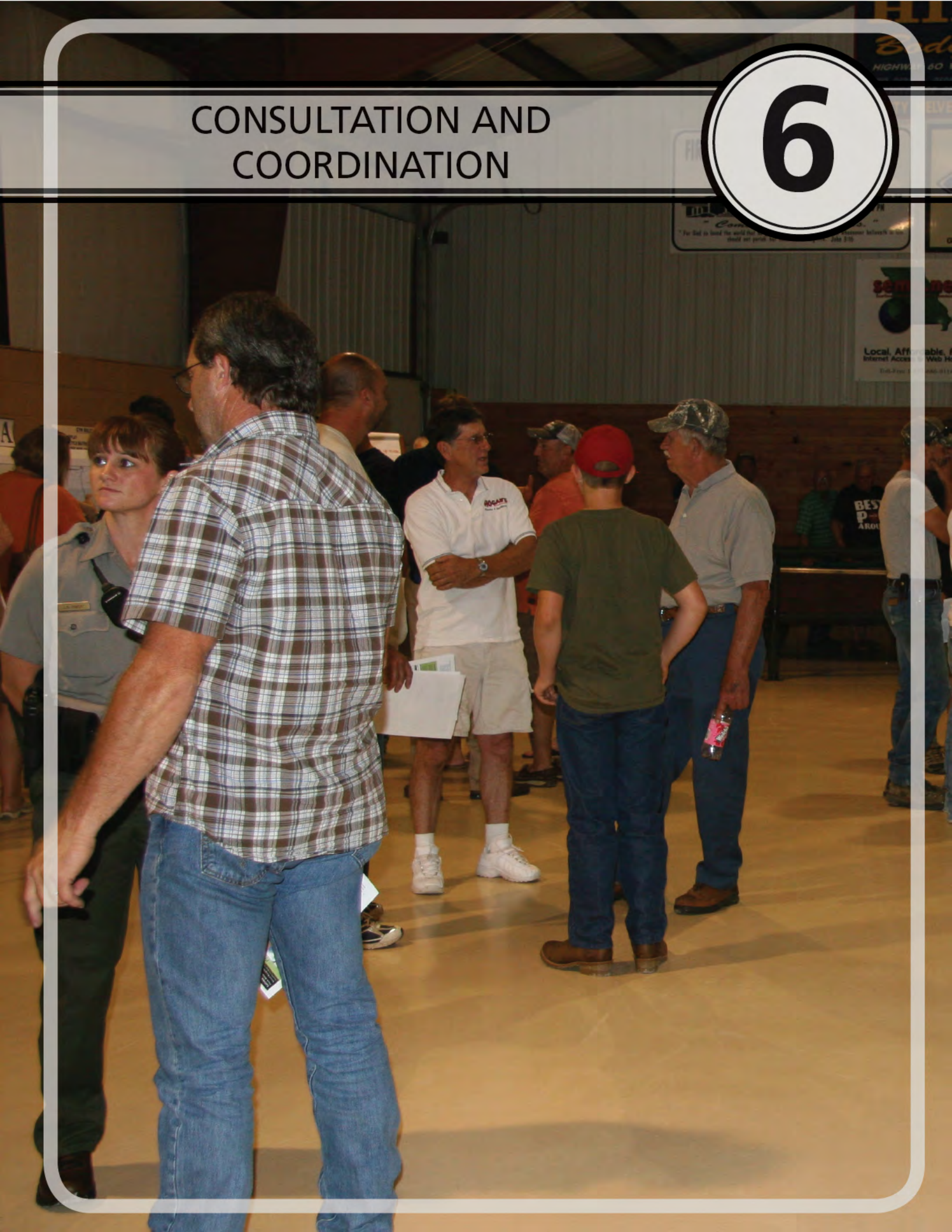

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PUBLIC AND AGENCY INVOLVEMENT

This *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* represents input from the NPS Riverways staff, NPS planners, other agencies, American Indian tribes, and the general public. Consultation and coordination among the tribes, agencies, and public were vitally important throughout the planning process. The primary avenues available to the public for providing input during the development of the plan included participation in public meetings and submitting comments via the NPS planning website or regular mail.

Public meetings, newsletters, and workshops were used to keep the public informed and involved in the planning process for the Ozark National Scenic Riverways. A mailing list was compiled that consisted of members of government agencies, organizations, businesses, legislatures, local governments, and interested citizens. Comments and suggestions offered by participants provided NPS planners with important insights about what NPS Riverways' visitors, neighboring landowners, county officials, science experts, and others expect from the general management plan.

The notice of intent to prepare an environmental impact statement was published in the *Federal Register* on December 5, 2006 (Volume 71, Number 233, Pages 70530–70531).

PUBLIC SCOPING MEETINGS

Five public scoping meetings were held during September 2006 in Van Buren, Eminence, Poplar Bluff, Salem, and St. Louis. The purpose of these meetings was to obtain early input on the public's vision for the NPS Riverways' future and any NPS Riverways' issues, concerns, and ideas related to the general management plan. More than 290 people attended these initial public scoping meetings.

A second set of public meetings and a public comment period occurred during the summer of 2009. Public open houses took place in Van Buren, Eminence, Salem, Columbia, and St. Louis. The main purpose of the comment period and meetings was to discuss and receive feedback on the preliminary alternatives. Over 1,015 people attended the open houses. A total of 5,117 comments were received through open houses, comment forms, e-mails, letters, and the project's website.

NEWSLETTERS

The National Park Service issued three newsletters between 2006 and 2009 during preparation of the draft general management plan. The first and third newsletters were released in conjunction with open public comment periods and the public scoping meetings mentioned in the above section. Over 7,000 comments were received from these newsletters and during meetings. This figure includes people who commented at public meetings, mailed back comment forms enclosed in a newsletter, wrote letters to the NPS Riverways' superintendent, or commented about the plan by electronic mail. Newsletter 1 was issued in August 2006. This newsletter outlined the purpose of the NPS Riverways and the general management plan. It also stated the NPS Riverways' significance and described the general process for completing the general management plan. The newsletter urged the public to actively participate in the planning process by commenting on the purpose and significance statements and by attending one of the public scoping meetings.

Newsletter 2 was distributed in August 2007. It included an overview of the issues and comments received in response to the first newsletter, actions the NPS Riverways had taken in response to some concerns, and a description of the next steps for the project.

Newsletter 3 outlined the preliminary alternatives and management zones for the general management plan. This newsletter was issued in May 2009 prior to the public comment period and meetings of that summer.

The public holds a wide range of interests and concerns about the National Riverways. Many expressed how much they value the National Riverways' scenic beauty, its water resources, and the variety of available visitor experience and recreational opportunities. People commented on the importance of experiencing quiet and solitude and a family-friendly environment. Motorboat use and regulations were another comment topic for many members of the public. Comments from the public have been instrumental in the formulation of the alternatives within this plan.

WORKSHOP

In response to the large number of comments on the preliminary management alternatives, particularly those relating to motorboat use and river use management, the National Park Service obtained additional input from stakeholder groups in a workshop. In February 2010, 34 stakeholders met over two days to discuss varying strategies for how to best manage park resources and recreation opportunities. The results of this workshop were considered when refining the alternatives.

Using input from the public, and considering the probable environmental consequences and costs of the alternatives, the planning team developed a preliminary preferred alternative through a "Choosing by Advantages" process in February 2011. The *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* was then produced and distributed for public review. After it is distributed, there will be more public meetings to give the public an opportunity to discuss the revised alternatives, including the preferred alternative, and to provide comments and suggestions.

CONSULTATION AND COORDINATION WITH OTHER AGENCIES, OFFICES, AND TRIBES

U.S. FISH AND WILDLIFE SERVICE, SECTION 7 CONSULTATION

The Endangered Species Act of 1973, as amended, requires in section 7 (a)(2) that each federal agency, in consultation with the Secretary of the Interior, ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This section sets out the consultation process as implemented by 50 CFR 402.

The National Park Service contacted the U.S. Fish and Wildlife Service in a letter dated January 12, 2011. The letter advised the U.S. Fish and Wildlife Service of the National Park Service planning process for this *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* and requested a current list of federally listed threatened, endangered, and candidate species within the NPS Riverways.

A response memorandum from the U.S. Fish and Wildlife Service, dated March 22, 2011, indicated that three such species may be found within the NPS Riverways. They include the Indiana bat, gray bat, and Ozark hellbender. Copies of the planning process newsletters from the National Park Service were also provided to the U.S. Fish and Wildlife Service over the duration of the planning process to keep the agency updated on the plan status.

In the months prior to the release of this *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement*, the National Park Service conducted informal discussions with the U.S. Fish and Wildlife Service on possible effects on these three species from proposed National Riverways actions. The National Park Service also provided a copy of this draft document to the U.S. Fish and Wildlife Service for their preliminary review.

In these informal consultation communications, NPS staff sought advice from the U.S. Fish and Wildlife Service regarding how best to fulfill NPS responsibilities for complying with Section 7 of the Endangered Species Act. These discussions had two primary outcomes: (1) the NPS would commit under all action alternatives to working closely with the US. Fish and Wildlife Service to develop and implement conservation plans and strategies for all federal listed species in the NPS Riverways (under Section 7(a)(1) of the Endangered Species Act); and (2) the NPS would prepare and submit a biological assessment for this general management plan, with a biological opinion prepared by the U.S. Fish and Wildlife Service in response and prior to implementation of this plan. The biological opinion would likely provide determinations of effect for listed species, and mitigation measures for the National Park Service to follow to ensure protection of certain threatened or endangered species.

The National Park Service sent a letter dated January 12, 2011, to the Missouri Department of Conservation advising it of the NPS planning process for this *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* and including a current list of special status species within the NPS Riverways. The National Park Service asked the Missouri Department of Conservation to provide feedback regarding the accuracy and thoroughness of the list.

On January 26, 2011, the Missouri Department of Conservation provided an updated list. Copies of each planning process newsletter were also provided to the Missouri Department of Conservation from the National Park Service to keep the department updated on the planning process.

SECTION 106 CONSULTATION

Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470 et seq.) requires that agencies with direct or indirect jurisdiction over historic properties consider the effect of any undertaking on properties listed in or eligible for listing in the National Register of Historic Places. To meet the requirements of the Advisory Council on Historic Preservation's regulations (36 CFR 800), the National Park Service invited the Missouri State Historic Preservation Office to participate in the planning process. The state historic preservation officer responded positively to the invitation to work with the National Riverways on the plan in a letter dated November 4, 2010.

On November 15, 2010, park staff met with representatives of the Missouri State Historic Preservation Office and the Missouri Attorney General's Office. At that meeting, the park staff explained the general management planning and wilderness study process and the current phase of the plan. The state historic preservation officer was provided a copy of the Newsletter 3 (spring/summer 2009) and was informed of the preliminary alternatives that had been developed. The National Riverways would keep the state historic preservation officer informed as general management planning progresses.

CONSULTATION WITH AMERICAN INDIAN TRIBES

The National Park Service recognizes that indigenous peoples may have traditional interests and rights in lands now under NPS management. Related American Indian concerns are sought through tribal consultations. The need for government-to-government consultation with associated tribal governments stems from the historic power of Congress to make treaties with tribes as sovereign nations. Consultations with federally recognized tribes are required by various federal laws, executive orders, regulations, and policies. They are needed, for example, to comply with the Native American Graves Protection and Repatriation Act and section 106 of the National Historic Preservation Act of 1966.

In August 2003, park staff traveled to Oklahoma and Missouri to meet with the following culturally affiliated American Indian tribes:

- Cherokee Nation (Tahlequah, OK)
- Delaware Nation (Anadarko, OK)
- Delaware Tribe of Indians (Bartlesville, OK)
- Eastern Shawnee Tribe of Oklahoma (Seneca, MO)
- Osage Nation (Pawhuska, OK)
- United Keetoowah Band of Cherokee Indians (Tahlequah, OK)

The purpose of the meetings was to introduce NPS staff to the tribal leadership and improve the exchange of information as part of ongoing government-to-government consultations. Tribal leaders were oriented to the National Riverways and shared information regarding tribal origins, ancestral homelands, migrations to Oklahoma and eastern Missouri, and the relationships to other tribes in the area. NPS staff informed the tribes of upcoming park plans and facility development

projects. The tribes were advised of the upcoming general management plan and the importance of tribal input in the planning process to help guide long-term park management. Tribes were asked to share potential interests and concerns related to the planning effort.

In October 2006, park staff traveled to Oklahoma and Missouri to update the affiliated tribes on the status of the general management planning process and to gather and share information. Consultation meetings were held with the following:

- Absentee-Shawnee Tribe of Indians of Oklahoma (Shawnee, OK)
- Cherokee Nation (Tahlequah, OK)
- Delaware Nation (Anadarko, OK)
- Delaware Tribe of Indians (Bartlesville, OK)
- Eastern Shawnee Tribe of Oklahoma (Seneca, MO)
- Osage Nation (Pawhuska, OK)
- Shawnee Tribe (Miami, OK)
- United Keetoowah Band of Cherokee Indians in Oklahoma (Tahlequah, OK)

In consultation meetings held in November 2010, park staff provided updates of the general management plan and wilderness study. The tribes were given copies of newsletter 3 (spring/summer 2009) and informed of the preliminary alternatives. The NPS staff extended invitations to all the tribal representatives to visit the National Riverways and to actively participate in the planning process. Meetings were held with the following:

- Absentee-Shawnee Tribe of Indians of Oklahoma (Shawnee, OK)
- Cherokee Nation (Tahlequah, OK)
- Delaware Nation (Anadarko, OK)
- Delaware Tribe of Indians (Bartlesville, OK)
- Eastern Shawnee Tribe of Oklahoma (Seneca, MO)
- Shawnee Tribe (Miami, OK)
- United Keetoowah Band of Cherokee Indians in Oklahoma (Tahlequah, OK)

A meeting with the Osage Nation was canceled due to a scheduling conflict, but park staff provided the tribe with an informational letter and materials regarding the general management planning effort.

AGENCIES, ORGANIZATIONS, AND INDIVIDUALS RECEIVING A COPY OF THIS DOCUMENT

FEDERAL AGENCIES

Advisory Council on Historic Preservation
Bureau of Indian Affairs
Natural Resources Conservation Service
U. S. Forest Service
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Geologic Survey

U.S. SENATORS AND REPRESENTATIVES

Missouri Senator Roy Blunt
Missouri Senator Claire McCaskey
Representative JoAnn Emerson, Missouri, 8th District

MISSOURI STATE AGENCIES

Department of Agriculture
Department of Conservation
Department of Game, Fish and Parks
Department of Natural Resources
Department of Transportation
State Historic Preservation Office

STATE OFFICIALS

Jay Nixon, Governor, Missouri
Representative Don Wells, District 147
Representative Jason Smith, District 150
Representative Paul Fitzwater, District 152
Representative Steve Cookson, District 153

AMERICAN INDIAN TRIBES

Absentee-Shawnee Tribe of Indians of Oklahoma, Shawnee, Oklahoma
Cherokee Nation, Tahlequah, Oklahoma
Delaware Nation, Anadarko, Oklahoma
Delaware Tribe of Indians, Bartlesville, Oklahoma
Eastern Shawnee Tribe of Oklahoma, Seneca, Missouri
Osage Nation, Pawhuska, Oklahoma
Shawnee Tribe, Miami, Oklahoma
United Keetoowah Band of Cherokee Indians in Oklahoma, Tahlequah, Oklahoma

LOCAL AND REGIONAL GOVERNMENT AGENCIES

Carter County
Dent County
Mayors and Town Councils
Ozark Foothills Regional Planning Commission
Reynolds County
Shannon County
South Central Missouri Regional Planning Commission
Texas County

ORGANIZATIONS AND BUSINESSES

Association of RV Parks and Campgrounds
Audubon Society
Bass Pro / Wonders of Wildlife
Carter County Saddle Club
Cave Research Federation
Community Betterment Association
Conservation Federation of Missouri
Ducks Unlimited
Friends of Ozark National Scenic Riverways
Good Sam Club
Houston Saddle Club
Jacks Fork Watershed Committee
L-A-D Foundation
Lions Club
Missouri Archeological Society
Missouri Canoe and Floaters Association
Missouri Coalition for the Environment
Missouri Equine Council
Missouri Native Plant Society
Missouri Speleological Society
Missouri Wild Horse League

National Association of Canoe Livery Operators
Ozark Cave Diving Alliance
Ozark Trail Association
Ozark Trails ATV Club
Queen Ann's Clubs
Riverways concessioners
Rotary Club
Salem Saddle Club
Scenic Rivers Stream Team Association
Scenic Rivers Watershed Partnership
Show-Me Missouri Back Country Horsemen, Inc.
Sierra Club
Small Mouth Bass Alliance
The Nature Conservancy
Trail Rides
- Big Creek
- Whispering Pines
- Coldwater Ranch

Trout Unlimited
Voice of the Ozarks
Wild Turkey Foundation

NEWSPAPERS AND MAGAZINES

The list of newspapers and magazines receiving a copy of the draft plan and/or being notified of the availability of the *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* is available from NPS Riverways headquarters.

RADIO AND TELEVISION STATIONS

The list of newspapers and magazines receiving a copy of the draft plan and/or being notified of the availability of the *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* is available from NPS Riverways headquarters.

INDIVIDUALS

The list of individuals receiving a copy of the draft plan and/or being notified of the availability of the *Ozark National Scenic Riverways Draft General Management Plan / Wilderness Study / Environmental Impact Statement* is available from NPS Riverways headquarters.

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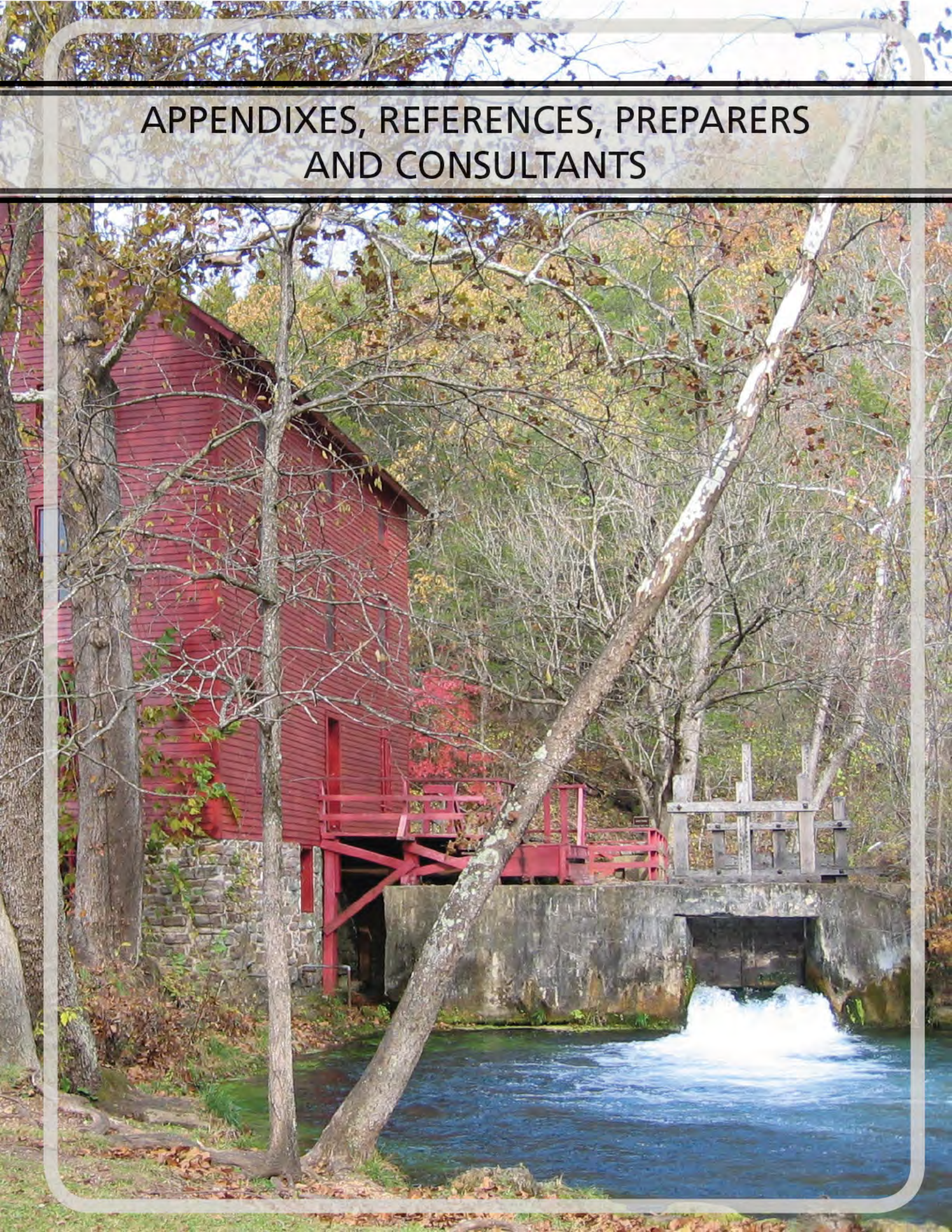
APPENDIXES, REFERENCES, PREPARERS AND CONSULTANTS



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APPENDIX A: SERVICEWIDE MANDATES AND POLICIES PERTAINING TO OZARK NATIONAL SCENIC RIVERWAYS

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Topic	Desired conditions and strategies to achieve legal and policy requirements
	Relations with other communities
Relations with private and public organizations, owners of adjacent land, and governmental agencies	NPS *Management Policies 2006* emphasizes consultation and cooperation with local, state, tribal, and federal entities (5.2.1) and calls for cooperative conservation beyond park unit boundaries (1.6) and for cooperative planning (2.3.1.8). Director's Order 75A, "Civic Engagement and Public Involvement," provides further guidance. **Desired Conditions:** Ozark National Scenic Riverways is managed as part of a greater ecological, social, economic, and cultural system. Good relations are maintained with adjacent landowners, surrounding communities, and private and public groups that affect and are affected by Ozark National Scenic Riverways. The area is managed proactively to resolve external issues and concerns and ensure that area values are not compromised. Because the National Riverways is a part of a larger regional environment, the National Park Service and its neighbors work cooperatively with others to anticipate, avoid, and resolve potential conflicts, protect the National Riverways' resources, and address mutual interests in the quality of life for community residents. Regional cooperation involves federal, state, and local agencies; Indian tribes; neighboring landowners; and all other concerned parties. **Strategies:** NPS staff will continue to establish and foster partnerships with public and private organizations to achieve the purposes of Ozark National Scenic Riverways. Partnerships will continue to be sought for resource protection, research, education, and visitor enjoyment purposes. To foster a spirit of cooperation with neighbors and encourage compatible adjacent land uses, NPS staff will continue to keep landowners, land managers, local governments, and the public informed about Ozark National Scenic Riverways management activities. Likewise, NPS managers will seek relationships with adjacent landowners and jurisdictions that will keep NPS managers informed about their activities that may affect the National Riverways. Periodic consultations will continue with landowners who may be affected by visitors and management actions. NPS staff will continue to respond promptly to conflicts that arise over NPS activities, visitor access, and proposed activities and developments on adjacent lands that could affect Ozark National Scenic Riverways. Information will be shared with adjacent landowners on resources, natural processes, and threats to resources. NPS staff may provide technical and management assistance to landowners to address issues of mutual interest. NPS staff will continue to work closely with local, state, and federal agencies and tribal governments whose programs affect or are affected by activities in Ozark National Scenic Riverways. NPS managers will continue to pursue cooperative regional planning whenever possible to integrate the National Riverways into issues of regional concern. NPS staff will continue to work closely with local, state, and federal agencies and tribal governments to foster interagency training, cooperation, and mutual assistance that afford the highest level of protection and security for visitors and park resources.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Relations with the Town of Van Buren, Town of Eminence, and Shannon, Dent, Texas and Carter Counties	As stated above, NPS *Management Policies 2006* emphasizes consultation and cooperation with local governments and for cooperative planning. **Desired Conditions:** NPS staff continues its close working relationships with the Town of Van Buren, the Town of Eminence, and Shannon, Dent, Texas and Carter counties. NPS staff and local officials maintain a high level of trust and goodwill. Local government officials feel they have an important stake in Ozark National Scenic Riverways, and NPS staff feel they have an important stake in the local communities. NPS managers are familiar with local issues and concerns. **Strategies:** NPS staff will continue to regularly communicate and meet with local government officials to identify problems and concerns facing the local governments and Ozark National Scenic Riverways, and actions that can be taken to address these problems and concerns. Local government officials will continue to be kept informed of planning and other actions in Ozark National Scenic Riverways that could affect the local governments. Likewise, NPS managers will seek relationships with local government officials that will keep NPS managers informed about their activities that may affect the National Riverways. NPS staff will continue to work with local government law enforcement, emergency services, and community education programs. When appropriate, NPS staff will provide technical and management assistance to the local governments, including sharing information and resources, to address problems and issues of mutual interest, such as growth in park visitation and ecotourism. NPS staff will continue to be involved in community-based efforts. NPS staff will participate in community planning when it may influence the National Riverways.
Government-to-government relations between American Indian Tribes and Ozark National Scenic Riverways	Mandates or policies for the National Park Service to maintain a government-to-government relationship with federally recognized tribal governments are included in the Presidential Memorandum of April 29, 1994; Executive Order 13175; Executive Order 13007 (Indian Sacred Sites); a variety of federal statutes, such as the National Historic Preservation Act; and NPS *Management Policies 2006* (1.11.1). **Desired Conditions:** The National Park Service and tribes culturally affiliated with the National Riverways maintain positive, productive, government-to-government relationships. Park managers and staff respect the viewpoints and needs of the tribes, continue to promptly address conflicts that occur, and consider American Indian values in park management and operation. **Strategies:** NPS staff continue to meet and communicate with tribal officials to identify problems and issues of mutual concern and interest, and work together to take actions to address these concerns. Tribal officials will continue to be kept informed of planning and other actions in Ozark National Scenic Riverways that could affect the tribes. When appropriate, NPS staff provide technical assistance to the tribes, including sharing information and resources, to address problems and issues of mutual concern. NPS staff continue to recognize the past and present existence of native peoples in the region and the traces of their land use and occupation as an important part of the cultural environment to be researched, preserved, and interpreted, if appropriate. NPS staff consult with the tribes traditionally associated with the National Riverways to develop and accomplish the programs of Ozark National Scenic Riverways in a way that respects the beliefs, traditions, and other cultural values of the tribes with ties to National Riverways lands. NPS staff accommodate access to traditionally used areas, once they have been identified through consultation and research, in ways consistent with park purposes and American Indian values, and that avoid adversely affecting the physical integrity of such sites and resources. NPS staff conduct appropriate ethnographic, ethno-historical, or cultural anthropological research in conjunction with, and in cooperation with, American Indian tribes traditionally associated with the National Riverways and cooperate as appropriate in light of law and policy with any continuation of subsistence activities.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
	Natural resources
Ecosystem management	NPS *Management Policies 2006* (1.6, 4.1, 4.1.4, 4.4.1) provides general direction for managing park units from an ecosystem perspective. Ozark National Scenic Riverways is part of a greater ecological, social, economic, and cultural system. Activities that take place outside the park affect, sometimes profoundly, the National Park Service's ability to protect natural resources inside the park. As section 1.6 of NPS *Management Policies 2006* states, "Recognizing that parks are integral parts of larger regional environments, and to support its primary concern of protecting park resources and values, the service will work cooperatively with others to anticipate, avoid, and resolve potential conflicts; protect park resources and values; provide for visitor enjoyment; and address mutual interests in the quality of life of community residents, including matters such as compatible economic development and resource and environmental protection." Thus, it is important to manage Ozark National Scenic Riverways from an ecosystem perspective, where internal and external factors affecting visitor use, environmental quality, and resource stewardship goals are considered at a scale appropriate to their impact on affected resources. Ecosystem management is a collaborative approach to natural and cultural resource management that integrates scientific knowledge of ecological relationships with resource stewardship practices for the goal of sustainable ecological, cultural, and socioeconomic systems. Approaches to ecosystem management are varied and occur at many levels. Achieving the desired future conditions stated in this plan for park resources requires that a regional perspective be considered, recognizing that actions taken on lands surrounding the park directly and indirectly affect the park. Many of the threats to park resources, such as threats to water quality and invasive species, come from outside the park boundaries, requiring an ecosystem approach to understand and manage the park's natural resources. Imperative in this effort is understanding the health or condition of the ecosystem. Key indicators of resource or system conditions must be identified and monitored. Cooperation, coordination, negotiation, and partnerships with agencies and neighbors are also crucial to meeting or maintaining desired future conditions for the park while recognizing the need to accommodate multiple uses on a regional scale. This approach to ecosystem management may involve many parties or cooperative arrangements with state agencies or tribes to obtain a better understanding of trans-boundary issues. **Desired Conditions**: Ozark National Scenic Riverways is managed holistically, from an ecosystem perspective, where internal and external factors affecting visitor use, environmental quality, and resource stewardship goals are considered at a scale appropriate to their impact on affected resources. The National Park Service is a leader in resource stewardship and conservation of ecosystems within and outside the park. Natural processes and population fluctuations occur within a natural range of variability with as little human intervention as possible. Park resources and visitors are managed considering the ecological and social conditions of the park and surrounding area. Ecological integrity is maintained or restored in areas not developed for visitors. NPS managers adapt to changing ecological and social conditions within and external to the park and continue as partners in regional planning and land and water management. The park is managed proactively to resolve external issues and concerns to ensure that park values are not compromised. **Strategies:** NPS staff will continue to participate in programs that have importance within and beyond park boundaries and encourage ongoing partnerships with local, state, tribal, and federal agencies; educational institutions; and other organizations. Cooperative agreements, partnerships, and other arrangements can be used to set an example in resource conservation and innovation, and to facilitate research related to park resources and their management. Partnerships important to the long-term viability of natural and cultural resources include, but are not limited to, the following: • inventorying, monitoring, and managing terrestrial resources

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Ecosystem management (continued)	• managing wildlife across human-created boundaries, such as jurisdictions and property lines • monitoring and managing aquatic resources (for example, water quality), and enforcing regulations • managing nonnative invasive species • supporting scientific research and ecological monitoring to increase understanding of park resources, natural processes, and human interactions with the environment, and to guide recovery/conservation efforts • approaching all resource management questions from an ecosystem standpoint, taking into account all biological interrelationships • continuing long-term monitoring of the change in condition of cultural and natural resources and related human influences • identifying management considerations for areas external to the park where ecological processes, natural and cultural resources, and/or human use affect park resources or are closely related to park resource management, initiating joint management actions, agreements, or partnerships to promote resource conservation • practicing science-based decision making and adaptive management, and incorporating the results of resource monitoring and research into NPS operations • as called for in the National Riverways' fire management plan (NPS 2004b), continuing to use prescribed fire as appropriate to reduce hazardous fuel conditions, supplement the ecological role of fire as a natural process, eliminate or reduce nonnative species, protect or restore key plant or animal habitats or communities, and restore or maintain cultural/historic scenes in the park unit • detecting and investigating illegal activities; apprehending and successfully prosecuting violators; and preventing unauthorized and illegal access and operations through resource education, public safety efforts, and deterrence

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
River processes	River processes, including channel migration wave action (erosion) and deposition and movement of sediments, have, and continue to shape, the path of the National Riverways' main river channel as well as the banks of the river. NPS *Management Policies 2006* (4.6.6) and the *Natural Resource Reference Manual #77* provide general direction on the management of watershed and river process in park units. **Desired Conditions:** The National Riverways' river processes are preserved and protected as integral components of the park unit's natural systems. Natural river processes, such as erosion, deposition, and channel migration, function in as natural a condition as possible. To the extent possible, structures such as boat ramps and activities such as boating (motorized and nonmotorized) do not alter the nature or rate of natural river processes. **Strategies:** NPS staff will continue to be a partner with federal, state, and local agencies and with academic institutions to conduct research on the river. NPS managers will work with researchers to study the effects of boat ramps and boating (motorized and nonmotorized) on river processes, such as the transport of sediment and the accretion/erosion of adjacent riverbanks. The National Park Service will establish and implement a geomorphological monitoring program to establish baseline data and detect changes over time. Any manipulation of the river proposed to protect cultural resources will preserve or restore natural geologic and river processes as much as possible. Inventorying and monitoring will continue to ensure that river features are not adversely affected by human activities. Effects of recreation on river habitat will continue to be monitored at sites with known impacts. New or replacement developments will not be placed in areas vulnerable to wave erosion or active flooding processes unless the development is essential to meet the park's purposes and: • No practicable alternative locations are available. • The development will be reasonably assured of surviving during its planned life span without the need for riverbank control measures. • Steps will be taken to minimize safety hazards and harm to property and natural and cultural resources. • Work will continue on restoring the disturbed riverbanks as needed. Interpretive and educational programs will continue to be developed to educate visitors and the public about the nature and importance of river features and processes.
Geologic resources	Ozark National Scenic Riverways geologic setting is a fundamental underlying factor for the characteristics of its landscapes. Geology is a major determinant of the chemistry of the water and soil, type of plants that will grow and thrive, stability of the hillsides, availability of fresh water, and locations of habitats. Geologic resources are important for their role in the ecosystem, scenic grandeur, and contribution to visitor enjoyment. The National Riverways' geologic resources include both geologic features and geologic processes. Karst topography, river processes, and soils are discussed separately below. NPS *Management Policies 2006* (4.8.1.2) and the *Natural Resource Reference Manual #77* provide general direction on the management of geologic resources in park units. **Desired Conditions:** The National Riverways' geologic processes are preserved and protected as integral components of the park's natural systems. **Strategies:** NPS managers will integrate the management and protection of National Riverways geologic resources into park planning and operations. Geologic resources will be systematically inventoried and monitored. Scientific research and geologic education and interpretation will be encouraged.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Geologic resources (continued)	NPS staff will continue to detect and investigate illegal activity; apprehend and successfully prosecute violators; and prevent unauthorized and illegal access and operations through resource education, public safety efforts, and deterrence.
Natural resources: restoration of natural environment and management of nonnative species	NPS *Management Policies 2006* (4.4) calls for the National Park Service to maintain natural ecosystems in park units and restore native plant and animal populations. *Natural Resource Reference Manual #77* also provides general direction on the restoration of natural resources for the NPS Riverways. Many of Ozark National Scenic Riverways natural ecosystems have been altered by the activities of people and the introduction of nonnative species. (Nonnative species, also referred to as exotic, alien, or invasive species, are those species that occupy or could occupy National Riverways lands directly or indirectly as the result of deliberate or accidental human activities). More specifically, the condition of natural vegetation communities has declined in the National Riverways due to the expansion of annual grasses and the spread of nonnative plant and animal species. NPS *Management Policies 2006* (4.4) calls for the National Park Service to maintain natural ecosystems in park units and to restore native plant and animal populations. **Desired Conditions:** With the exception of culturally significant areas (including open fields), the Ozark National Scenic Riverways environment is restored as nearly as possible to the conditions it would be in today had natural ecological processes not been altered. Native species populations that have been severely reduced in or extirpated from the NPS Riverways are restored where feasible and sustainable. Populations of native plant and animal species function in as natural a condition as possible except where special considerations are warranted. Vegetation is in a condition reminiscent of when the National Riverways was first designated. All federally and state threatened and endangered species are no longer in danger of extinction and are at least stable. The presence of nonnative species in the National Riverways (including nonnative species present in aquatic and subterranean habitats) is minimized to the degree possible. The NPS staff provides for their control to minimize the economic, ecological, and human health impacts that these species cause. **Strategies:** Active restoration efforts continue throughout the National Riverways, primarily focusing on management of nonnative plant and animal species, revegetation of native plants, prescribed fire, and restoration of native plants and animals. The management of populations of nonnative plant and animal species, up to and including eradication, are undertaken wherever such species threaten park resources or public health, and when control is prudent and feasible. Inventory and monitoring of invasive nonnative plant species continue. High priority is given to managing nonnative species that have or potentially could have a substantial impact on park resources, and that can reasonably be expected to be successfully controllable. Efforts continue to control or eradicate nonnative plants that are particularly invasive and destructive pests, or have the potential to rapidly spread and dominate plant communities. Lower priority would be given to nonnative species that have almost no impact on park resources or that probably cannot be successfully controlled. Restoration of previously or newly disturbed areas uses native genetic materials (when available) from the local region to regain maximum habitat value. Should facilities be removed, the disturbed lands are restored to natural topography and soils, and the areas are revegetated with native species. Only plants that are not invasive and would remain within developed areas are used. The current fire management plan (NPS, 2004) is designed to meet resource management objectives prescribed for the various areas of the National Riverways and to ensure that the safety of firefighters and the public are not compromised. All wildland fires are effectively managed, considering resource values to be protected and firefighter and public safety, using the full range of strategic and tactical operations as described in the approved fire management plan. Research is supported that contributes to management knowledge of native species. Interpretive and educational programs continue to be provided on the preservation of native species for visitors and for residents

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
	neighboring the National Riverways.
Federally and state-listed threatened and endangered species	Under the Endangered Species Act, the National Park Service is mandated to promote the conservation of all federal threatened and endangered species and their critical habitats within park unit boundaries. NPS *Management Policies 2006* (4.4.2.3) calls for the agency to survey for, protect, and strive to recover all species native to park units that are listed under the Endangered Species Act. In addition, the National Park Service is directed to inventory, monitor, and manage state listed species in a manner similar to the treatment of federal listed species, to the greatest extent possible. Several federally and state-listed threatened and endangered species have been recorded at Ozark National Scenic Riverways (see chapter 4 for a detailed listing). However, there is the possibility that threatened and endangered species occur in the National Riverways but have not yet been documented as being present. **Desired Conditions:** Ozark National Scenic Riverways contributes to the overall recovery and eventual delisting of all listed species and species proposed for listing. Essential habitats that support these species are all protected. Federally and state-listed threatened and endangered species and their habitats are protected and sustained. Native threatened and endangered species populations that have been severely reduced in or extirpated from the National Riverways are restored where feasible and sustainable. **Strategies**: NPS staff, cooperators, and contractors continue to survey and monitor for the presence of federally and state threatened and endangered species in the National Riverways. NPS staff cooperate with the U.S. Fish and Wildlife Service and Missouri Department of Conservation in inventorying, monitoring, protecting, and perpetuating the natural distribution and abundance of all federally and state-listed species and their essential habitats. These species and their required habitats are specifically considered in ongoing planning and management activities. If appropriate, surveys for threatened and endangered species are undertaken prior to permitting ground-disturbing activities or developments. If any federally and state-listed or proposed threatened or endangered species are found in areas that would be affected by construction, visitor use, or restoration activities proposed in any of the alternatives in this plan, the NPS staff will first consult informally with the above agencies. The NPS staff will then take action to address any potential adverse impacts on federally and state-listed species. Should it be determined through informal consultation that an action may adversely affect a species that is federally listed or proposed for listing, NPS staff initiate formal consultation under section 7 of the Endangered Species Act.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Air quality	The Clean Air Act (42 USC 7401 *et seq*.) gives federal land managers the responsibility for protecting air quality and related values, including visibility, plants, animals, soils, water quality, cultural resources, and public health, from adverse air pollution impacts. NPS *Management Policies 2006* (4.7), and *Natural Resource Reference Manual #77* provide further direction on the protection of air quality and related values for park units. Ozark National Scenic Riverways is classified as a Class II area under the Clean Air Act (42 USC 7401 *et seq*.). This air quality classification is the second most stringent and is designed to protect most of the country from air quality degradation. The Clean Air Act gives federal land managers the responsibility for protecting air quality and related values, including visibility, plants, animals, soils, water quality, cultural resources, and public health, from adverse air pollution impacts. **Desired Conditions**: Good to excellent air quality is maintained. Air quality in the National Riverways meets national ambient air quality standards for specified pollutants. The National Riverways' air quality is maintained or enhanced with no significant deterioration. Nearly unimpaired views of the landscape both within and outside the National Riverways are present. Scenic views, both day and night, are protected and unimpaired for the enjoyment of current and future visitors. **Strategies:** NPS staff continues to work with appropriate federal and state government agencies and nearby communities to maintain and improve the National Riverways' regional air quality. NPS staff members participate in regional air quality planning, research, educating other users, the implementation of air quality standards, and the implementation of air quality standards. Air quality in the National Riverways is periodically monitored to gain baseline information and measure any significant changes (improvement or deterioration) to the Ozark National Scenic Riverways air shed. To minimize smoke impacts, controlled burns occur only when favorable meteorological conditions are present. The vegetation to be burned is in a condition that facilitates combustion and minimizes the amount of smoke emitted during combustion.
Water quality	Water is a key resource to Ozark National Scenic Riverways, shaping the landscape and affecting plants, animals, and visitor use. The Clean Water Act strives to restore and maintain the integrity of U.S. waters, which include waters in the National Riverways. NPS *Management Policies 2006* (4.6.3) and *Natural Resource Reference Manual #77* provide direction on the protection and management of water quality in Ozark National Scenic Riverways. The Jacks Fork and Current Rivers within the Ozark National Scenic Riverways are designated as Outstanding National Resource Waters because of their exceptional water quality. This designation has national, recreational, and ecological significance. Both rivers are also classified as Tier Three Waters by the State of Missouri. These stringent federal and state standards are designed to protect against any degradation in the water quality of these rivers. **Desired Conditions:** Ozark National Scenic Riverways water quality reflects natural conditions and supports native plant and animal communities and administrative and recreational uses. All water in the National Riverways meets applicable state standards. All human sources of water pollution, both within and outside the park unit, that are adversely affecting Ozark National Scenic Riverways are eliminated, mitigated, or minimized. **Strategies:** Using a standardized suite of parameters, NPS staff will monitor surface water quality on a regular basis throughout Ozark National Scenic Riverways. Other chemical contaminants, such as pesticides and bacteria levels, will be periodically monitored. NPS staff will work with the U.S. Environmental Protection Agency, Missouri Department of Conservation, U.S. Geological Survey, U.S. Fish and Wildlife Service, and adjacent landowners to identify pollution sources outside the National Riverways' boundaries that are affecting water quality, such as long-range transport of pollutants and wastewater discharges. Locations of storm water discharges, which contain a number of potentially toxic substances, will be documented. Mitigative measures will be required as part of construction to avoid potential impacts to water quality. NPS managers will continue to educate visitors about current boating regulations and risks posed by fuel spills, human waste discharge,

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Water quality (continued)	aquatic invasive species, and discharge of bilge water or bait buckets. NPS staff will continue to detect and investigate illegal activity; apprehend and successfully prosecute violators; and prevent unauthorized and illegal access and operations through resource education, public safety efforts, and deterrence. Best management practices will be applied in the National Riverways to storm water runoff and to all pollution-generating activities and facilities, such as maintenance and storage facilities and parking areas. The use of pesticides and other chemicals will be minimized and managed in conformance with NPS policy and federal regulations. A hazardous substance and spill contingency plan will be kept current on contamination from hazardous materials, such as petroleum products, sewage, and agricultural chemicals). NPS staff will continue to educate and promote greater public understanding of the importance of water quality to the National Riverways. Information regarding water quality and related values, including threats of water pollution to park resources, will be provided to park visitors and regional residents. NPS staff will review permit applications for major new water pollution sources that could affect the National Riverways.
Floodplains	Floodplains exist along the Current and Jacks Fork rivers. Floods can occur due to seasonal rains and year-round storms, posing a risk to structures, visitors, and employees. Floodplains are protected and managed in accordance with Executive Order 11988 ("Floodplain Management"), NPS Director's Order 77-2 and its accompanying procedural manual, and NPS *Management Policies 2006* (4.6.4). **Desired Conditions:** Natural floodplain values are preserved or restored. Long- and short-term impacts associated with the occupancy and modification of floodplains are avoided. Hazardous conditions associated with flooding that could affect visitor safety are minimized. **Strategies:** Whenever possible, new structures are located on sites outside floodplains. If it is not possible to avoid locating a new structure on a floodplain or to avoid a management action that would affect a floodplain, the National Park Service will perform the following: • prepare and approve a statement of findings in accordance with Director's Order 77-2 • use nonstructural measures as much as practicable to reduce hazards to human life and property while minimizing impacts on the natural resources of the floodplains • ensure that structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR 60) Mitigation measures will be required as part of construction to avoid any potential indirect effects on floodplains. Before initiating any ground-disturbing projects, further investigation will be conducted to determine if floodplain resources would be affected. Floodplains will be addressed at the project level to ensure that projects are consistent with NPS policy and Executive Order 11988. Visitor interpretive and education efforts emphasize the hazards that exist when flash flooding occurs in the recreation area, and appropriate responses.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Wetlands	Wetlands are present throughout most of the National Riverways. Wetlands are protected and managed in accordance with Executive Order 11990, "Protection of Wetlands," and NPS Director's Order 77-1, "Wetland Protection" and its accompanying procedural manual. **Desired Conditions:** The natural values of wetlands are maintained and protected. If appropriate, wetlands are used for educational, recreational, scientific, and similar purposes provided the uses do not disrupt natural wetland functions. **Strategies**: A monitoring program will be developed for wetlands in the National Riverways based on wetland inventory information to help ensure proper management and protection of wetland resources. More detailed wetland mapping will be done in areas that are proposed for development or are otherwise susceptible to degradation or loss due to human activities. NPS staff will be trained on identifying wetlands to ensure that operational activities do not inadvertently drain or alter wetlands, including ephemeral (seasonal) wetlands. The construction of new developments avoids wetlands. If it is not possible to avoid locating a new development in a wetland or to avoid a management action that would adversely affect a wetland, the National Park Service will comply with the provisions of Executive Order 11990, the Clean Water Act, and Director's Order 77-1. All practicable measures, including the best management practices described in appendix 2 of *Procedural Manual #77-1, Wetland Protection,* will be included in the proposed action to minimize harm to wetlands. The loss of any wetlands will be compensated. A statement of findings for wetlands will be prepared in accordance with the guidelines defined in procedural manual #77-1 if an action would result in an adverse impact on a wetland. The statement of findings would include an analysis of the alternatives, delineation of the wetland, a wetland restoration plan to identify mitigation, and a wetland functional analysis of the impact site and restoration site.
Lightscape management	NPS *Management Policies 2006* (4.10), recognizes that the night sky contributes to the visitor experience. The policy further states that the NPS staff will seek to minimize the intrusion of artificial light into the night scene. In natural areas, artificial outdoor lighting will be limited to meet basic safety requirements and would be shielded when possible. **Desired Conditions**: Opportunities to view the night sky at Ozark National Scenic Riverways are available. Artificial light sources within the National Riverways do not unacceptably affect night sky viewing opportunities or wildlife populations. **Strategies:** To the extent possible, the NPS staff work within a regional context to protect the night sky quality. NPS staff seek to minimize the intrusion of artificial light into the night scene. In natural areas, artificial outdoor lighting is limited to meet basic safety requirements and is shielded when possible. If it is determined that light sources within the National Riverways affect views of the night sky, alternatives will be studied to address the impact, such as shielding lights, changing lamp types, or eliminating unnecessary sources. NPS managers participate in planning meetings at the state and county level to protect the night sky from light from new developments adjacent to the National Riverways.
Soundscape management	NPS *Management Policies 2006 (*4.9) and Director's Order 47, Sound Preservation and Noise Management require NPS managers to strive to preserve the natural soundscape (natural quiet) associated with the physical and biological resources (for example, the sounds of the wind in the trees). NPS regulations (36 CFR 2.12) identify audio disturbances that are prohibited in park units. In addition, NPS regulations (36 CFR 3.7) state that when operating a vessel in or upon inland water, the noise level should not exceed 82 decibels measured at a distance of 82 feet from the vessel. **Desired Conditions:** Natural soundscapes are preserved. Visitors have opportunities in most of Ozark National Scenic Riverways to hear natural sounds. The sounds of civilization are generally confined to developed areas (and limited to specific hours of the day). Unreasonable noise from motorized equipment, including motor vehicles, considering such factors as the purposes of the park and the impact on other park users, is prohibited. Noise-generating activities that could adversely affect National Riverways wildlife populations

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Soundscape management (continued)	are also prevented or minimized to the greatest extent possible. **Strategies**: Baseline data on National Riverways soundscapes are collected to understand characteristics and trends in natural soundscapes. Activities causing excessive or unnecessary unnatural sounds in and adjacent to the National Riverways are monitored, and action is taken to prevent or minimize unnatural sounds that adversely affect park resources or values or visitors' enjoyment of them. NPS managers work with concessioners and boat owners to help minimize the noise impacts of boats on the National Riverways. Visitors are encouraged to avoid unnecessary noise, such as maintaining quiet hours at campsites. Interpretive programs and materials help visitors understand the role of natural sounds and the value of natural quiet. NPS managers minimize noise generated by management activities by strictly regulating NPS administrative use of noise-producing machinery such as motorized equipment. Noise is a consideration when procuring and using NPS equipment. NPS staff detect, investigate, and enforce violations relating to unreasonable noise described in 36 CFR 2.10, 2.12, 2.15, 2.34, 2.38, 2.50, 2.51. 3.15, 4.2; successfully prosecute violators; and prevent unauthorized and illegal activities through resource education, public safety efforts, and deterrence.
Cultural resources	
Archeological resources	NPS *Management Policies 2006* (5.3.5.1) calls for the National Park Service to protect and manage archeological resources *in situ* to the greatest extent possible. If site disturbance is unavoidable, data recovery or other mitigation measures are carried out in consultation with the Missouri State Historic Preservation Officer, traditionally associated tribes and other concerned parties. Management occurs in accordance with 36 CFR 79 and *The Secretary of the Interior's Standards and Guidelines for Archeological Documentation*. More than 480 prehistoric and historic archeological sites have been recorded in the National Riverways and additional undiscovered sites are likely to be present. **Desired Conditions:** Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable. **Strategies:** Archeological surveys occur as needed to identify, inventory, and document archeological sites and assess their eligibility for the National Register of Historic Places. In accordance with section 110 of the National Historic Preservation Act, archeological surveys continue to be carried out in a systematic fashion so that as much of the National Riverways as is reasonably possible is surveyed. When disturbance or deterioration is unavoidable, the site through data recovery is professionally excavated and documented, and the resulting artifacts, materials, and records are curated and conserved in consultation with the Missouri State Historic Preservation Office, associated American Indian tribes, and other groups as appropriate. Some archeological sites that can be adequately protected may be interpreted to visitors. NPS staff continue to detect and investigate violations of the Archaeological Resource Protection Act; successfully prosecute violators; and prevent unauthorized and illegal activities through resource education, public safety efforts, and other deterrence measures.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Historic structures	NPS *Management Policies 2006* (5.3.5.4) calls for the treatment of historic and prehistoric structures to be based on sound preservation practice to enable the long-term preservation of historic/architectural features, materials, and qualities. Preservation treatments are conducted in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties.* The National Historic Preservation Act calls for analyzing the effects of possible federal actions on historic structures listed or eligible for listing in the National Register of Historic Places and for inventorying and evaluating their significance and condition. Ozark National Scenic Riverways has a wide variety of historic structures, ranging from homesteads to grist mills. The NPS List of Classified Structures identifies all structures within the National Riverways that possess historical and/or architectural and engineering significance. Many of these structures are listed or eligible for listing in the National Register of Historic Places. **Desired Conditions:** Structures listed or eligible for listing in the National Register of Historic Places are managed and maintained to ensure their long-term preservation and the protection of character-defining features. **Strategies:** Appropriate preservation treatments for historic structures are carried out in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. As required, historic structures requiring more intensive rehabilitation or restoration treatments receive further investigation and documentation (for example, historic structure reports) to support management decisions and ensure protection of historic fabric and architecturally significant features. Preservation of historic structures is emphasized as a critical component of the National Riverways' ongoing maintenance and resource protection programs. NPS staff partner with others to maintain historically significant properties to the extent necessary. NPS staff continue to promote and encourage relevant studies to provide baseline documentation in support of appropriate treatment and management. National register nominations and supporting documentation are prepared for eligible properties in consultation with the state historic preservation office and other concerned parties. NPS staff and volunteers continue to interpret selected historic properties to the public, demonstrating the importance of preservation maintenance, stabilization and restoration/rehabilitation undertakings along with interpretation of historical and cultural significance. NPS staff monitor, evaluate, and implement measures to minimize visitor use impacts on historic structures. NPS staff continue to detect and investigate acts of tampering, vandalism, damage, and violations affecting historic structures; successfully prosecute violators; and prevent unauthorized and illegal activities through resource education, public safety efforts, and deterrence measures.
Ethnographic resources	Ethnographic resources exist throughout Ozark National Scenic Riverways. NPS *Management Policies 2006* (5.3.5.3) calls for gathering ethnographic information through anthropological and collaborative community research that recognizes the sensitive nature of such cultural data and documents the meanings that traditionally associated groups assign to natural and cultural resources and the landscapes they form. In accordance with NPS *Management Polices 2006* and the National Historic Preservation Act, the National Park Service strives to preserve and conserve ethnographic resources in park units, and encourages the continuation of cultural traditions and uses that are a living expression of our diverse American heritage. Executive Order 13007 also calls for NPS managers to accommodate access to and the ceremonial use of American Indian sacred sites by practitioners and to preserve the physical integrity of these sites. **Desired Conditions:** Traditionally associated groups retain access to culturally important places and resources. Traditional activities, uses, and resource procurement for ceremonial or other purposes are allowed, provided such uses are consistent with the park's purposes and resource protection objectives. Access to and ceremonial use of American Indian sacred sites by Indian religious practitioners is accommodated in a manner that avoids adversely affecting the physical integrity of these sites. All ethnographic resources listed in or determined eligible for listing in the National Register of Historic Places are protected as traditional

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Ethnographic resources (continued)	cultural properties. **Strategies:** Appropriate cultural anthropological research is conducted in cooperation with groups associated with the National Riverways to identify potential ethnographic resources, determine their significance as traditional cultural properties, and suggest preservation treatments and management options. If disturbance of ethnographic resources is unavoidable, formal consultation with the Missouri State Historic Preservation Officer, associated tribes and/or other traditionally associated groups (for examples, descendants of the region's Euro-American settlers) is conducted. This consultation is in accordance with the National Historic Preservation Act, as amended, the implementing regulations of the Advisory Council on Historic Places, and other laws, policies, regulations or agreements. Protection and preservation of ethnographic resources are emphasized as a critical component of the National Riverways' ongoing maintenance and resource protection programs. The identities of community consultants and information about culturally sensitive places and practices are kept confidential when research agreements or other circumstances warrant.
Cultural landscapes	NPS *Management Policies 2006* (5.3.5.2) calls for the preservation of the physical attributes, biotic systems, and uses of cultural landscapes that contribute to historical significance. **Desired Conditions**: Character-defining features and attributes contributing to the national register significance of the National Riverways' cultural landscapes are appropriately identified, documented, and preserved. Additional inventories of other National Riverways areas are carried out to identify cultural landscape resources potentially eligible for the National Register of Historic Places. **Strategies:** NPS staff will prepare cultural landscape inventories and reports to provide baseline documentation and management recommendations supporting the appropriate treatment of the National Riverways' cultural landscapes. National register nominations and supporting documentation are prepared for eligible landscapes in consultation with the state and tribal historic preservation offices and other concerned parties. Cultural landscape preservation is emphasized as a critical component of the National Riverways' ongoing maintenance and resource protection programs. Management of cultural landscapes focuses on protecting, preserving, and possibly rehabilitating each landscape's character-defining features and attributes in accordance with recommendations in an up-to-date cultural landscape report. The appropriate preservation treatment of cultural landscapes is undertaken in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guideline's for the Treatment of Cultural Landscapes.*
Museum collections	NPS *Management Policies* 2006 (5.3.5.5) states that the National Park Service "…will collect, protect, preserve, provide access to, and use objects, specimens, and archival and manuscript collections … in the disciplines of archeology, ethnography, history, biology, geology, and paleontology to aid understanding among park visitors, and to advance knowledge in the humanities and sciences." Museum collections are managed in accordance with 36 CFR 79 ("Curation of Federally-Owned and Administered Archeological Collections"), 36 CFR 2.5, NPS *Museum Handbook,* Director's Order 24 ("NPS Museum Collections Management"), and other relevant policies. **Desired Conditions:** All museum collections and archives and their component artifacts, objects, specimens, documents, photographs, maps, plans, and manuscripts, are properly inventoried, accessioned, catalogued, curated, documented, protected, and preserved. Appropriate measures provide access to the collections by NPS staff and other researchers and allow their use in scientific and historical research, exhibits, and interpretation. The qualities that contribute to the significance of collections are protected and preserved in accordance with established NPS museum curation and storage standards.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Museum collections (continued)	**Strategies:** Museum objects that are currently on exhibit will remain in the National Riverways for the duration of their exhibition. Long-term museum storage will continue to be provided in the collection storage facility near Big Spring. A future, multipark storage facility may be constructed in the National Riverways in accordance with the Midwest Region's *Museum Collection Storage Plan* (2006). A select "core" of historically significant objects and archives (primary source records) may be curated locally if suitable partnership opportunities are identified that meet NPS preservation, protection, and controlled access standards. The NPS Riverways' archeological materials and associated records will continue to be curated at the Midwest Archeological Center in Lincoln Nebraska.
Visitor use and experience	
Visitor use and experience	The NPS Organic Act, NPS General Authorities Act, 1978 National Parks and Recreation Act, and NPS *Management Policies 2006* (1.4, 8.1) all address the importance of park units being available to all Americans to enjoy and experience. Current laws, regulations, and policies leave considerable room for judgment about the best mix of types and levels of visitor use activities, programs, and facilities. For this reason, most decisions related to visitor experience and use are addressed in the general management plan alternatives. **Desired Conditions:** Park resources are conserved "unimpaired" for the enjoyment of future generations. Visitors have opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the National Riverways; opportunities continue to be provided for visitors to understand, appreciate, and enjoy Ozark National Scenic Riverways. For all of the National Riverways' management zones, the types and levels of visitor use are consistent with the desired resource and visitor experience conditions prescribed for those areas. No activities occur that would cause degradation of the values and purposes for which the National Riverways was established. Visitors have opportunities to understand and appreciate the significance of the National Riverways and its resources, and to develop a personal stewardship ethic. To the extent feasible, all programs, services, and facilities in the National Riverways are accessible to and usable by all people, including those with disabilities. High-quality public opportunities continue to be available for appropriate uses, including such activities as hiking, boating, picnicking, photography, sightseeing, horseback riding, and fishing. **Strategies:** All of Ozark National Scenic Riverways' programs and facilities are evaluated on a regular basis to ensure that they are accessible to the extent feasible. Visitor surveys are periodically conducted to determine visitor satisfaction with the park facilities, NPS management, and the experiences visitors are having. NPS staff periodically meet with chambers of commerce, tourism agencies, and other land managers in the region, such as the U.S. Forest Service, to improve visitor trip planning, information and orientation, and interpretation and education opportunities for Ozark National Scenic Riverways visitors. NPS staff continue to monitor visitor comments on issues such as crowding and availability of parking spaces and campsites at busy times of the year, and monitor for resource impacts caused by visitors. Should any of the trends increase to levels unacceptable to managers, NPS staff will consider what actions to take. (Additional information is provided in the visitor use management and visitor capacity section of this document in chapter 2). If new campsites are built, they will be developed according to design standards that would protect resources and provide a high-quality visitor experience consistent with the Ozark National Scenic Riverways environment.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Visitor information, interpretation, and education	A variety of methods are used to orient visitors to Ozark National Scenic Riverways, provide information about the National Riverways, and interpret the National Riverways' resources. Interpretation and education are two key park programs for achieving the park's purposes and maintaining its significance. NPS *Management Policies 2006 (*chapter 7), and Director's Order 6, Interpretation and Education provide guidance for park interpretive and educational programs. **Desired Conditions:** Interpretive and educational services/programs at the National Riverways facilitate intellectual and emotional connections between visitors and park resources, foster understanding of park resources and resource stewardship, and build a local and national constituency. Outreach programs through schools, organizations, and partnerships build connections to the National Riverways. Curriculum and place-based education inspire student understanding and resource stewardship. Visitors receive adequate information to orient themselves to the National Riverways and opportunities for a safe and enjoyable visit. Pretrip information is available for visitors to plan a rewarding trip. **Strategies:** The National Riverways' comprehensive interpretive plan is implemented and updated as appropriate, with emphasis on providing information, orientation, and interpretive services in the most effective manner possible. NPS staff stay informed of changing visitor demographics and preferences to effectively tailor programs for visitors. Interpretive media are developed to support park purposes, significance, interpretive themes, and fundamental resources and values. NPS staff continue to promote improved pretrip planning information and orientation for park visitors through the National Riverways' web site and other media. NPS staff work with local communities and other entities to provide services outside park unit boundaries, where appropriate. NPS staff cooperate with partners, other governmental agencies, educational institutions, and other organizations to enrich interpretive and educational opportunities locally, regionally, and nationally. An education strategy plan will be developed and implemented, which outlines goals and actions for providing curriculum and place-based education programs. NPS staff continue to regularly update plans and prioritize actions needed to serve visitors and provide effective interpretation. Efforts continue to educate staff, visitors, and the public about park interpretive and education programs. NPS staff continue to educate, interpret, and inform the public about the significance and uniqueness of park resources; conservation; ecologically sound practices; and the laws, rules, and regulations developed to protect park resources and provide for their safe and nonconsumptive use. NPS staff stay informed on natural and cultural conditions and the latest science based research findings affecting park resources.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Public health and safety	NPS *Management Policies 2006* (8.2.5) state that the saving of human life would take precedence over all other management actions as the National Park Service strives to protect human life and provide for injury-free visits. Other federal statutes and regulations that apply to the protection of public health and safety include the following: • Director's Order 50 and *Reference Manual 50, Safety and Health* • Director's Order 58 and *Reference Manual 58, Structural Fire Management* • Director's Order 83 and *Reference Manual 83, Public Health* • Director's Order 51 and *Reference Manual 51, Emergency Medical Services* • Director's Order 30 and *Reference Manual 30, Hazard and Solid Waste Management* • regulations of the Occupational Safety and Health Administration in Title 29 of the *Code of Federal Regulations* **Desired Conditions:** While recognizing that there are limits on its ability to totally eliminate all hazards, the National Park Service and its partners, contractors, and cooperators work cooperatively to provide a safe and healthful environment for visitors and employees. NPS staff strive to identify recognizable threats to safety and health and protect property by applying nationally accepted standards. Consistent with mandates and nonimpairment, the NPS staff reduce or remove known hazards or apply appropriate mitigating measures, such as closures, guarding, gating, education, and other actions. **Strategies:** A documented safety program is maintained in the National Riverways to address health and safety concerns and identify appropriate levels of action and activities. Maintenance efforts continue to ensure that all potable water systems and wastewater systems in the National Riverways meet state and federal requirements. Interpretive signs and materials are provided as appropriate to notify visitors of potential safety concerns, hazards, and procedures to help provide for a safe visit to the National Riverways and to ensure that visitors are aware of possible risks of certain activities. NPS staff continue to work with local emergency and public health officials to make reasonable efforts to search for lost persons and rescue sick, injured, or stranded persons.
Sport fishing	Under the National Riverways' enabling legislation and NPS *Management Policies 2006* (8.2.2.5) fishing is allowed at Ozark National Scenic Riverways. Recreational fishing is a popular activity in the National Riverways. **Desired Conditions**: High-quality public opportunities continue to be available for fishing in the National Riverways, provided that harvesting does not unacceptably impact park resources or natural processes. **Strategies:** NPS staff continue to work with the Missouri Department of Conservation in monitoring fish populations and enforcing state laws to ensure stocking and harvest levels do not adversely affect the park's fish populations. Populations of nonnative fish are managed whenever such species threaten park resources or public health and when control is prudent and feasible. NPS managers work with agencies to minimize stocking inside and out park unit boundaries that will influence park resources. NPS staff continue to detect and investigate fishing violations and illegal transportation of fish, water, and invasive aquatic species; apprehend and successfully prosecute criminal violators; and prevent unauthorized and illegal activities through resource education, public safety efforts, and deterrence.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Hunting/trapping	Under the National Riverways' enabling legislation, hunting and trapping are permitted in Ozark National Scenic Riverways, provided that these activities do not unacceptably impact park resources or natural processes. **Desired Conditions**: High-quality opportunities for the public continue to be available for hunting and trapping in the National Riverways and do not unacceptably impact park resources or natural processes or endanger other visitors. **Strategies:** NPS staff continue to work with the Missouri Department of Conservation to set harvest limits, dates, and seasons for hunting and trapping in the National Riverways; develop and revise these regulations as needed; monitor and enforce the regulations to ensure that harvest levels are sustainable; and ensure that visitors have a safe, quality experience. NPS staff may encourage the intensive harvesting of certain species, such as deer, in certain situations when needed to meet park management objectives. Habitats will not be manipulated to increase the numbers of a harvested species above their natural population ranges. NPS staff continue to detect and investigate hunting and trapping violations; apprehend and successfully prosecute criminal violators; and prevent unauthorized and illegal activities through resource education, public safety efforts, and deterrence.
Other topics	
Sustainable design/ development	Sustainability involves doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices consider local and global consequences to minimize the short- and long-term environmental impacts of human actions and developments through resource conservation, recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques. The federal government has been increasingly emphasizing the adoption of sustainable practices. In particular, Executive Order 12873 mandates federal agency recycling and waste prevention and Executive Order 12902 mandates energy efficiency and water conservation at federal facilities. NPS *Management Policies 2006* (1.8, 1.9.5.2, 8.2, 9.1.1, 9.2) also call for sustainable operations, facilities, and uses in park units. **Desired Conditions:** Ozark National Scenic Riverways is a leader in sustainable practices. Administrative and visitor facilities are harmonious with park resources, compatible with natural processes, aesthetically pleasing, functional, as accessible as possible to all segments of the population, energy-efficient, and cost-effective. All decisions regarding operations, facilities management, and development in the National Riverways, from the initial concept through design and construction, reflect principles of resource preservation. Thus, all park developments and operations are sustainable to the maximum degree possible and practical. New developments and existing facilities are located, built, and modified according to the *Guiding Principles of Sustainable Design* (NPS 1993) or other similar guidelines. The National Riverways' land, water, soil, wildlife, and other natural resources are managed in ways that improve their condition and mimic or restore natural conditions wherever possible. The National Riverways has state-of-the-art systems for conserving water, using energy conservation technologies, and using renewable energy sources whenever possible. Nontoxic, biodegradable, and/or durable materials are used in the National Riverways whenever possible. The reduction, use, and recycling of materials is promoted, while materials that are nondurable, environmentally detrimental, or require transportation from great distances are avoided as much as possible. The National Riverways' carbon footprint is minimized as much as possible. **Strategies:** NPS staff work with experts both inside and outside the National Park Service to make Ozark National Scenic Riverways facilities and programs sustainable. Partnerships are sought to implement sustainable practices in the National Riverways. NPS staff work with stakeholders and business partners to augment NPS environmental leadership and sustainability efforts.

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Sustainable design/ development (continued)	NPS staff will be educated to have a comprehensive understanding of their relationship to environmental leadership and sustainability. NPS staff encourage suppliers and contractors to follow sustainable practices. Energy use is monitored and energy efficient practices and renewable energy sources are promoted wherever possible. Ozark National Scenic Riverways interpretive programs highlight sustainable and nonsustainable practices. Visitors can become familiar with the principles of environmental leadership and sustainability through exhibits, media, and printed material. Value planning, which also is called value analysis, engineering, or management, is incorporated into all levels of park planning. Park managers use this tool, including life-cycle analysis, to examine the energy, environmental, and economic implications of proposed developments. NPS managers measure and track environmental compliance and performance. Audits ensure environmental compliance, emphasize best management practices, and educate employees at all levels about environmental management responsibilities.
Climate change	Climate change is occurring and is expected to affect the National Riverways' weather, resources (for example, its vegetation, fish, wildlife, and historic structures), and visitors (for example, use seasons and recreational fishing). These changes will affect resource management, park operations, and the way visitors use and experience the National Riverways. Although climate change will likely affect the National Riverways during the life of this plan, the specific effects, rates of change, and severity of impacts are not known. Guidance regarding climate change is available in the following: • NPS Organic Act • Executive Order 13423, which includes requirements for the reduction of greenhouse gases and stipulates the use of energy and water conservation measure • NPS Climate Change Response Strategy • NPS Green Parks Plan • Department of the Interior Secretarial Order 3226, which requires that climate change impacts are taken into account in connection with departmental planning and decision making • NPS *Management Policies 2006*, including sections on environmental leadership (1.8), sustainable energy design (9.1.1.6), and energy management (9.1.7) **Desired Conditions:** Education and interpretive efforts help park visitors understand the process of climate change, its effects on the National Riverways and the wider environment, and how they can respond. Park staff promote innovation, best practices, adaptive management, and partnerships to respond to the challenges of climate change and its effects on park resources. Park staff monitor, plan, and adapt to the effects of climate change by using the best information as it becomes available. **Strategies:** The National Riverways' strategies related to climate change is two-pronged. One aspect focuses on reducing the National Riverways' greenhouse gas contributions and the other focuses on planning for and responding to the effects of climate change on park resources. Ozark National Scenic Riverways may become a member of the Climate Friendly Parks program, measuring park-based greenhouse emissions, developing sustainable strategies to mitigate these emissions and adapt to climate change impacts, educating the public about these efforts, and developing future action plans. Scientific studies and inventories will be encouraged to identify and document changes caused by climate change, predict potential changes, and assist in identifying potential responses to climate change. Since emissions from all motorized vehicles contribute to the National Riverways' emissions, options to improve transportation efficiencies will be explored, including NPS and visitor activities on both water and land. Emissions from visitors' travel to the National Riverways, and from employees commuting to work and traveling for business. Alternative transportation options and effective carbon

Table A-1: Servicewide Mandates and Policies Pertaining to Ozark National Scenic Riverways (continued)

Topic	Desired conditions and strategies to achieve legal and policy requirements
Climate change (continued)	offset strategies will be considered for opportunities to reduce the emissions associated with the National Riverways. National Riverways education and interpretive efforts will engage park employees, partners, visitors, and the public on climate change. This could include providing the latest park research and monitoring data and trends, informing the public about what responses are being taken at the National Riverways, and inspiring visitors to reduce their carbon footprint. NPS staff will work with local, regional, and national agencies, universities, and other partners to conduct scenario planning for climate change and identify actions that can be taken to respond to these changes.

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APPENDIX B: ENABLING LEGISLATION

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16 U.S.C.
United States Code, 2011 Edition
Title 16 - CONSERVATION
CHAPTER 1 - NATIONAL PARKS, MILITARY PARKS, MONUMENTS, AND SEASHORES
SUBCHAPTER LXX - OZARK NATIONAL SCENIC RIVERWAYS
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SUBCHAPTER LXX—OZARK NATIONAL SCENIC RIVERWAYS

§460m. Establishment

For the purpose of conserving and interpreting unique scenic and other natural values and objects of historic interest, including preservation of portions of the Current River and the Jacks Fork River in Missouri as free-flowing streams, preservation of springs and caves, management of wildlife, and provisions for use and enjoyment of the outdoor recreation resources thereof by the people of the United States, the Secretary of the Interior (hereinafter referred to as the "Secretary") shall designate for establishment as the Ozark National Scenic Riverways the area (hereinafter referred to as "such area") generally depicted on map numbered NR OZA 7002 entitled "Proposed Ozark National Rivers" dated December 1963 which map is on file for public inspection in the office of the National Park Service, Department of the Interior: *Provided*, That the area so designated shall not include more than sixty-five thousand acres of land now in private ownership and that no lands shall be designated within two miles of the present boundaries of the municipalities of Eminence and Van Buren, Missouri. The Secretary, with the concurrence of the State, shall designate for inclusion in the Ozark National Scenic Riverways, the lands composing Big Springs, Alley Springs, and Round Spring State Parks, and the Secretary is hereby directed to negotiate with the State for the donation and the inclusion of such park lands in the Ozark National Scenic Riverways.

(Pub. L. 88–492, §1, Aug. 27, 1964, 78 Stat. 608.)

§460m–1. Acquisition of lands, easements, etc.; exchange of lands; consent of State; reversion to State; administrative jurisdiction of Federal lands or waters

The Secretary may, within the area designated or altered pursuant to section 460m–3 of this title, acquire lands and interests therein, including scenic easements, by such means as he may deem to be in the public interest: *Provided*, That scenic easements may only be acquired with the consent of the owner of the lands or waters thereof: *And provided further*, That any parcel of land containing not more than five hundred acres, which borders either the Current River or the Jacks Fork River, and which is being primarily used for agricultural purposes, shall be acquired by the Secretary in its entirety unless the owner of any such parcel consents to the acquisition of a part thereof. Property so acquired which lies outside the boundary generally depicted on the map referred to in section 460m of this title may be exchanged by the Secretary for any land of approximately equal value within the boundaries. Lands and waters owned by the State of Missouri within such area may be acquired with the consent of the State and, notwithstanding any other provision of law, subject to provision for reversion to such State conditioned upon continued use of the property for National Scenic Riverway. Federally owned lands or water lying within such area shall, upon establishment of the area pursuant to section 460m–3 of this title, be transferred to the administrative jurisdiction of the Secretary, without transfer of funds, for administration as part of the Ozark National Scenic Riverways.

(Pub. L. 88–492, §2, Aug. 27, 1964, 78 Stat. 608; Pub. L. 92–272, title IV, §401, Apr. 11, 1972, 86 Stat. 122.)

AMENDMENTS

1972—Pub. L. 92–272 substituted provisions authorizing lands and waters owned by the State of Missouri to be acquired with the consent of the State, subject to reversion to such State conditioned upon the continued use of the property for the National Scenic Riverway, for provisions authorizing lands and waters owned by the State of Missouri to be acquired only with the consent of the State.

§460m–2. Reservation of use and occupancy of improved property for noncommercial residential purposes; term; valuation

Any owner or owners, including beneficial owners (hereinafter in this section referred to as "owner"), of improved property on the date of its acquisition by the Secretary may, as a condition to such acquisition, retain the right of use and occupancy of the improved property for noncommercial residential purposes for a term ending at the death of such owner, or the death of his spouse, or at the death of the survivor of either of them. The owner shall elect the term to be reserved. The Secretary shall pay to the owner the fair market value of the property on the date of such acquisition less the fair market value on such date of the right retained by the owner.

(Pub. L. 88–492, §3, Aug. 27, 1964, 78 Stat. 608.)

§460m–3. Establishment; notice in Federal Register; alteration of boundaries; acreage limitation

When the Secretary determines that lands and waters, or interests therein, have been acquired by the United States in sufficient quantity to provide an administrable unit, he shall declare establishment of the Ozark National Scenic Riverways by publication of notice in the Federal Register. The Secretary may thereafter alter such boundaries from time to time, except that the total acreage in the Ozark National Scenic Riverways shall not exceed sixty-five thousand acres, exclusive of land donated by the State of Missouri or its political subdivisions and of federally owned land transferred pursuant to section 460m–1 of this title.

(Pub. L. 88–492, §4, Aug. 27, 1964, 78 Stat. 609.)

§460m–4. Cooperative land development programs; hunting and fishing

(a) Development of comprehensive plans

In furtherance of the purposes of this subchapter, the Secretary is authorized to cooperate with the State of Missouri, its political subdivisions, and other Federal agencies and organizations in formulating comprehensive plans for the Ozark National Scenic Riverways and for the related watershed of the Current and Jacks Fork Rivers in Missouri, and to enter into agreements for the implementation of such plans. Such plans may provide for land use and development programs, for preservation and enhancement of the natural beauty of the landscape, and for conservation of outdoor resources in the watersheds of the Current and Jacks Fork Rivers.

(b) Establishment of hunting and fishing zones and periods

The Secretary shall permit hunting and fishing on lands and waters under his jurisdiction within the Ozark National Scenic Riverways area in accordance with applicable Federal and State laws. The Secretary may designate zones where, and establish periods when, no hunting shall be permitted, for reasons of public safety, administration, or public use and enjoyment and

shall issue regulations after consultation with the Conservation Commission of the State of Missouri.

(Pub. L. 88–492, §5, Aug. 27, 1964, 78 Stat. 609.)

§460m–5. Administration

The Ozark National Scenic Riverways shall be administered in accordance with the provisions of sections 1, 2, 3, and 4 of this title, as amended and supplemented, and in accordance with other laws of general application relating to the areas administered and supervised by the Secretary through the National Park Service; except that authority otherwise available to the Secretary for the conservation and management of natural resources may be utilized to the extent he finds such authority will further the purposes of this subchapter.

(Pub. L. 88–492, §6, Aug. 27, 1964, 78 Stat. 609.)

§460m–6. Free-roaming horses

(a) In general

The Secretary, in accordance with this section, shall allow free-roaming horses in the Ozark National Scenic Riverways. Within 180 days after November 12, 1996, the Secretary shall enter into an agreement with the Missouri Wild Horse League or another qualified nonprofit entity to provide for management of free-roaming horses. The agreement shall provide for cost-effective management of the horses and limit Federal expenditures to the costs of monitoring the agreement. The Secretary shall issue permits for adequate pastures to accommodate the historic population level of the free-roaming horse herd, which shall be not less than the number of horses in existence on November 12, 1996, nor more than 50.

(b) Removal of horses

The Secretary may not remove, or assist in, or permit the removal of any free-roaming horses from Federal lands within the boundary of the Ozark National Scenic Riverways unless—

(1) the entity with whom the Secretary has entered into the agreement under subsection (a) of this section, following notice and a 90-day response period, substantially fails to meet the terms and conditions of the agreement;

(2) the number of free-roaming horses exceeds 50; or

(3) in the case of an emergency or to protect public health and safety, as defined in the agreement.

(c) Construction; liability of United States

Nothing in this section shall be construed as creating liability for the United States for any damages caused by the free-roaming horses to property located inside or outside the boundaries of the Ozark National Scenic Riverways.

(Pub. L. 88–492, §7, Aug. 27, 1964, 78 Stat. 609; Pub. L. 104–333, div. I, title VIII, §803(b), Nov. 12, 1996, 110 Stat. 4186.)

CODIFICATION

November 12, 1996, referred to in subsec. (a), was in the original “enactment of this section” and “the date of the enactment of this section”, respectively, which were translated as meaning the date of enactment of Pub. L. 104–333, which amended this section generally, to reflect the probable intent of Congress.

AMENDMENTS

1996—Pub. L. 104–333 amended section generally, substituting provisions relating to free-roaming

horses for provisions relating to Ozark National Scenic Riverways Commission.

§460m–7. Authorization of appropriations

There are hereby authorized to be appropriated such sums (but not more than $10,804,000 for the acquisition of lands or interests in lands) as are necessary to carry out the purposes of this subchapter.

(Pub. L. 88–492, §8, Aug. 27, 1964, 78 Stat. 610; Pub. L. 92–272, title I, §101(7), Apr. 11, 1972, 86 Stat. 120.)

AMENDMENTS

1972—Pub. L. 92–272 increased maximum amount authorized to be appropriated for acquisition of lands or interests in lands from not more than $7,000,000 to not more than $10,804,000.

24. Ozark Riverways

An Act to provide for the establishment of the Ozark National Scenic Riverways in the State of Missouri, and for other purposes. (78 Stat. 608)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, for the purpose of conserving and interpreting unique scenic and other natural values and objects of historic interest, including preservation of portions of the Current River and the Jacks Fork River in Missouri as free-flowing streams, preservation of springs and caves, management of wildlife, and provisions for use and enjoyment of the outdoor recreation resources thereof by the people of the United States, the Secretary of the Interior (hereinafter referred to as the "Secretary") shall designate for establishment as the Ozark National Scenic Riverways the area (hereinafter referred to as "such area") generally depicted on map numbered NR OZA 7002 entitled "Proposed Ozark National Rivers" dated December 1963 which map is on file for public inspection in the office of the National Park Service, Department of the Interior: *Provided*, That the area so designated shall not include more than sixty-five thousand acres of land now in private ownership and that no lands shall be designated within two miles of the present boundaries of the municipalities of Eminence and Van Buren, Missouri. The Secretary, with the concurrence of the State, shall designate for inclusion in the Ozark National Scenic Riverways, the lands composing Big Springs, Alley Springs, and Round Spring State Parks, and the Secretary is hereby directed to negotiate with the State for the donation and the inclusion of such park lands in the Ozark National Scenic Riverways.

SEC. 2. The Secretary may, within the area designated or altered pursuant to section 4, acquire lands and interests therein, including scenic easements, by such means as he may deem to be in the public interest: *Provided*, That scenic easements may only be acquired with the consent of the owner of the lands or waters thereof: *And provided further*, That any parcel of land containing not more than five hundred acres, which borders either the Current River or the Jacks Fork River, and which is being primarily used for agricultural purposes, shall be acquired by the Secretary in its entirety unless the owner of any such parcel consents to the acquisition of a part thereof. Property so acquired which lies outside the boundary generally depicted on the map referred to in section 1 of this Act may be exchanged by the Secretary for any land of approximately equal value within the boundaries. Lands and waters owned by the State of

Missouri within such area may be acquired only with the consent of the State. Federally owned lands or waters lying within such area shall, upon establishment of the area pursuant to section 4 hereof, be transferred to the administrative jurisdiction of the Secretary, without transfer of funds, for administration as part of the Ozark National Scenic Riverways.

SEC. 3. Any owner or owners, including beneficial owners (hereinafter in this section referred to as "owner"), of improved property on the date of its acquisition by the Secretary may, as a condition to such acquisition, retain the right of use and occupancy of the improved property for noncommercial residential purposes for a term ending at the death of such owner, or the death of his spouse, or at the death of the survivor of either of them. The owner shall elect the term to be reserved. The Secretary shall pay to the owner the fair market value of the property on the date of such acquisition less the fair market value on such date of the right retained by the owner.

SEC. 4. When the Secretary determines that lands and waters, or interests therein, have been acquired by the United States in sufficient quantity to provide an administrable unit, he shall declare establishment of the Ozark National Scenic Riverways by publication of notice in the Federal Register. The Secretary may thereafter alter such boundaries from time to time, except that the total acreage in the Ozark National Scenic Riverways shall not exceed sixty-five thousand acres, exclusive of land donated by the State of Missouri or its political subdivisions and of federally owned land transferred pursuant to section 2 of this Act.

SEC. 5. (a) In furtherance of the purposes of this Act, the Secretary is authorized to cooperate with the State of Missouri, its political subdivisions, and other Federal agencies and organizations in formulating comprehensive plans for the Ozark National Scenic Riverways and for the related watershed of the Current and Jacks Fork Rivers in Missouri, and to enter into agreements for the implementation of such plans. Such plans may provide for land use and development programs, for preservation and enhancement of the natural beauty of the landscape, and for conservation of outdoor resources in the watersheds of the Current and Jacks Fork Rivers.

(b) The Secretary shall permit hunting and fishing on lands and waters under his jurisdiction within the Ozark National Scenic Riverways area in accordance with applicable Federal and State laws. The Secretary may designate zones where, and establish periods when, no hunting shall be permitted, for reasons of public safety, administration, or public use and enjoyment and shall issue regulations after consultation with the Conservation Commission of the State of Missouri.

SEC. 6. The Ozark National Scenic Riverways shall be administered in accordance with the provisions of the Act of August 25, 1916 (39 Stat. 535), as amended and supplemented, and in accordance with other laws of general application relating to the areas administered and supervised by the Secretary through the National Park Service; except that authority otherwise available to the Secretary for the conservation and management of natural resources may be utilized to the extent he finds such authority will further the purposes of this Act.

SEC. 7. (a) There is hereby established an Ozark National Scenic Riverways Commission. The Commission shall cease to exist ten years after the date of establishment of the area pursuant to section 4 of this Act.

(b) The Commission shall be composed of seven members each appointed for a term of two years by the Secretary as follows:

(1) Four members to be appointed from recommendations made by the members of the county court in each of the counties in which the Ozark National Scenic Riverways is situated (Carter, Dent, Shannan, and Texas), one member from the recommendations made by each such court;

(2) Two members to be appointed from recommendations of the Governor of the State of Missouri; and

(3) One member to be designated by the Secretary.

(c) The Secretary shall designate one member to be chairman. Any vacancy in the Commission shall be filled in the same manner in which the original appointment was made.

(d) A member of the Commission shall serve without compensation. The Secretary shall reimburse members of the Commission for travel, subsistence, and other necessary expenses incurred by them in the performance of the duties vested in the Commission.

(e) The Secretary or his designee shall from time to time consult with the members of the Commission with respect to matters relating to the development of the Ozark National Scenic Riverways, and shall consult with the members with respect to carrying out the provisions of this Act.

(f) It shall be the duty of the Commission to render advice to the Secretary from time to time upon matters which the Secretary may refer to it for its consideration.

SEC. 8. There are hereby authorized to be appropriated such sums (but not more than $7,000,000 for the acquisition of lands or interests in lands) as are necessary to carry out the purposes of this Act.

Approved August 27, 1964.

Legislative History

House Report No. 1241 accompanying H.R. 1803 (Committee on Interior and Insular Affairs).

Congressional Record:

Vol. 109 (1963): Oct. 22, considered and passed Senate.

Vol. 110 (1964):

Aug. 11, considered and passed House, amended, in lieu of H.R. 1803.

Aug. 14, Senate concurred in House amendments.

An Act to provide for increases in appropriation ceilings and boundary changes in certain units of the national park system, and for other purposes. (86 Stat. 120)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—ACQUISITION CEILING INCREASES

SEC. 101. The limitation on appropriations for the acquisition of lands and interests therein within units of the national park system contained in the following Acts are amended as follows:

* * * * * * *

(7) Ozark National Scenic Riverways, Missouri: section 8 of the Act of August 27, 1964 (78 Stat. 608), is amended by changing "$7,000,000" to "$10,804,000"; and

* * * * * * *

TITLE III—BOUNDARY CHANGES

SEC. 301. The Secretary of the Interior is authorized to revise the boundaries of the following units of the national park system:

* * * * * * *

(10) Ozark National Scenic Riverways, Missouri: to add approximately 1,670 acres; and

* * * * * * *

SEC. 302. The boundary revisions authorized in section 301 shall become effective upon publication in the Federal Register of a map or other description of the lands added or excluded by the Secretary of the Interior.

SEC. 303. Within the boundaries of the areas as revised in accordance with section 301, the Secretary of the Interior is authorized to acquire lands and interest therein by donation, purchase with donated or appropriated funds, exchange, or transfer from any other Federal agency. Lands and interests therein so acquired shall become part of the area to which they are added, and shall be subject to all laws, rules, and regulations applicable thereto. When acquiring any land pursuant to this Act, the Secretary (i) may tender, to the owner or owners of record on the date of enactment of this Act, a revocable permit for the continued use and occupancy of such land or any portion thereof subject to such terms and condi-

tions as he deems necessary or (ii) may acquire any land pursuant to this Act subject to the retention of a right of use and occupancy for a term not to exceed 25 years or for the life of the owner or owners. Lands and interests therein excluded from the areas pursuant to section 301 may be exchanged for non-Federal lands within the boundaries as revised, or they may be transferred to the jurisdiction of any other Federal agency or to a State or political subdivision thereof, without monetary consideration, as the Secretary of the Interior may deem appropriate. In exercising the authority in this section with respect to lands and interests therein excluded from the areas, the Secretary of the Interior may, on behalf of the United States, retrocede to the appropriate State exclusive or concurrent legislative jurisdiction subject to such terms and conditions as he may deem appropriate, over such lands, to be effective upon acceptance thereof by the State. Any such lands not so exchanged or transferred may be disposed of in accordance with the Federal Property and Administrative Services Act of 1949, as amended.

* * * * * * *

TITLE IV—MISCELLANEOUS CHANGES

SEC. 401. The third sentence of section 2 of the Act of August 27, 1964 (78 Stat. 608) is amended to read as follows: "Lands and waters owned by the State of Missouri within such area may be acquired with the consent of the State and, notwithstanding any other provision of law, subject to provision for reversion to such State conditioned upon continued use of the property for National Scenic Riverway."

* * * * * * *

Approved April 11, 1972.

2. Ozark National Scenic Riverways

PUBLIC LAW 104–333—NOV. 12, 1996 110 STAT. 4093

Public Law 104–333
104th Congress

An Act

To provide for the administration of certain Presidio properties at minimal cost to the Federal taxpayer, and for other purposes.

Nov. 12, 1996
[H.R. 4236]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Omnibus Parks and Public Lands Management Act of 1996.
16 USC 1 note.

SECTION 1. SHORT TITLE AND TABLE OF CONTENTS.

This Act may be cited as the "Omnibus Parks and Public Lands Management Act of 1996".

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DIVISION I

110 STAT. 4097

* * * * * * *

TITLE VIII—MISCELLANEOUS ADMINISTRATIVE AND MANAGEMENT PROVISIONS

110 STAT. 4186

* * * * * * *

SEC. 803. FERAL BURROS AND HORSES.

* * * * * * *

(b) OZARK NATIONAL SCENIC RIVERWAYS.—Section 7 of the Act entitled "An Act to provide for the establishment of the Ozark National Scenic Riverways in the State of Missouri, and for other purposes", approved August 27, 1964 (16 U.S.C. 460m–6), is amended to read as follows:

"SEC. 7. (a) The Secretary, in accordance with this section, shall allow free-roaming horses in the Ozark National Scenic Riverways. Within 180 days after enactment of this section, the Secretary shall enter into an agreement with the Missouri Wild Horse League or another qualified nonprofit entity to provide for management of free-roaming horses. The agreement shall provide for cost-effective management of the horses and limit Federal expenditures to the costs of monitoring the agreement. The Secretary shall issue permits for adequate pastures to accommodate the historic population level of the free-roaming horse herd, which shall be not less than the number of horses in existence on the date of the enactment of this section nor more than 50.

Contracts.

110 STAT. 4187

"(b) The Secretary may not remove, or assist in, or permit the removal of any free-roaming horses from Federal lands within the boundary of the Ozark National Scenic Riverways unless—

"(1) the entity with whom the Secretary has entered into the agreement under subsection (a), following notice and a 90-day response period, substantially fails to meet the terms and conditions of the agreement;

"(2) the number of free-roaming horses exceeds 50; or

"(3) in the case of an emergency or to protect public health and safety, as defined in the agreement.

"(c) Nothing in this section shall be construed as creating liability for the United States for any damages caused by the

free-roaming horses to property located inside or outside the boundaries of the Ozark National Scenic Riverways.".

* * * * * * *

110 STAT. 4281 Approved November 12, 1996.

LEGISLATIVE HISTORY—H.R. 4236:

CONGRESSIONAL RECORD, Vol. 142 (1996):
Sept. 28, considered and passed House.
Oct. 3, considered and passed Senate.
WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 32 (1996):
Nov. 12, Presidential remarks and statement.

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APPENDIX C: PARK REGULATIONS

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discharged or emptied only at designated sanitary pumping stations.

[34 FR 6524, Apr. 16, 1969, as amended at 34 FR 15415, Oct. 3, 1969; 49 FR 18451, Apr. 30, 1984]

§ 7.80 Sleeping Bear Dunes National Lakeshore.

(a) Powerless flight. The use of devices designed to carry persons through the air in powerless flight is allowed at times and locations designated by the superintendent, pursuant to the terms and conditions of a permit.

(b) Fishing. Unless otherwise designated, fishing in a manner authorized under applicable State law is allowed.

[49 FR 18451, Apr. 30, 1984]

§ 7.81 Point Reyes National Seashore.

(a) Powerless flight. The use of devices designed to carry persons through the air in powerless flight is allowed at times and locations designated by the superintendent, pursuant to the terms and conditions of a permit.

[49 FR 18451, Apr. 30, 1984]

§ 7.82 Apostle Islands National Lakeshore.

Fishing. Unless otherwise designated, fishing in a manner authorized under applicable State law is allowed.

[49 FR 18451, Apr. 30, 1984]

§ 7.83 Ozark National Scenic Riverways.

(a) Restrictions for motorized vessels. (1) On waters situated within the boundaries of Ozark National Scenic Riverways, the use of a motorized vessel is limited to a vessel equipped with an outboard motor only.

(2) For the purposes of this section, horsepower ratings on a particular motor will be based upon the prevailing industry standard of power output at the propeller shaft as established by the manufacturer.

(3) The use of a motorized vessel is allowed as follows:

(i) Above the Big Spring landing on the Current River and below Alley Spring on the Jacks Fork River with an outboard motor not to exceed 40 horsepower.

(ii) Above Round Spring on the Current River and above Alley Spring on the Jacks Fork River with an outboard motor not to exceed 25 horsepower.

(iii) Above Akers Ferry on the Current River from May 1 to September 15 with an outboard motor not to exceed 10 horsepower.

(iv) Above Bay Creek on the Jacks Fork River from March 1 to the Saturday before Memorial Day with an outboard motor not to exceed 10 horsepower.

(4) Operating a motorized vessel other than as allowed in § 7.83(a) is prohibited.

(b) Scuba Diving. (1) Scuba diving is prohibited within all springs and spring branches on federally owned land within the boundaries of Ozark National Scenic Riverways without a written permit from the superintendent.

(2) Permits. The superintendent may issue written permits for scuba diving in springs within the boundaries of the Ozark National Scenic Riverways; Provided,

(i) That the permit applicant will be engaged in scientific or educational investigations which will have demonstrable value to the National Park Service in its management or understanding of riverways resources.

(ii) [Reserved]

(c) Commercial Activities. The activities listed herein constitute commercial activities which are prohibited within the boundaries of Ozark National Scenic Riverways, except in accordance with the provisions of a permit, contract, or other written agreement with the United States. The National Park Service reserves the right to limit the number of such permits, contracts or other written agreements, when, in the judgment of the Service, such limitation is necessary in the interest of visitor enjoyment, public safety, or preservation or protection of the resources or values of the Riverways.

(1) The sale or rental of any goods or equipment to a member or members of the public which is undertaken in the course of an ongoing or regular commercial enterprise.

(2) The performance of any service or activity for a member or members of the public in exchange for monetary or other valuable consideration.

(3) The delivery or retrieval within the boundaries of Ozark National Scenic Riverways of watercraft or associated boating equipment which has been rented to a member or members of the public at a location not within the Riverways, when such delivery or retrieval is performed by a principal, employee or agent of the commercial enterprise offering the equipment for rental and when these services are performed as an integral part, necessary complement, or routine adjunct of or to the rental transaction, whether or not any charge, either separately or in combination with any other charge, is made for these services.

(4) The performance, by a principal, employee, or agent of a commercial enterprise, within the boundaries of Ozark National Scenic Riverways of any other service or activity for which a fee, charge or other compensation is not collected, but which is an integral part, necessary complement, or routine adjunct of or to any commercial transaction undertaken by that enterprise for which monetary or other valuable consideration is charged or collected, even though such transaction is initiated, performed, or concluded outside the boundaries of the Riverways.

(5) The solicitation of any business, employment, occupation, profession, trade, work or undertaking, which is engaged in with some continuity, regularity or permanency for any livelihood, gain, benefit, advantage, or profit.

(d) Fishing. (1) Unless otherwise designated, fishing in a manner authorized under applicable State law is allowed.

(2) The superintendent may designate times and locations and establish conditions under which the digging of bait for personal use is allowed.

(e) Frogs, turtles and crayfish. (1) The superintendent may designate times and locations and establish conditions governing the taking of frogs, turtles and/or crayfish upon a written determination that the taking of frogs, turtles and/or crayfish:

(i) Is consistent with the purposes for which the area was established; and

(ii) Will not be detrimental to other park wildlife or the reproductive potential of the species to be taken; and

(iii) Will not have an adverse effect on the ecosystem.

(2) Violation of established conditions or designations is prohibited.

[38 FR 5851, Mar. 5, 1973, as amended at 41 FR 23959, June 14, 1976; 49 FR 18451, Apr. 30, 1984; 50 FR 43388, Oct. 25, 1985; 56 FR 30696, July 5, 1991; 56 FR 37158, Aug. 5, 1991]

§ 7.84 Channel Islands National Park.

(a) [Reserved]

(b) Wrecks. No person shall destroy, molest, remove, deface, displace, or tamper with wrecked and abandoned water or airborne craft or any cargo pertaining thereto.

(c) Fishing. The taking of any fish, crustaceans, mollusk, or other marine life shall be in compliance with State regulations except that:

(1) No invertebrates may be taken in water less than five (5) feet in depth.

(2) The taking of abalone and lobsters for commercial purposes is prohibited in the following areas:

(i) Anacapa Island. Northside to exterior boundary of the monument between east end of Arch Rock 119 °21 – 34°01 and west end of island, 119 °27 – 34°01 .

(ii) Santa Barbara Island. Eastside to exterior boundary of monument 119 °02 – 33°28 and 119 °02 –33°29 30 .

(3)(i) The use of all nets is prohibited within the outer edge of the kelp line surrounding Anacapa and Santa Barbara Islands.

(ii) The use of trammel or gill nets is prohibited in less than 20 fathoms of water in all areas surrounding Anacapa and Santa Barbara Islands.

(4) The Superintendent shall require all persons fishing commercially within Channel Islands National Monument, on waters open for this purpose, to obtain an annual permit from him. Such permits shall be issued on request except that:

(i) Lobster permits for Anacapa and Santa Barbara Islands will be issued only to applicants who filed with the California State Department of Fish and Game fish receipts for lobsters caught at Anacapa and Santa Barbara Islands during the period July 1, 1968, to July 1, 1971.

(ii) Abalone permits for Anacapa and Santa Barbara Islands will be issued only to applicants who filed with the

APPENDIX D: MANAGEMENT ZONES OVERVIEW TABLES

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Table D-1: Ozark National Scenic Riverways Land-based Management Zones

	Developed	Resource-based recreation	Natural	Primitive
Zone concept	Areas support moderate to high levels of development and visitor services to accommodate concentrated visitor use and diverse recreational, educational, and interpretive opportunities. Most of the administrative facilities for operations and maintenance would be in this zone.	Areas support moderate levels of visitor use to accommodate a wide range of recreational, educational, and interpretive opportunities. Although some resource modifications could occur, natural and cultural resources would remain largely intact.	Areas support the broader ecological integrity of the national riverways. Natural processes would dominate and only low-impact recreational activities would be allowed. Visitors would be immersed in nature with opportunities to enjoy solitude and natural sights and sounds.	Areas retain their wild, natural character. Natural resources and processes would be preserved to maintain their pristine conditions and ecological integrity. Opportunities would be provided for visitors to experience backcountry challenges and solitude.
Levels of development	Moderate to high levels of development to meet visitor use and park administrative needs.	Moderate levels of development for the purpose of directing visitor use, enhancing recreational opportunities, and protecting resources.	Developments would be limited to those essential for resource protection, research, monitoring, and basic visitor services.	Minimal development would be allowed for the protection of natural resources and to allow for dispersed, low-impact visitor use.
–Facilities	Facilities could include visitor centers, contact stations, museums, exhibits, developed campgrounds, cabins, lodges, restaurants, dining halls, restrooms, picnic grounds, pavilions, kiosks, research stations, administrative buildings, maintenance shops, wastewater treatment plants, and storage areas.	Facilities could include semi-developed and semi-primitive campground and campsites, picnic grounds, restrooms, maintenance shops, and storage areas.	Facilities could include semi-primitive and primitive campgrounds and campsites, pit toilets, and remote storage areas.	Facilities could include a limited number of primitive campsites and trails. Minimal signage would be provided.
–Access	Visitor access would be convenient to a wide variety of recreational activities.	Visitor access would be convenient with a low to moderate level of difficulty.	Visitor access would require a moderate level of difficulty.	Visitor access would require a moderate to high level of skill and effort with nonmotorized equipment.
–Density and surface of roads, trails, and access points	Medium to high density of road and trail networks would ensure safe access and circulation for visitors. Paved roads, parking areas, viewing areas, trailheads, and foot paths would be common.	Low to medium density of road and trail networks would ensure safe access, circulation for visitors, and protection of resources. Gravel roads, parking areas, viewing areas, trailheads, and foot paths would be common. Surfaces of roads, trails, parking areas, and other heavy-use areas may be hardened where appropriate.	Low density of road and trail networks would ensure the natural setting is maintained and resources are protected. Roads, parking areas, trails, and trailheads would be gravel or unpaved.	Low density of unpaved trails would provide visitor access.
–Removal or modification of existing developments	Existing developments are consistent with the desired resource conditions of these zones.	Same as Developed.	Existing developments that are not consistent with the desired resource conditions could be removed or modified.	Existing developments that are not consistent with the desired resource conditions could be removed.
Visitor experience	Visitors would have opportunities to better understand the riverways' significant resources and values through a wide range of interpretive facilities and services, interact with other visitors and park staff, and recreate in an environment that is supported by a variety of visitor services. Visitors would experience a modified natural environment with developed visitor facilities for orientation; day and overnight use would concentrate most of the park's visitors in these areas. They also would have a high expectation for quality services and facilities.	Visitors would have opportunities to participate in a range of recreational, interpretive, and educational opportunities. Visitors would experience a mostly natural setting where some visitor services are available.	Visitors would encounter intact natural resources, features, and systems for personal inspiration, education, and recreation. Experiences could include opportunities for solitude, contemplation, and self-reliance. Evidence of human use would be limited.	Visitors would be immersed in a primitive, wild setting with opportunities to experience backcountry challenges, solitude, and self-reliance. Visitors would have a sense of remoteness, isolated from the sights and sounds of other people.
–Types of activities	See table 5 for a list of recreation opportunities available in each zone.	Same as Developed.	Same as Developed.	Same as Developed.
–Density of visitor use	Moderate to high density of visitor use.	Moderate to high density of visitors, especially at key access points and along trails during the peak season.	Low to moderate density of visitors, especially during the off-peak season.	Low density of visitors year-round.
–Frequency of encounters	Moderate to high encounter rates with other visitors engaging in a diversity of recreational activities.	Moderate encounter rates with other visitors engaging in a diversity of recreational activities.	Low encounter rates with other visitors, mostly engaging in nonmotorized recreational activities.	Very low encounter rates with other visitors year-round.
–Soundscapes	Sounds associated with concentrated visitor use, recreational activities, and park operations would frequently supplant the sounds of nature, especially during periods of peak use. During periods of low visitation, the natural soundscape would be more prevalent.	The natural soundscape would often be mixed with the sounds of human activity. During periods of low visitation, the natural soundscape would predominate.	The natural soundscape would be largely intact and would be an important part of the visitor experience. During periods of low visitation, the natural soundscape would predominate.	The natural soundscape would be largely intact. Natural sounds would predominate and would be an important part of the visitor experience.

Table D-1: Ozark National Scenic Riverways Land-based Management Zones (continued)

	Developed	Resource-based recreation	Natural	Primitive
Visitor services	Moderate to high level of visitor services could include one or more of the following: orientation and interpretive programs, signs, wayside exhibits, campgrounds, contact stations, commercial operations, convenience stores, dining, and shuttle services.	Moderate levels of visitor services would be provided, such as orientation and interpretive programs, signs and wayside exhibits, and commercial services if compatible with the desired resource conditions and visitor experiences.	Low levels of visitor services would be provided, such as informational signs and wayside exhibits.	Directional signs would be provided at trailheads. Limited interpretive materials might be available to promote safe and responsible recreation.
–Interpretation and education	Orientation, interpretation, and educational opportunities would be greatest in this zone. A wide array of structured and self-guided interpretive and educational programs, including cultural and natural events, would be offered. Specific, onsite interpretive themes would be presented.	A variety of structured and self-guided interpretive and educational programs would be offered. Specific, onsite interpretive themes would be presented.	Self-guided interpretive and educational opportunities would be available. Some structured programs would be offered occasionally during the peak season. Minimal onsite interpretation related to management and protection of natural and cultural resources would be provided.	Unstructured, self-guided opportunities would exist for visitors to discover nature and participate in primitive recreation. Some structured programs would be offered occasionally.
Natural resource condition	Natural resources would be managed to accommodate facilities for NPS operations and concentrated visitor use. The effects of developments and visitor use on the natural surroundings would be minimized through planning and design efforts.	Resources would be maintained in their natural condition, yet modified where necessary to provide distinct visitor opportunities and experiences. Modifications would be aesthetically blended with the environment as much as possible.	Ecological integrity would be maintained by preserving and restoring natural resources and processes through an integrated natural resource management approach. Emphasis would be placed on protecting and restoring outstanding natural features and habitats for rare and endangered species.	Natural systems and processes would function independent of human intervention. Natural conditions would be restored when disturbed by human activity, but only if degraded sites are not expected to recover in a timely manner without human intervention. No development would occur.
–Restoration of degraded sites	Degraded sites would be evaluated to determine if they should be restored or continue to be managed to accommodate visitor use.	Same as Developed.	Same as Developed.	Degraded sites would be evaluated to determine if they should be restored.
–Level of modifications	Visitors would experience a highly modified environment that accommodates visitor use and park operations. Modifications would be aesthetically blended with the environment as much as possible and designed to minimize resource impacts.	Natural resources may be modified to ensure resource protection, create scenic views, provide appropriate facilities for safety and sanitation, and accommodate visitor access and use.	Modifications of natural resources would only occur when necessary to achieve resource management objectives or to mitigate for human-caused impacts.	Modifications of natural resources would only occur when necessary to achieve resource management objectives or to mitigate for human-caused impacts. Evidence of modifications would be unobtrusive.
–Fire suppression	Fires would be managed to protect human life and property and reduce fuel loading.	Fires would be suppressed when necessary to protect human life and property.	Same as Resource-based Recreation.	Fires would be suppressed when necessary to protect human life and property. Wildland fires may be allowed to burn to maintain natural disturbance regimes and ecological integrity.
–Prescribed fire	Prescribed fire may be used.	Management-ignited prescribed fire or prescribed natural fire may be used to achieve resource management objectives when feasible.	Same as Resource-based Recreation.	Same as Resource-based Recreation.
–Open fields	Selected open fields would be maintained by hay leases, prescribed burning, mechanical, and/or approved chemical or biological methods. Others would be left unmanaged to revert back to nature.	Same as Developed.	Same as Developed.	Same as Developed.
–Invasive exotic species and extirpated species	Invasive exotic species would be eradicated where feasible. Extirpated species would be reintroduced where feasible.	Same as Developed.	Same as Developed.	Same as Developed.
–Scenery	Opportunities would be provided for visitors to access and experience the scenery of the park from designated overlooks.	Same as Developed.	Same as Developed.	Same as Developed.
–Maintenance and modification of designated overlooks	Designated overlooks would be modified to maintain scenic vistas and to accommodate public access and moderate to high levels of use.	Designated overlooks would be modified to maintain scenic vistas and to accommodate public access and moderate levels of use.	Designated overlooks would be maintained in a manner that would not degrade the natural setting.	Natural resources would be protected to perpetuate the wild primitive character of the landscape as viewed from designated overlooks of the park.

Table D-1: Ozark National Scenic Riverways Land-based Management Zones (continued)

	Developed	Resource-based recreation	Natural	Primitive
Cultural resource condition	Cultural resources eligible for or listed in the National Register of Historic Places would be protected and managed consistent with NPS policies and the standards published by the secretary of the interior. All other cultural resources would be evaluated to determine if they should be preserved, stabilized, restored, or left unmaintained.	Same as Developed.	Same as Developed.	Same as Developed.
– *Cultural resources treatments*	Appropriate treatments would include preservation, stabilization, restoration, and rehabilitation.	Same as Developed.	Appropriate treatments would primarily include preservation and stabilization consistent with management efforts to promote natural processes and ecological integrity.	Same as Natural.
– *Visitor use and interpretation of cultural resources*	As appropriate, selected cultural resources would provide distinct visitor opportunities and experiences, and would be the backdrop for interpretation, visitor use, and services.	As appropriate, selected cultural resources would be preserved to reflect their period of significance, allowing people to experience these resources first-hand and learn about their associated stories and events.	As appropriate, selected cultural resources would be preserved or stabilized to provide opportunities for visitor use and education.	Same as Natural.
– *Historic sites and structures*	At a minimum, historic structures would be preserved and stabilized as feasible to correct unsafe conditions and inhibit the adverse impacts of weathering on historic fabric. More extensive restoration / rehabilitation treatments would be carried out for selected historic structures and sites to enhance visitor educational and interpretive opportunities. Cemeteries would be documented, protected, and evaluated to determine appropriate levels of preservation, maintenance, and public or private access.	Same as Developed.	Preservation and stabilization of historic structures would be carried out as feasible to correct unsafe conditions and inhibit the adverse impacts of weathering on historic fabric.	Same as Natural.
– *Archeological resources*	Archeological resources would be preserved in *situ*, stabilized as necessary, and left undisturbed unless identified for approved archeological investigations. Sites that cannot be avoided by construction activities, or are subject to disturbance by visitor use impacts or natural processes, would be adequately mitigated in accordance with section 106 compliance and consultation requirements.	Same as Developed.	Same as Developed.	Same as Developed.
– *Historic districts and cultural landscapes*	Historic districts (that is, properties having an array of contributing historic structures and/or cultural landscape features that evoke the historic setting and spatial extent / arrangement of the site) would be protected and managed in accordance with NPS polices and the standards published by the secretary of the interior. Character-defining features of identified cultural landscapes (for example, vegetation and other natural features, patterns of access and circulation, constructed water features, and small-scale elements such as walls and walkways) would be preserved and managed in accordance with the *Secretary's Standards and Guidelines for the Treatment of Cultural Landscapes*. Selected historic structures within the districts could be rehabilitated and adaptively used and/or incorporated into opportunities for visitor use and interpretation. New construction and other development activities would be limited to preserve the historic setting and viewsheds.	Same as Developed.	Same as Developed.	Same as Developed.
– *Ethnographic resources*	Ethnographic resources would be managed in accordance with NPS policies to protect and provide access to resources and places that are important for preserving the heritage, identity, and values of culturally associated peoples (including American Indian tribes and other groups with ancestral ties to the area).	Same as Developed.	Same as Developed.	Same as Developed.

Table D-2: Ozark National Scenic Riverways River-based Management Zones (includes rivers up to the ordinary high-water mark)

	Mixed-use	Seasonal mixed-use	Nonmotorized
Zone concept	The river supports a mix of motorized and nonmotorized boating opportunities. The natural setting would predominate, but the sights and sounds of human activity would be prevalent.	The river supports a mix of nonmotorized and lower-horsepower motorized boating during the off-peak season, which occurs from after Labor Day through March 14. The rest of the year, only nonmotorized boating would be allowed. The natural setting would predominate, but the social setting would vary seasonally with the types of allowable activities and levels of use.	The river supports year-round, nonmotorized boating opportunities. Visitors would experience an unaltered river system where natural sights and sounds would predominate, except during peak use when recreational activity would be more apparent.
Levels of development	Low to moderate levels of development would be provided to accommodate launching and retrieving motorized and nonmotorized watercraft on the river. Locating new developments or improvements in the floodplain would be avoided where possible.	Same as Mixed-use.	Low levels of development could be provided to accommodate launching and retrieving only nonmotorized watercraft on the river. Locating new development or improvements in the floodplain would be avoided.
– Facilities	Facilities could include: developed watercraft launches, restrooms, picnic tables, and trash receptacles at designated river access points.	Same as Mixed-use.	Facilities could include: semi-developed watercraft launches, restrooms, picnic tables, and trash receptacles at designated river access points.
– Access	There would be a low to moderate density of designated river access points. A low density of designated river fords would be provided.	Same as Mixed-use.	There would be a low density of designated river access points. No river fords would be designated.
– Commercial shuttle services	Commercial shuttle services would be available to boat launch areas.	Same as Mixed-use.	Same as Mixed-use.
Visitor experience	Visitors would have opportunities to engage in a diverse mix of motorized and nonmotorized boating experiences.	Visitors would have the opportunity to float the river without the presence of motorized boats during the peak season, which is defined as March 15 through Labor Day. During the off-season, visitors would have opportunities to engage in a mix of lower-horsepower motorized and nonmotorized boating experiences.	Visitors would have the opportunity to float the river without the presence of motorized boats year-round.
– Types of activities	See table 5 for a list of recreation opportunities available in each zone.	Same as Mixed-use.	Same as Mixed-use.
– Motorized boating	Motorboats would be allowed year-round. Horsepower restrictions would vary among the alternatives from 25 horsepower maximum to 60/40 horsepower maximum to no horsepower restrictions. See table 4 for motorboat horsepower restrictions by alternative.	Motorboats would only be allowed during the off-peak season. Horsepower restrictions would vary among the alternatives from 10 horsepower maximum to 25 horsepower maximum during the off-peak season. See table 4 for motorboat horsepower restrictions by alternative.	No motorized boats would be allowed.
– Density of visitor use	A moderate density of boaters would occur during most of the year. Periodically, there would be higher densities of motorized and nonmotorized boaters along popular stretches of the river during the peak season.	A low to moderate density of boaters would occur during most of the year. Periodically, there would be higher densities of nonmotorized boaters along popular stretches of the river during the peak season.	A low to moderate density of boaters would occur during most of the year. Periodically, there would be higher densities of nonmotorized boaters along popular stretches of the river during the peak season.
– Frequency of encounters	Visitor encounters would typically be moderate to high, especially during peak use. During the peak season, some sections of the river would be managed for dispersed visitor use with low encounter rates.	Visitor encounters would typically be moderate to high, especially during peak use. During the peak season, some sections of the river would be managed for dispersed visitor use with low encounter rates.	Visitor encounters would typically be low to moderate, especially during peak use. During the peak season, some sections of the river would be managed for dispersed visitor use with low encounter rates.
– Soundscapes	Sounds of recreational activities would be prevalent, with limited opportunities to experience natural sounds, especially during the peak season. The natural soundscape would often be mixed with the sounds of human activity and motorized boats.	During the motorized boating season, the natural soundscape would often be mixed with the sounds of human activity and motorized boats. During the nonmotorized boating season, natural sounds would be more prevalent.	Natural sounds would predominate and would be an important part of the visitor experience. Rivers and riverbanks would be free from the sounds of motorized boats and vehicles. During periods of peak use, the sounds of visitors would be apparent.
– Presence of vehicles	Visitors may encounter vehicles at designated campgrounds and access point along the riverways.	Same as Mixed-use.	Same as Mixed-use.
– Orientation / interpretive signs	Orientation and interpretive signs and informational bulletin boards would be available.	Same as Mixed-use.	Same as Mixed-use.
– Likelihood of encountering NPS staff	Visitors would have a moderate to high likelihood of encountering NPS staff.	Same as Mixed-use.	Same as Mixed-use.
– Frequency of NPS patrols	On the river, there would be moderate to high frequency of NPS patrols, particularly during the peak season.	Same as Mixed-use.	On the river, there would be a low to moderate frequency of NPS patrols, except during the peak season when patrols would be more frequent.

TABLE D-2: OZARK NATIONAL SCENIC RIVERWAYS RIVER-BASED MANAGEMENT ZONES (INCLUDES RIVERS UP TO THE ORDINARY HIGH-WATER MARK) (continued)

	Mixed-use	Seasonal mixed-use	Nonmotorized
Natural resource condition	The natural resource conditions in the river corridor would be managed to ensure that the free-flowing clear, clean water of the river was not degraded.	Same as Mixed-use.	Same as Mixed-use.
–Enhancement	Resource conditions would be enhanced by regulating motorboat horsepower.	Resource conditions would be seasonally enhanced by limiting these sections of the river to nonmotorized boating only.	Resource conditions would be enhanced year-round by limiting these sections of the river to nonmotorized use.
Cultural resource condition	Cultural resources eligible for or listed in the National Register of Historic Places would be protected and managed consistent with NPS policies and the standards published by the secretary of the interior. All other cultural resources would be evaluated to determine if they should be preserved, stabilized, restored, or left unmaintained. Cultural resources that are subject to bank erosion, slumping, subsidence, or other natural deterioration would be stabilized using best management practices.	Same as Mixed-use.	Same as Mixed-use.

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APPENDIX E: CONSULTATION LETTERS

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United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

Governor Larry Nuckolls
Attn: Lt. Governor Scott Miller
Absentee Shawnee Tribe
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Dear Governor Nuckolls:

Thank you for agreeing to host our visit Wednesday, October 18, at approximately 3 p.m. It is our opinion that your Tribe has a cultural affiliation with this National Park area. In respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and whomever you think is appropriate from your staff to discuss the planning process and the appropriate places that you, as an Affiliated Tribe, might want to be involved. This meeting would also give us a chance to get acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,

/s/ Noel R. Poe

Noel R. Poe
Superintendent

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR

NRP/pld M104 Absentee Shawnee

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

Principal Chief Chad Smith
Cherokee Nation
P.O. Box 948
Tahlequah, Oklahoma 74465

Dear Chief Smith:

Thank you for agreeing to host our visit Tuesday, October 17, at 1:00 p.m. You may recall that we came over in August 2003 and met with Richard Allen. It is our opinion that your Tribe has a cultural affiliation with this National Park area. In respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and whomever you think is appropriate from your staff to discuss the planning process and the appropriate places that you, as an Affiliated Tribe, might want to be involved. This meeting would also give us a chance to get re-acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,

/s/ Noel R. Poe

Noel R. Poe
Superintendent

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR
NRP/pld M101.Cherokee

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

President Edgar French
Attn: Summer Harris
Delaware Nation
P.O. Box 825
Anadarko, Olkahoma 73005

Dear President French:

Thank you for agreeing to host our visit Wednesday, October 18, at approximately 10:30 a.m. It is our opinion that your Tribe has a cultural affiliation with this National Park area. In respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and whomever you think is appropriate from your staff to discuss the planning process and the appropriate places that you, as an Affiliated Tribe, might want to be involved. This meeting would also give us a chance to get acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,

/s/ Noel R. Poe

Noel R. Poe
Superintendent

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR

NRP/pld M103.Delaware Nation

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

Chief Jerry Douglas
Attn: Ann Swearingson
Delaware Tribe
170 NE Barbara Avenue
Bartlesville, Oklahoma 74003

Dear Chief Douglas:

Thank you for agreeing to host our visit Thursday, October 19, at 2:00 p.m. You may have been briefed by staff that we came over in August 2003 for a visit. It is our opinion that your Tribe has a cultural affiliation with this National Park area, and in respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and whomever you think is appropriate from your staff to discuss the planning process and the appropriate places that you, as an Affiliated Tribe, might want to be involved. This meeting would also give us a chance to get acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,

/s/ Noel R. Poe
Noel R. Poe
Superintendent

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR

NRP/pld M106.Delaware Tribe

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

Chief Charles Enyart
Eastern Shawnee Tribe
P.O. Box 350
Seneca, Missouri 64865

Dear Chief Enyart:

Thank you for agreeing to host our visit Friday, October 20, at 9 a.m. We look forward to meeting with you, if possible, and with Cultural Preservation Officer Robin Duschane and Administrative Officer Dorothy McCormick. You may recall that we came over in August 2003 to meet with you. It is our opinion that your Tribe has a cultural affiliation with this National Park area, and in respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and your staff to discuss the planning process and the appropriate places that you as an Affiliated Tribe might want to be involved. This meeting would also give us a chance to get re-acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,
/s/ Noel R. Poe

Noel R. Poe
Superintendent

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR

NRP/pld M108.Eastern Shawnee Enyart

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

Chairman Ron Sparkman
Attn: Tribal Administrator Rebecca Hawkins
Shawnee Tribe
P.O. Box 189
Miami, Oklahoma 74355

Dear Chairman Sparkman:

Thank you for agreeing to host our visit Monday, October 16, at 2:30 p.m.. It is our opinion that your Tribe has a cultural affiliation with this National Park area. In respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and whomever you think is appropriate from your staff to discuss the planning process and the appropriate places that you, as an Affiliated Tribe, might want to be involved. This meeting would also give us a chance to get acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,

/s/ Noel R. Poe

Noel R. Poe
Superintendent

NRP/pld M100.Shawnee

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

Chief George Wickliff
Attn: Lisa Stopp
United Keetoowah Band of Cherokee
P.O. Box 746
Tahlequah, Oklahoma 74464

Dear Chief Wickliff:

Thank you for agreeing to host our visit Tuesday, October 17, at 3:00 p.m. It is our opinion that your Tribe has a cultural affiliation with this National Park area. In respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and whomever you think is appropriate from your staff to discuss the planning process and the appropriate places that you, as an Affiliated Tribe, might want to be involved. This meeting would also give us a chance to get acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,

/s/ Noel R. Poe

Noel R. Poe
Superintendent

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR

NRP/pld M102.United Keetoowah

RECEIVED
SEP 26 2011
Ozark National
Scenic Riverways

TRIBAL HISTORIC PRESERVATION OFFICE

Date: September 23, 2011 **File: 1112-63MO-10**

RE: NPS Ozark National Scenic Riverways General Management Plan

Ozark National Scenic Riverways
Reed E. Detring
P.O. Box 490
Van Buren, MO 63965

Dear Mr. Detring,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed NPS Ozark National Scenic Riverways General Management Plan. **The Osage Nation requests a copy of the Draft General Management Plan.**

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S.C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d)(6)(A), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Osage Nation has a vital interest in protecting its historic and ancestral cultural resources. **The Osage Nation anticipates reviewing and commenting on the Draft of the proposed NPS Ozark National Scenic Riverways General Management Plan.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

James Munkres
Archaeologist I

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
D18 GMP (xH2217)

OCT 7 2011

Mr. James Munkres
Osage Nation, Archaeologist I
627 Grandview
Pawhuska, Oklahoma 74056

Dear Mr. Munkres:

Thank you for your letter of September 23, 2011, in which you request a copy of the park's Draft General Management Plan (GMP). At this time the Draft GMP has not yet been completed. Your name and mailing address is now added to our mailing list so that you will receive future notices of the progress of this GMP.

The latest document that went out to the public was *the Summary Newsletter and Preliminary Alternatives Newsletter #3, Spring/Summer 2009*. This document can be viewed on the park's website at http://parkplanning.nps.gov/. See enclosures copied from the website to assist you in locating information regarding the GMP. Go through the indexes to find our park in Missouri under the name of Ozark National Scenic Riverways. The project is entitled General Management Plan, Wilderness Study, Environmental Impact Statement. Click on the document list for numerous documents pertaining to the GMP. In previous correspondence with the Osage Nation, upon the printing of the *Preliminary Alternatives*, a copy was mailed to the Principal Chief. In November of 2010 we provided the Tribal Historic Preservation Officer Dr. Andrea A. Hunter with a copy of this document as well. We hope this information will assist you. If you need further assistance, please do not hesitate to contact my secretary Patty Dorris at 573-323-4852.

The next major step in the planning process is to prepare the Draft General Management Plan/Wilderness Study/Environmental Impact Statement (GMP/WS/EIS). This document will present the planning alternatives in detail, including the National Park Service's preferred alternative. It will include analysis of impacts on the park's natural and cultural resources, the visitor experience, and the socioeconomic environment (both inside and outside the park).

The following outlines the next steps and the planned timeframes:

▪ **Refine planning alternatives and identify an agency preferred alternative.** The planning team will identify an agency preferred alternative. The preferred alternative may be one of the alternatives in the existing alternatives, it may include elements from several of the alternatives (including the no-action alternative), or it may be an entirely new alternative.	April 2011

▪ **Prepare/Print a Draft Plan.** A Draft GMP/WS/EIS will be prepared to present the draft alternatives and environmental impacts. The director of the NPS Midwest Region must approve this document before it is distributed to the public.	January 2012
▪ **Invite Public Comment.** The public will be invited to review and comment on the draft plan. The public may comment at public open houses, through written comments, and through the NPS Planning, Environment and Public Comment (PEPC) website.	February 2012
▪ **Prepare/Print a Final Plan.** The team will analyze public comments on the draft document, prepare responses to substantive comments, and make appropriate revisions to the draft document. The Final General Management Plan/Wilderness Study/Environmental Impact Statement will then be distributed to the public.	October 2012
▪ **Implement the Approved Plan.** A "Record of Decision" will be issued to adopt the approved management plan. The approved plan will then be implemented as funding allows. The findings of the Wilderness Study will be transmitted, as appropriate, to the NPS Director, Secretary of the U.S. Department of the Interior, Congress, and finally, the President.	November 2012 and beyond.

We hope that we have satisfied your inquiry. Do not hesitate to give us a call if we may be of further assistance. We appreciate your interest in Ozark National Scenic Riverways.

Sincerely,

Reed E. Detring
Superintendent

Enclosures

General Management Plan, Wilderness Study, Environmental Impact Statement

Ozark National Scenic Riverways » General Management Plan, Wilderness Study, Environmental Impact Statement » Document List

Dear Friends of Ozark National Scenic Riverways,

I would like to thank everyone for the excellent response we received on the preliminary alternatives for the General Management Plan / Wilderness Study. The turnout at the five June 2009 open houses was very large and we received a high volume of written comments. Because of that volume, it has taken a while to read all of the comments; put them into the Planning, Environment, and Public Comment (PEPC) database; and prepare a summary for the public.

I understand that there is a high level of interest in these comments and to ensure transparency in our process, we have posted the following documents on this PEPC site. These documents can be downloaded and printed:

- Public Comment Summary
- Tables of Complete Comments that are sorted by:
  - Correspondence ID (order they were put into the database)
  - Zip code
- Open House Flip Chart Comments (five files)
- Map showing distribution and density of public comments

To view these documents, please click on the Document List to the left and then select the document(s) you wish to read.

Given the variety of concerns and suggestions that we are hearing from the public, the National Park Service will be doing additional work in 2010 and 2011 to revise and refine the planning alternatives and develop the agency's preferred alternative. Included in the process will be work to better understand the impacts of these alternatives on the natural, cultural, social, and economic environment of the national riverways. The park staff will also be seeking funding to complete studies in the areas of social and natural science to support agency decisions.

The revised alternatives, including the NPS preferred alternative, will be presented in a printed Draft General Management Plan / Wilderness Study / Environmental Impact Statement. Upon release of this document, there will be an extensive public review and comment period. The NPS Midwest Regional Director will not approve a final management plan until all comments on the draft plan are reviewed and considered.

Sincerely,
Reed E. Detring, Superintendent

Document List

Ozark National Scenic Riverways » General Management Plan, Wilderness Study, Environmental Impact Statement

Select a document to review or comment:

- Columbia, Missouri, Open House Flip Chart Notes
- Eminence, Missouri, Open House Flip Chart Notes
- Ozark National Scenic Riverways Stakeholder Workshop Report
- Public Comment Distribution Map
- Public Comment Summary Report on the Preliminary Alternatives
- Public Comments Correspondence Table Organized by Correspondence ID Number
- Public Comments Correspondence Table Organized by Correspondence ID Supplement
- Public Comments Correspondence Table Organized by Zip Code
- Salem, Missouri, Open House Flip Chart Notes
- St. Louis, Missouri, Open House Flip Chart Notes
- Van Buren, Missouri, Open House Flip Chart Comments
- a. Ozark NSR, GMP - Summary Newsletter and Preliminary Alternatives Newsletter #3, Spring/Summer 2009
- b. Ozark NSR, GMP - Newsletter #2 - Summer 2007
- c. Ozark NSR, GMP - Newsletter #1, Summer 2006

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
H2217

October 6, 2006

Principal Chief Jim R. Gray
Attn: David Conrad
Osage Nation
P.O. Box 779
Pawhuska, Oklahoma 74056

Dear Chief Gray:

Thank you for agreeing to host our visit Thursday, October 19, at 11:00 a.m. You may recall that we came over in August 2003 and met with you and some of your staff. It is our opinion that your Tribe has a cultural affiliation with this National Park area, and in respect and recognition of this, we are seeking your input.

The park is starting a planning process for a new General Management Plan (GMP). The GMP is the document that provides guidance for future managers over the next 15 to 20 years. As of this date the "*Notice of Intent*" has not been printed in the Federal Register, but we expect it in the next few weeks. However, I would like to meet with you and whomever you think is appropriate from your staff to discuss the planning process and the appropriate places that you, as an Affiliated Tribe, might want to be involved. This meeting would also give us a chance to get re-acquainted and discuss any other necessary issues.

Accompanying me will be Deputy Superintendent Russ Runge and Archeologist Dr. Jim Price. I expect that our meeting should take less than one hour. If something comes up and you become busy, please arrange to have us meet with the appropriate staff or other leaders in your Tribe. Should you ever have any questions, please give me a call at (573) 323-4236, extension 225.

Sincerely,

/s/ Noel R. Poe

Noel R. Poe
Superintendent

bcc: Mary McVeigh, DSC
Sandra Washington, MWR
Gary Candelaria, MWR
NRP/pld M105.Osage Indian

OZARK NATIONAL SCENIC RIVERWAYS GENERAL MANAGEMENT PLAN TRIBAL CONSULTATION TRIP TO OKLAHOMA FOR MEETINGS WITH EIGHT NATIVE AMERICAN TRIBES

Compiled By James E. Price, Archeologist, ONSR

Representatives of ONSR:

1. Noel Poe, Superintendent, ONSR
2. Russ Runge, Deputy Superintendent, ONSR
3. James E. Price, Ph.D., Cultural Resources Manager/Anthropologist/Archeologist

Dates of Trip: October 16 through October 20, 2006.

This was a followup visit to the trip made in the Summer of 2003 to the Affiliated Tribes. This trip we were able to make arrangements to visit all 8 Native American Tribes. Approximately 1300 miles were put on the odometer to complete these visits.

Poe, Runge, and Price departed ONSR Headquarters at 8:45 a.m. on October 16, 2006, stopping for lunch in Springfield, Missouri. On the way Poe discovered that only one complete copy of the GMP newsletter was available and that more were needed, one for each tribe consulted. The consultation team arrived in Miami, Oklahoma approximately 1:45 p.m. and located the tribal headquarters of The Shawnee Tribe. The team entered the headquarters building at 2:25 p.m.

Consultation With The Shawnee Tribe:

ONSR representatives met with Rebecca Hawkins in the conference room of the tribal headquarters. Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. Poe also presented a DVD containing imagery of ONSR. Poe asked for any input by the Shawnees into the GMP process. J. Price described the archeological and historical evidence for Shawnee occupation of lands now within Ozark National Scenic Riverways. Rebecca Hawkins gave an oral presentation on history of the Shawnee Tribe and gave Poe, Runge, & Price each a brief written history of the tribe. Poe and Hawkins discussed ways that ONSR and the Shawnee Tribe could work together for public education. Rebecca Hawkins presented Poe, Runge, and Price with tribal pins, depictions of the tribal seal, a turkey feather, and an eagle feather. After leaving the meeting, Poe directed Runge to call Patty Dorris and have Rebecca Hawkins' name added to the ONSR-GMP mailing list, per Hawkins request.

The ONSR tribal consultation team departed Miami, Oklahoma and drove to Tulsa to spend the night. J. Price used his cell phone to locate addresses for Office Depot stores in Tulsa. Upon arrival in Tulsa in the late afternoon, the team went to an Office Depot store and had facsimile copies of the GMP newsletter made. Plastic sleeves were purchased at the store also. The team took lodging in the LaQuinta Inn in Tulsa.

On the morning of Tuesday, October 17, 2006, the consultation team drove to Tahlequah, Oklahoma for two meetings, the first with The Cherokee Nation and the second with the Keetoowah Band of Cherokee.

Consultation With The Cherokee Nation

At 1:30 p.m. on October 17, 2006, the consultation team met in a meeting room in Tribal Headquarters with Principal Chief Chad Smith. Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. Poe also presented a DVD containing imagery of ONSR. He invited the Principal Chief Chad Smith to visit Ozark National Scenic Riverways. Principal Chief Smith presented Poe with DVD on anniversary of Cherokee Constitution. Chief Smith expressed willingness for ONSR to provide a link to the tribal website, www.cherokee.com. The meeting lasted approximately 20 minutes.

Consultation With The Keetoowah Band Of Cherokee

The consultation team then went to the headquarters of The Keetoowah Band of Cherokee located in another area of Tahlequah, Oklahoma. At approximately 3:20 p.m. On October 17, 2006, the group entered the administrative office building and waited for tribal contact person, Lisa Stopp to arrive. She was not immediately available and was on a return trip from giving a tour of Cherokee cemeteries near the Arkansas/Oklahoma line. When she arrived, she explained she had been escorting a scholar who was studying Cherokee graves with little wooden structures on top representing central place and a holdover when Cherokee burials were made in house floors.

The meeting took place in a room in the administrative office building. The Keetoowah Band of Cherokee more closely follows the traditional practices than the Cherokee Nation. Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. Poe also presented a DVD containing imagery of ONSR. J. Price described known Shawnee archeological sites in Ozark National Scenic Riverways. Price described the Broadfoot Cemetery on ONSR and Stopp stated an interest in entering into an agreement with NPS concerning a reburial ground for NAGPRA interments of all tribes. Stopp was interested in this possibility because often times when human Indian remains are discovered they are in a developed area where it is difficult for a proper

burial in the immediate vicinity. In her opinion having a site inside a national park area would protect the re-burial graves and provide a sense of peace. We did not know the NPS policies on such an action but expressed interest because there are over 30 cemeteries within the park, such as the one existing at Broadfoot, and some of these are still active.

Superintendent Poe invited Stopp and other representatives of the Keetoowah Band to ONSR. There was an in-depth discussion concerning Cherokee involvement in the GMP process. A discussion followed of having Keetoowah Cherokee at the Haunting In The Hills Event at Alley Mill in October, 2007. It was suggested that if Stopp could bring some Tribal cultural demonstrators that she could visit the Broadfoot Cemetery. The Broadfoot family of Shannon County trace part of their ancestry to Cherokee origins. Stopp mentioned once more her desire to explore the potential of using part of the Broadfoot Tract as a NAGPRA burial ground. Lisa Stopp told story of role of the spider in delivering the first fire to the Cherokee. Superintendent Noel Poe requested permission to provide a link on the ONSR website to the website of The Keetoowah Band Of Cherokee and permission was granted. This meeting was much more cordial than the 2003 meeting.

The consultation team departed Tahlequah at 4:10 p.m. and drove to Muskogee, Oklahoma where they visited the Gift Shop in The Five Civilized Tribes Museum. Gifts were purchased for staff members who assisted in compiling the notebooks presented to each tribe by Noel Poe.

The consultation team spent the night in Oklahoma City, Oklahoma. The next morning they departed and drove to Anadarko for a meeting with a representative of The Delaware Nation.

Tribal Consultation With The Delaware Nation

The consultation team arrived at the headquarters building of The Delaware Nation and at approximately 10:30 a.m. conducted a meeting with Tamara Francis, Director of NAGPRA/Cultural Preservation for the tribe. Also present were three other individuals including Summer Harris, Tamara's assistant. Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. Poe also presented a DVD containing imagery of ONSR. Tamara Francis asked numerous questions about ARPA and NAGPRA which J. Price addressed. Noel Poe requested permission to provide a link on the ONSR website to the website of The Delaware Nation. J. Price described archeological and historical evidence of the presence of Delaware Indians within the present bounds of Ozark National Scenic Riverways. Noel Poe invited Tamara Francis to ONSR. She then took Poe, Runge, and Price on a tour of the tribal museum followed by an invitation to view a Delaware Nation Big House under construction on a hill slope a short distance from the headquarters building. The group was driven in a van to the

ceremonial grounds to examine the Big House. The carpenter/craftsman, Mike Watkins, was introduced and a tour was given of the ceremonial structure which was constructed on very large cedar posts. Each post was carved with the effigy of a human face on one side. Modern construction materials were employed in the frame, sheathing, and roof. Tamara then took the consultation team to their Tribal Museum and to view graphic panels depicting history of The Delaware Nation. Tamara explained that Chief Edgar French was ill and undergoing surgery with several members of the Tribal Council at the hospital with him.

The consultation team then drove to Shawnee, Oklahoma for consultation with The Absentee Shawnee Tribe. The consultation team arrived early and spent some time in the tribal gift shop and library. On October 18, 2006 at approximately 3:00 p.m. the meeting began.

Tribal Consultation With The Absentee Shawnee Tribe

The consultation team met with Scott Miller, Lt. Governor. The meeting was in Building 1 of the tribal complex. Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. Mr. Miller stated that he had attended college and Joplin, Missouri and on sports trips had been in Rolla indicating he was familiar with the Missouri Ozark Highland. He commented on the beauty of the Ozarks. He and his uncle had also visited Old Appleton on Apple Creek north of Cape Girardeau to view the homeland of the Absentee Shawnee peoples. They had also been in Cape Girardeau. Miller expressed concern concerning NAGPRA issues and J. Price explained how ONSR complied with the regulations by working with Judith Deel of DNR-HPP and the Missouri NAGPRA coordinator. He also gave business cards of Karen Kaniatobe to the consultation team members as she is the Tribe's Historic Preservation Officer. Permission was granted by Mr. Miller to provide a link on the ONSR website to the Absentee Shawnee website.

The consultation team departed Shawnee, Oklahoma at 3:45 p.m. and drove to Tulsa, Oklahoma to spend the night in the same LaQuinta Inn the team occupied on Monday night.

On the morning of October 19 the team departed for Pawhuska, Oklahoma for consultation with The Osage Nation. The team arrived early and toured the Osage Nation Tribal Museum and gift shop.

Consultation with The Osage Nation

At 11:00 a.m. the consultation team met with a group of six representatives of The Osage Nation. Those present representing the Osage Nation were:

1. Johnny Red Eagle, Assistant Chief
2. Eddy Red Eagle, Osage Native Congress Congressman, Chair of Cultural Committee
3. Faren Revard Anderson, Representative in Congress, Chair of Natural Resources Committee
4. Diane Daniels, Director of Osage Environmental and Natural Resources Department
5. David Conrad, Governmental Relations Specialist for The Osage Nation
6. Jim Gray, Principal Chief (Entered briefly to meet the consultation team from ONSR).

Following introductions, Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. David Conrad expressed NAGPRA concerns both he and Eddy Red Eagle cited some dissatisfaction with the Missouri DNR-Historic Preservation Program. Conrad mentioned lawsuits between Native American Tribes and DNR-HPP and that a new office had been opened to deal with relations with Native Americans. Conrad requested a copy of Maria Zedeno's scholarly study in establishing the affiliated tribes of Ozark National Scenic Riverways. Eddy Red Eagle presented a detailed discourse on the history of the Osage Nation and stressed its dominance in the 18th Century from the Mississippi River westward to the Rocky Mountains. He explained that when the survivors of the Osage Tribe left Fort Osage, tribal elders instructed their people to forget their history and traditional practices. Mr. Red Eagle said he is leading a movement to reconstruct Osage history and is working with The University of Arkansas-Fayetteville and University of Missouri-Columbia. He also stated that historic Osage medicine bundles are curated at The Gilcrease Foundation in Tulsa. J. Price and Mr. Red Eagle discussed the scholarly work of the late Dr. Carl H. Chapman of the University of Missouri-Columbia and that Price, at the onset of his career as an archeologist, has first worked for Chapman on the Vernon County, Missouri Osage sites. Noel Poe invited representatives of The Osage Nation to visit Ozark National Scenic Riverways. Permission was sought and granted to provide a link on the ONSR website to the website of The Osage Nation. The park learned that the Osage Nation had just re-organized its form of government and established a one-house Congress with the Principal Chief and Ass't Chief leading the Congress. This was a very productive meeting as evidenced by the number of ranking officials in attendance. It is expected that some members of this meeting will visit ONSR.

The ONSR tribal consultation team departed Pawhuska and drove to Bartlesville to meet with representatives of The Delaware Tribe of Indians.

Consultation With The Delaware Tribe Of Indians

The tribal consultation team entered into a meeting with The Delaware Tribe of Indians at approximately 1:45 p.m. on 10-19-06. The meeting was in a new building of the health services complex. Those present at the meeting were Chief Jerry Douglas, Vicki Sousa, Tribal Attorney, and a tribal member, Ernest Tiger. Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. Chief Douglas related that because of a lawsuit and District Judge's opinion, the Delaware Tribe Of Indians no longer has Federal tribal status and had been removed from the Register. The Oklahoma Congressional Delegation has introduced legislation into the U.S. Congress to give Federal recognition to Delaware Tribe of Indians at Bartlesville. Whether or not this legislation passes Congress may depend on the heated Tribal election on November 16, 2006. A phone call was placed to Judith Deel of Missouri DNR-Historic Preservation Program by J. Price to inquire if that agency has continued to recognize The Delaware Tribe of Indians as an ethnic entity. Judith Deel stated that Missouri DNR-HPP no longer recognizes The Delaware Tribe of Indians as a tribe affiliated with Missouri. Therefore, it is recommended that The Delaware Tribe of Indians at Bartlesville, Oklahoma no longer be considered an Affiliated Tribe of Ozark National Scenic Riverways.

The Chief also told the consultation team that the tribe had to sell its headquarters building in Bartlesville because of excessive utility bills. Mr. Douglas requested a copy of Maria Zedeno's scholarly study establishing the affiliated tribes of Ozark National Scenic Riverways. Permission was sought and was granted for providing a link on the ONSR website to The Delaware Tribe Of Indians website.

The consultation team departed Bartlesville and drove to Joplin, Missouri for the night, arriving there at 5:15 p.m. On the morning of 10-20-06 the team drove from Joplin and arrived at Seneca, Missouri at 7:45 a.m.

Consultation with The Eastern Shawnee Tribe

Poe, Runge, and Price met with Robin Dushane in the Eastern Shawnee Administrative Headquarters Building in Oklahoma, a few hundred yards west of the Missouri-Oklahoma line. Ms. Dushane relayed that Chief Gray was at the hospital with his wife and had called to apologize for missing our meeting. Noel Poe opened the meeting with a description of Ozark National Scenic Riverways and an explanation of the General Management Plan process. This was accomplished by showing the contents of a notebook containing descriptive text, photos, and maps. Robin Dushane asked numerous questions throughout the meeting and these were addressed by members of the consultation team. Both ARPA and NAGPRA issues were discussed. These as well as Section 106 Compliance procedures at Ozark

Scenic Riverways were addressed. Robin Dushane expressed her wish to address two major issues:

1. The first was a move to better educate the visiting public at ONSR about Native American history and heritage.
2. The second point was that she wants signage or other media available to discuss the illegal nature of digging for artifacts on public lands...

After the meeting Robin Dushane escorted the consultation team to the tribal library and small museum in a separate building for a brief tour. During that tour the librarian was introduced to the consultation team. Robin Dushane then invited the consulting team to a tour of the Eastern Shawnee Tribe's land and infrastructure on a 400-acre tract of land. At the headquarters building the consulting team was introduced to Larry Dushane, Robin's husband who is a residential repair contractor for the tribe. The tour group entered a van and Robin drove around the reservation pointing out infrastructure improvements including a second casino, a filling station, a bank, and other businesses owned by the tribe. The team viewed the social services building as well as housing for tribal members. The site of a proposed library, museum and visitor center was pointed out. The tour group returned to tribal headquarters and took lunch together at the tribal "AOA" nutrition center. During lunch Robin Dushane described her trip to Chattanooga, Tennessee to a meeting concerning a large archeological site at Moccasin Bend. She also described her role in organizing the Native American Tribes of Oklahoma through tribal resolutions to oppose the proposed sale of USDA-Forest Service lands.

The consultation team departed Seneca, Missouri at 12:45 p.m. and drove to Ozark National Scenic Riverways Headquarters in Van Buren, Missouri, arriving there at 4:30 p.m.

Noel Poe

cc: MWRO-Cultural Resources
MWRO-Planning
DSC-A.Van Huizen

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
D18 GMP (xH3017)

State Historic Preservation Office Consultation Report
November 15, 2010

On November 15 the park staff met with:

Missouri Department of Natural Resources
- Compliance Coordinator Judith Deel
- Cultural Resource Management Section Leader Kim Dillon
- Archaeologist Jane Lee

State of Missouri Attorney's General Office
- Assistant Attorney General Kara L.Valentine

Park staff attending the meeting were:
- Superintendent Reed E. Detring
- Deputy Superintendent Russell W. Runge
- Chief of Resource Management and Archeologist Dr. Jim Price
- Environmental Protection Specialist (EPS) Joe Strenfel

The park's General Management Plan (GMP) / Wilderness Study process was described. We informed of the phase we are in now. We described the workshop held in February of this year. They were assured that we will continue to send updates and information on the GMP process. We provided them with the latest GMP Newsletter #3. Preliminary Alternatives, dated Spring/Summer 2009. The Planning, Environment and Public Comment (PEPC) site was provided and explained. They were invited to call the Superintendent's office if guidance was needed to utilize the PEPC site.

As was requested by SHPO, for any future correspondence with SHPO regarding the GMP, Log Number 004-MLT-11 will be provided.

Reed E. Detring
Superintendent

prepared by Patty L. Dorris 11/18/2010

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Kip A. Stetzler, Acting Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

November 4, 2010

RECEIVED
NOV 12 2010
Ozark National
Scenic Riverways

Reed E. Detring
Superintendent
Ozark National Scenic Riverways
P.O. Box 490
Van Buren, Missouri 63965

Re: General Management Plan, Ozark National Scenic Riverways (NPS) Missouri

Dear Mr. Detring:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which requires identification and evaluation of cultural resources.

We appreciate the invitation to participate in the development of a General Management Plan (GMP) for Ozark National Scenic Riverways, and look forward to working with you as this process goes forward.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call 573/751-7862. Please be sure to include the SHPO Log Number **(004-MLT-11)** on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

Mark A. Miles
Director and Deputy
State Historic Preservation Officer

MAM:jd

c Jim Price, ONSR

Recycled Paper

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
D18 GMP

January 12, 2011

Memorandum

To: Field Supervisor Charles M. Scott, U.S. Fish and Wildlife Service

From: Superintendent, Ozark National Scenic Riverways

Subject: General Management Plan/Environmental Impact Statement, Section 7 Informal Consultation

We are contacting your office regarding Federal listed threatened and endangered species that inhabit the Ozark National Scenic Riverways (park), located in Carter, Dent, Shannon, and Texas Counties, Missouri. The National Park Service is developing a General Management Plan and Environmental Impact Statement (GMP/EIS) to provide a long-term vision and overall management direction for the park. We are writing to initiate informal consultation with your agency for this planning effort pursuant to the requirements of Section 7 of the Endangered Species Act.

In an effort to more efficiently expedite the planning process, we would like to ask your office to review the attached special status species list for the park. The table includes Federal and State listed threatened and endangered species, Federal candidate species, Federal species of concern, and State-ranked species that are known to exist within the boundary of the park. The list was developed, in part, from information collected from your website. However, certain species identified on your website (for the four counties in which the park is located) were excluded from our list, because they have not been documented within the park. Your feedback regarding the accuracy and thoroughness of this information for Federal listed species would be very helpful to us.

Soon we will be printing the *Draft GMP/EIS* that describes four alternative management approaches for the park. Your professional insight and interest in the park is greatly appreciated and will be invaluable as we prepare the *Draft GMP/EIS*. We are working on a tight timeframe for various reasons and would appreciate your written response to us no later than March 1, 2011.

We appreciate your attention to this inquiry and look forward to working with your office. If you have any questions please contact Dr. James E. Price, Chief of Resource Management at 573-323-4818 or Natural Resource Manager Victoria Grant at 573-323-4936.

Reed E. Detring

Attachment

OZARK NATIONAL SCENIC RIVERWAYS
FEDERAL- AND STATE- LISTED SPECIES

Federal- and State-listed Species Present within the Ozark National Scenic Riverways

Common Name	Scientific Name	Federal Status	State Status	State Rank
Mammals				
American Badger	*Taxidea taxus*			SU
Black bear	*Ursus americanus*			S3
Golden mouse	*Ochrotomys nuttalli*			S3
Gray bat	*Myotis grisescens*	E	E	S3
Indiana bat	*Myotis sodalis*	E	E	S1
Long-tailed weasel	*Mustela frenata*			S2
Marsh Rice Rat	*Oryzomys palustris*			SU
Plains spotted skunk	*Spilogale putorius interrupta*		E	S1
Swamp rabbit	*Sylvilagus aquaticus*			S2
Birds				
Bald Eagle	*Haliaeeatus leucocephalus*		E	S3
Cerulean warbler	*Dendroica cerulea*	SC		S2S3
Henslow's sparrow	*Ammodramus henslowii*	SC		
Northern Harrier	*Circus cyaneus*		E	S2
Sharp-shinned Hawk	*Accipiter striatus*			S3
Swainson's warbler	*Limnothlypis swainsonii*		E	S2
Amphibians				
Four-toed salamander	*Hemidactylium scutatum*			S4
Grotto salamander	*Eurycea spelaeus*			S2S3
Ozark hellbender	*Cryptobranchus alleganiensis bishopi*	C	E	S1
Ringed Salamander	*Ambystoma annulatum*			S3
Reptiles				
Alligator snapping turtle	*Macrochelys temminckii*			S2
Eastern Collared Lizard	*Crotaphytus collaris*			S4
Fish				
American brook lamprey	*Lampetra appendix*			S2
Arkansas saddled darter	*Etheostoma euzonum euzonum*			S2
Current River saddled darter	*Etheostoma euzonum erizonum*			S3
Blue sucker	*Cycleptus elongatus*			S3
Checkered madtom	*Noturus flavater*			S3S4
Ozark shiner	*Notropis ozarcanus*			S2
Paddlefish	*Polyodon spathula*			S3
Southern brook lamprey	*Ichthyomyzon gagei*			S2S3
Southern cavefish	*Typhlichthys subterraneus*			S2S3
Weed shiner	*Notropis texanus*			S3
Highfin Carpsucker	*Carpiodes velifer*			S2

Common name	Scientific name	Federal status	State status	State rank
Flier	*Centrarchus macropterus*			S3
Lake Chubsucker	*Erimyzon sucetta*			S2
Mooneye	*Hiodon tergisus*			S3
Stargazing Darter	*Percina uranidea*			S2
Crustaceans				
Cave isopod	*Caecidotea antricola*			S4
Salem cave crayfish	*Cambarus hubrichti*			S3
Salem cave isopod	*Caecidotea salemensis*			S2
Serrated cave isopod	*Caecidotea serrata*			S1
Mollusks				
Black sandshell	*Ligumia recta*			S2
Elktoe	*Alasmidonta marginata*			S2
Ouachita kidneyshell	*Ptychobranchus occidentalis*			S3
Ozark springsnail	*Fontigens aldrichi*			S4
Purple lilliput	*Toxolasma lividus*			S2
Slippershell mussel	*Alasmidonta viridis*			S2
Insects				
A heptageniid mayfly	*Stenonema bednariki*			S3
A net-spinning caddisfly	*Ceratopsyche piatrix*			S4
Clarus cave springtail	*Arrhopalites clarus*			S3
Comet darner	*Anax longipes*			S3
Gray petaltail	*Tachopteryx thoreyi*			S3
Pygmy snowfly	*Allocapnia pygmaea*			S3
Westfall's snaketail	*Ophiogomphus westfalli*			S3
Vascular plants				
A brome	*Bromus latiglumis*			S3
A false loosestrife	*Ludwigia microcarpa*			S2
A sedge	*Carex flaccosperma var. glaucodea*			S2
American barberry	*Berberis canadensis*			S2
Barren strawberry	*Waldsteinia fragarioides ssp.*			S2
Big-leaved aster	*Eurybia macrophylla*			S2
Carolina phlox	*Phlox carolina ssp. carolina*			S1
Dense-flowered smartweed	*Polygonum densiflorum*			S1S2
False bugbane	*Trautvetteria caroliniensis*			S2
Forked aster	*Eurybia furcata*			S2
Grass pink orchid	*Calopogon tuberosus*			S2
Harebell	*Campanula rotundifolia*			S1
Heart-leaved noseburn	*Tragia cordata*			S2
Horned pondweed	*Zannichellia palustris var. major*			S3
Large-leaved phlox	*Phlox amplifolia*			S3
Loesel's twayblade	*Liparis loeselii*			S2
Northern bedstraw	*Galium boreale ssp.*			S2

Common name	Scientific name	Federal status	State status	State rank
	septentrionale			
Oferhollow reed grass	*Calamagrostis porteri ssp.*			S3
Pale avens	*Geum virginianum*			S1
Riddell's goldenrod	*Solidago riddellii*			S3
Rigid sedge	*Carex tetanica*			S3
Showy lady-slipper	*Cypripedium reginae*			S2S3
Southern monkshood	*Aconitum uncinatum*			S1
Spreading sedge	*Carex laxiculmis*			S2
Star duckweed	*Lemna trisulca*			S2
Tall larkspur	*Delphinium exaltatum*			S2
Thread-like naiad	*Najas gracillima*			S2
Tussock sedge	*Carex stricta*			S3
White camas	*Zigadenus elegans ssp. glaucus*			S2
Wild Sweet William	*Phlox maculata var. pyramidalis*			S2
Lichens, mosses, liverworts				
A lichen	*Rimelia subisidiosa*			S1
A liverwort	*Riccardia multifida*			S1
A moss	*Hypnum cupressiforme var.*			S1
A moss	*Myurella sibirica*			S?
Golden glade-moss	*Rhytidium rugosum*			S1
Sharp's homaliadelphus	*Homaliadelphus sharpii*			S1

The U.S. Fish and Wildlife Service use the following categories to determine the federal status of species that are included in above table.

E—Endangered: A species which is in danger of extinction throughout all or a significant portion of its range.

T—Threatened: A species which is likely to become endangered within the foreseeable future.

C—Candidate: A species which the USFWS is reviewing for possible addition to the list of endangered and threatened species.

SC—Species of Concern: A species which the USFWS believes might be in need of concentrated conservation actions.

The Missouri Department of Conservation uses the following categories to determine the state status and rank of species that are included in above table. For those species with multiple state rankings, there is uncertainty about the exact status of their condition.

E—Endangered: A species which is in danger of extinction within the State of Missouri.

S1—Critically Imperiled: Critically imperiled in the nation or state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1,000).

S2—Imperiled: Imperiled in the nation or state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the nation or state. Typically 6 to 20 occurrences or few remaining individuals (1,000-3,000).

S3—Vulnerable: Vulnerable in the nation or state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

S4—Apparently Secure: Uncommon but not rare, and usually widespread in the nation or state. Possibly cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals remaining.

SU—Unrankable: Currently Unrankable due to lack of information or due to substantially conflicting information about status or trends.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Columbia Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

RECEIVED
MAR 28 2011
Ozark National
Scenic Riverways

MAR 22 2011

MEMORANDUM

To: Superintendent, Ozark National Scenic Riverways

From: Field Supervisor, U.S. Fish and Wildlife Service

Subject: Response to Section 7 Informal Consultation Request for General Management Plan/Environmental Impact Statement

This responds to your memorandum dated January 12, 2011, requesting review of federally endangered, threatened, or candidate species that may occur within the Ozark National Scenic Riverways (park) or that may be affected by activities within the park boundaries.

Our data indicate that the following species may occur within the park or may be affected by your activities:

1) Listed Species:

- Gray bat (*Myotis grisescens*) — Endangered
- Indiana bat (*Myotis sodalis*) — Endangered

2) Proposed Species:

- Ozark Hellbender (*Cryptobranchus alleganiensis bishopi*) — Proposed Endangered

Please note that the federal status of Ozark Hellbender is now Proposed Endangered rather than Candidate, and the Service will likely publish a final rule on the proposal in the upcoming year. Other changes we would recommend to your species list would be to remove the Species of Concern federal status for the Cerulean warbler (*Dendroica cerulea*) and Henslow's sparrow (*Ammodramus henslowii*). Recent surveys in Missouri indicate that these species are more abundant than previously believed and they are no longer considered Federal Species of Concern.

If you have not already done so, we recommend that you also contact the Missouri Department of Conservation regarding species of conservation concern. We appreciate the opportunity to provide input on the Ozark National Scenic Riverways General Management Plan and look forward to working with you in the future to develop conservation measure that may benefit your fish and wildlife resources.

O:\STAFF Folders\Crabill\FY11 Letters\NPS species list for GMP.doc

United States Department of the Interior

NATIONAL PARK SERVICE
Ozark National Scenic Riverways
404 Watercress Drive
P.O. Box 490
Van Buren, Missouri 63965

IN REPLY REFER TO:
D18 GMP

January 12, 2011

Director Robert L. Ziehmer
Missouri Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65109

Dear Director Ziehmer:

We are contacting your office regarding Missouri State listed species that inhabit the Ozark National Scenic Riverways (park), located in Carter, Dent, Shannon, and Texas Counties, Missouri. The National Park Service is developing a General Management Plan and Environmental Impact Statement (GMP/EIS) to provide a long-term vision and overall management direction for the park.

In an effort to more efficiently expedite the planning process, we would like to ask your office to review the attached special status species list for the park. The table includes Federal and State listed threatened and endangered species, Federal candidate species, Federal species of concern, and State-ranked species that are known to exist within the boundary of the park. The list was developed, in part, from information collected from your January 2009 checklist and natural heritage database. Your feedback regarding the accuracy and thoroughness of this information for State listed and ranked species would be very helpful to us.

Soon we will be printing the *Draft GMP/EIS* that describes four alternative management approaches for the park. Your professional insight and interest in the park is greatly appreciated and will be invaluable as we prepare the *Draft GMP/EIS*. We are working on a tight timeframe for various reasons and would appreciate your written response to us no later than March 1, 2011.

We appreciate your attention to this inquiry and look forward to working with your office. If you have any questions please contact Dr. James E. Price, Chief of Resource Management at 573-323-4818 or Natural Resource Manager Victoria Grant at 573-323-4936.

Sincerely,

Reed E. Detring
Superintendent

Enclosure

MISSOURI DEPARTMENT OF CONSERVATION

Headquarters
2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180
Telephone: (573) 751-4115 ▲ www.MissouriConservation.org

ROBERT L. ZIEHMER, Director

January 26, 2011

RECEIVED
JAN 31 2011
Ozark National
Scenic Riverways

Mr. Reed E. Detring
Superintendent
Ozark National Scenic Riverways
National Park Service
404 Watercress Dr.
PO Box 490
Van Buren, MO 63965

Dear Superintendent Detring:

RE: THREATENED AND ENDANGERED SPECIES REQUEST, NPS REFERENCE: D18 GMP

Attached is an updated heritage review and a list of federal and Missouri threatened and endangered species for the Ozark National Scenic Riverways as requested in your letter of January 12, 2011.

If you have specific technical questions about this list or status of species, please contact Susan Farrington (susan.farrington@mdc.mo.gov) our regional natural history biologist.

We look forward to consulting with the Park Service as you complete the *Draft General Management Plan/ Environmental Impact Statement (GMP/EIS)*. If you have any questions, please contact me at 573-522-4115 ext. 3378 or stuart.miller@mdc.mo.gov.

Sincerely,

Stuart Miller

STUART MILLER
POLICY COORDINATOR

c: Bob Zeihmer, Susan Farrington

CC: Chris Church
c/o Ann Van Huizen
Kim Hoff
Jo Streufert
D18 GMP file

Will try to get an electronic copy that will send to chris.

Missouri Department of Conservation

Heritage Review Report

January 25, 2011 -- Page 1 of 23

Policy Coordination Unit
P. O. Box 180
Jefferson City, MO 65102
heritage.review@mdc.mo.gov
573-522-4115 X 3367

Mr. Reed E. Detring, Superintendent Ozark National Scenic Riverways P. O. Box 490 Van Buren, MO 63956	*Project type:*	General Management Plan
	Location/Scope:	Ozark National Scenic Riverways
	County:	Dent, Texas, Shannon, Carter
	Query reference:	Ozark National Scenic Riverways long-term management planning
	Query received:	January 12, 2010

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and sensitive resources known to have been located close to and/or potentially affected by the proposed project. *On-site verification is the responsibility of the project. Heritage records were identified at some date and location. This report considers records near but not necessarily at the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean a protected species will not be encountered. These records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed in order to avoid or minimize impacts. More information may be found at http://mdc.mo.gov/discover-nature/places-go/natural-areas and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx. Contact information for the department's Natural History Biologist is online at http://mdc.mo.gov/contact-us.*

Prepared by: Shannon Cave

The appended tables show current listings and classifications for communities and species of concern within one-half mile of Ozark National Scenic Riverways .

Level 3 issues: Records of federal-listed (these are also state-listed) species or critical habitats near the project site:

- Gray bats (*Myotis grisescens*, federally and state listed "endangered") are likely to occur in the project area, as they forage over streams, rivers, and reservoirs in this part of Missouri. Avoid entry or disturbance of any cave inhabited by gray bats and when possible retain forest vegetation along the stream and from the gray bat cave opening to the stream. See http://mdc.mo.gov/104 for best management recommendations.
- Indiana bats (*Myotis sodalis,* federally and state listed "endangered") may occur in this area. These mammals hibernate during winter months in caves, in Missouri primarily in the southern half of the state. They are found in summer months, primarily north of the Missouri River, roosting and raising young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. If large trees with nesting cavities or loose bark need to be removed by your project, that should be done between November and March. Additional information to incorporate in planning documents is available at http://mdc.mo.gov/110.
- The proposed project occurs near a stream known to include or to provide habitat suitable for Ozark hellbenders (*cryptobranchus alleganiensis bishopi*, state-listed endangered and candidates for federal listing) or eastern hellbenders (*cryptobranchus alleganiensis alleganiensis,* state-listed endangered). Hellbenders are strictly aquatic salamanders whose well-being is dependent on high-quality water systems with constant levels of dissolved oxygen, temperature, and flow. These unusual animals are in serious decline, and information about best-management is available at http://www.mdc.mo.gov/documents/nathis/endangered/hellbender.pdf. Activities that change physical characteristics of rivers and streams (especially introducing silt loads or destabilizing gravel bars) or alter the flow of water should be avoided.

FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. Consult with U.S. Fish and Wildlife Service, 101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132

Level 2 issues: Records of state-listed (but not federal-listed) species or critical habitats near the project site:

- Best Management Recommendations for state endangered species should be followed. They are available for all State endangered list species at http://mdc4.mdc.mo.gov/applications/MDCLibrary/MDCLibrary2.aspx?NodeID=374.

STATE ENDANGERED species are listed in and protected under the Wildlife Code of Missouri (3CSR10-4.111).

Level 1 recommendations: Unlisted species/habitats tracked due to their rarity, but not listed as endangered or threatened or subject to special regulations.

A variety of public lands and natural areas fall in or near ONSR.

- MDC areas include Angeline, Barn Hollow, Current River, Montauk Hatchery, Rocky Creek and Sunklands Conservation Areas.
- Natural Areas are designated by an interagency committee and the Missouri Conservation Commission, and may be on public or private land. Designated natural areas in or near ONSR include the following: Alley Spring, Barn Hollow, Big Spring, Big Spring Pines, Cardareva Bluff, Jacks Fork, Mill Mountain, Pioneer, Poser Mill Cave, Prairie Hollow Gorge, Stegall Mountain, Sunklands, and Tunnel Bluff Woods Natural Areas. Special care is in order not to jeopardize the integrity or diversity of these areas.

The state tracks many species not listed as endangered, but sufficiently rare or challenged that special efforts to conserve them may be important to their survival and to avoid future listing. We encourage conservation of them if encountered. The Missouri Wildlife Code protects all wildlife species and it includes no special regulatory requirements for these.

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific heritage records):

- Bald eagles (*Haliaeetus leucocephalus*) may nest near streams or water bodies in the project area. Nests are large and fairly easy to identify. While no longer listed as endangered by either state or federal agencies, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Work managers should be alert for nesting areas within 1500 meters of project activities, and follow federal guidelines at http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf if eagle nests are seen. See also MDC's best management recommendations at http://mdc.mo.gov/87.
- The Current and Jack's Fork Rivers are bothe outstanding national or state waters, and among 138 state-designated spawning stream segments. Activities that alter, destabilize or destroy stream bottoms or banks should be avoided from March 15 to June 15 in order not to disrupt spawning (laying and fertilizing fish eggs). At all times, avoid habitat destruction or introducing heavy sediment loads, chemical or organic pollutants.
- Streams in the area should be protected from soil erosion, water pollution and in-stream activities that modify or diminish aquatic habitats. Best management recommendations relating to streams and rivers may be found at http://mdc.mo.gov/79.
- This area has many known karst geologic features (e.g. caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area. See

http://mdc.mo.gov/nathis/caves/manag_construc.htm for best management information.

- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≧104° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host unknown remnants of species once but no longer common.

Pre-screen heritage review requests at http://tinyurl.com/heritagereview. A "Level 1 response" will make further submission to MDC or USFWS unnecessary.

Natural Communities of Concern Near ONSR

Community	State Rank	Global Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Ozark - Special communities - Oxbow and slough	S?	GNR	Shannon	Eminence	T29N R04W	1	1987
Ozark - Special communities - Oxbow and slough	S?	GNR	Shannon	Powder Mill Ferry	T29N R02W	8	1998
Ozark - Special communities - Oxbow and slough	S?	GNR	Carter	Big Spring	T26N R01E	6	2002
Ozark - Special communities - Oxbow and slough	S?	GNR	Carter	Big Spring	T26N R01E	24	2002
Ozark - Special communities - Oxbow and slough	S?	GNR	Carter	Big Spring	T26N R01E	9	2002
Ozark - Special communities - Oxbow and slough	S?	GNR	Carter	Van Buren North	T28N R01W	33	
Ozark - Special communities - Spring and spring branch	S?	GNR	Shannon	Round Spring	T31N R05W	33	1987
Ozark - Special communities - Spring and spring branch	S?	GNR	Carter	Big Spring	T26N R01E	9	2002
Ozark - Special communities - Spring and spring branch	S?	GNR	Shannon	Powder Mill Ferry	T29N R02W	7	2001
Ozark - Special communities - Spring and spring branch	S?	GNR	Shannon	Powder Mill Ferry	T29N R02W	21	1999
Ozark - Special communities - Spring and spring branch	S?	GNR	Shannon	Alley Spring	T29N R05W	25	
Ozark - Warmwater - Small river	S?	GNR	Shannon	Bartlett	T28N R05W	9	
Mesic bottomland forest	S2	GNR	Shannon	Cedargrove	T31N R06W	14	1986
Mesic bottomland forest	S2	GNR	Carter	Big Spring	T26N R01E	5	1998
Ozark fen	S2	GNR	Shannon	Stegall Mountain	T28N R02W	3	2003
Ozark fen	S2	GNR	Shannon	Powder Mill Ferry	T29N R02W	31	1999
Ozark fen	S2	GNR	Carter	Van Buren North	T28N R01W	21	2000
Ozark fen	S2	GNR	Shannon	Powder Mill Ferry	T29N R02W	19	
Dolomite glade	S3	GNR	Shannon	Round Spring	T30N R04W	7	2003
Dolomite glade	S3	GNR	Shannon	Stegall Mountain	T28N R02W	3	1987
Dolomite glade	S3	GNR	Shannon	Powder Mill Ferry	T29N R02W	15	2003
Dolomite glade	S3	GNR	Shannon	Powder Mill Ferry	T29N R02W	22	1989
Dolomite glade	S3	GNR	Shannon	Powder Mill Ferry	T29N R02W	19	1987
Dolomite glade	S3	GNR	Shannon	Jam Up Cave	T27N R06W	4	1987
Dolomite glade	S3	GNR	Carter	Big Spring	T26N R01E	18	1986
Dolomite glade	S3	GNR	Shannon	Gladden	T31N R05W	16	1987
Dolomite glade	S3	GNR	Shannon	Alley Spring	T29N R04W	19	2004
Dolomite glade	S3	GNR	Shannon	Pine Crest	T27N R06W	6	1995
Dolomite glade	S3	GNR	Shannon	Powder Mill Ferry	T29N R02W	31	

Dolomite glade	S3	GNR	Shannon	Alley Spring	T29N R05W	25	
Dolomite glade	S3	GNR	Shannon	Alley Spring	T29N R05W	26	
Gravel wash	S3	GNR	Texas	Pine Crest	T28N R07W	35	2002
Igneous glade	S3	GNR	Shannon	Powder Mill Ferry	T28N R02W	5	2003
Igneous glade	S3	GNR	Shannon	Stegall Mountain	T28N R02W	5	2001
Igneous glade	S3	GNR	Shannon	Eminence	T29N R03W	5	1998
Igneous glade	S3	GNR	Shannon	Powder Mill Ferry	T29N R02W	31	1987
Igneous glade	S3	GNR	Shannon	Powder Mill Ferry	T29N R02W	32	1997
Igneous glade	S3	GNR	Shannon	Powder Mill Ferry	T29N R02W	32	1999
Igneous glade	S3	GNR	Shannon	Stegall Mountain	T28N R02W	8	1999
Mesic limestone/dolomite forest	S3	GNR	Shannon	Jam Up Cave	T27N R06W	4	1987
Mesic limestone/dolomite forest	S3	GNR	Carter	Big Spring	T26N R01E	10	
Cave	S4	GNR	Shannon	Round Spring	T30N R04W	7	2000
Cave	S4	GNR	Shannon	Round Spring	T30N R05W	1	1997
Cave spring	S4	GNR	Shannon	Powder Mill Ferry	T29N R02W	9	1999
Cave spring	S4	GNR	Carter	Big Spring	T26N R01E	24	
Cave spring	S4	GNR	Carter	Van Buren North	T28N R01W	21	
Dry chert woodland	S4	GNR	Carter	Grandin SW	T25N R01E	15	1993
Dry chert woodland	S4	GNR	Carter	Van Buren South	T26N R01W	12	2000
Dry chert woodland	S4	GNR	Shannon	Alley Spring	T29N R05W	25	
Dry igneous cliff	S4	GNR	Shannon	Eminence	T29N R03W	15	1999
Dry igneous woodland	S4	GNR	Shannon	Eminence	T29N R03W	15	1999
Dry-mesic chert forest	S4	GNR	Carter	Van Buren South	T26N R01W	12	2000
Dry-mesic chert woodland	S4	GNR	Carter	Big Spring	T27N R01E	32	2002
Dry-mesic chert woodland	S4	GNR	Carter	Big Spring	T26N R01E	7	1998
Dry-mesic chert woodland	S4	GNR	Shannon	Alley Spring	T29N R05W	25	
Dry-mesic igneous woodland	S4	GNR	Shannon	Stegall Mountain	T28N R02W	18	1999
Dry-mesic igneous woodland	S4	GNR	Shannon	Stegall Mountain	T28N R02W	5	1987
Moist limestone/dolomite cliff	S4	GNR	Shannon	Jam Up Cave	T28N R05W	20	2004
Moist limestone/dolomite cliff	S4	GNR	Shannon	Jam Up Cave	T28N R05W	29	1987
Moist limestone/dolomite cliff	S4	GNR	Texas	Pine Crest	T28N R07W	35	1990
Moist limestone/dolomite cliff	S4	GNR	Shannon	Pine Crest	T27N R06W	6	2006
Moist limestone/dolomite cliff	S4	GNR	Shannon	Jam Up Cave	T28N R05W	17	1987
Moist limestone/dolomite cliff	S4	GNR	Shannon	Jam Up Cave	T27N R06W	5	1987

Moist limestone/dolomite cliff	S4	GNR	Shannon	Jam Up Cave	T28N R05W	30	1992
Riverfront forest	S4	GNR	Shannon	Powder Mill Ferry	T29N R02W	35	1989
Riverfront forest	S4	GNR	Shannon	Exchange	T28N R01W	4	1997
Dry limestone/dolomite cliff	S5	GNR	Shannon	Powder Mill Ferry	T29N R02W	9	1999
Dry limestone/dolomite cliff	S5	GNR	Shannon	Jam Up Cave	T27N R06W	3	1995
Dry limestone/dolomite cliff	S5	GNR	Shannon	Exchange	T28N R01W	4	1983
Dry limestone/dolomite cliff	S5	GNR	Shannon	Jam Up Cave	T27N R06W	4	1987
Dry limestone/dolomite cliff	S5	GNR	Shannon	Jam Up Cave	T27N R06W	4	2000
Mdc cave		GNR	Shannon	Powder Mill Ferry	T29N R02W	7	2001
Mdc cave		GNR	Shannon	Powder Mill Ferry	T29N R02W	7	
Mdc cave		GNR	Shannon	Alley Spring	T29N R05W	26	2000
Mdc cave		GNR	Shannon	Van Buren North	T28N R01W	9	1999
Mdc cave		GNR	Shannon	Powder Mill Ferry	T29N R02W	7	2001
Mdc cave		GNR	Shannon	Powder Mill Ferry	T29N R02W	21	2000
Mdc cave		GNR	Shannon	Powder Mill Ferry	T29N R02W	21	2000
Mdc cave		GNR	Shannon	Alley Spring	T29N R05W	26	

Species of Concern, listing of all records within 0.5 miles of ONSR

Federal status is coded E (Endangered), T (Threatened) or C (Candidate), regulated by the Endangered Species Act

State Status is either E (endangered) or blank. Use and taking of all wildlife species are regulated in the Missouri Wildlife Code with endangered species subject to special restrictions.

State Rank codes: S1 (Critically imperiled); S2 (Imperiled) or S3 (Vulnerable). These are tracked due to their rarity and subject to general regulations in the Wildlife Code.

Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Myotis sodalis	Indiana Bat	E	E	S1	Shannon	Round Spring	T30N R04W	19	1996
Myotis sodalis	Indiana Bat	E	E	S1	Shannon	Powder Mill Ferry	T29N R02W	9	2009
Myotis sodalis	Indiana Bat	E	E	S1	Shannon	Powder Mill Ferry	T29N R02W	7	2001
Myotis sodalis	Indiana Bat	E	E	S1	Shannon	Round Spring	T30N R05W	1	2001
Myotis sodalis	Indiana Bat	E	E	S1	Shannon	Powder Mill Ferry	T29N R02W	9	
Myotis sodalis	Indiana Bat	E	E	S1	Shannon	Powder Mill Ferry	T29N R03W	13	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Cedargrove	T31N R06W	10	2009
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Eminence	T30N R03W	31	1977
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Van Buren North	T28N R01W	9	1999
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Pine Crest	T27N R06W	5	1994
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Round Spring	T30N R04W	7	2006
Myotis grisescens	Gray Bat	E	E	S3	Carter	Big Spring	T26N R01E	24	2001
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Powder Mill Ferry	T29N R02W	9	2009
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Round Spring	T30N R05W	1	2007
Myotis grisescens	Gray Bat	E	E	S3	Carter	Grandin SW	T26N R01E	34	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Round Spring	T30N R04W	19	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Alley Spring	T29N R05W	26	
Myotis grisescens	Gray Bat	E	E	S3	Dent	Cedargrove	T32N R06W	32	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Round Spring	T31N R05W	33	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Cedargrove	T31N R06W	3	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Powder Mill Ferry	T29N R02W	16	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Jam Up Cave	T28N R06W	35	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Pine Crest	T28N R06W	32	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Cedargrove	T31N R06W	10	

Species of Concern, listing of all records within 0.5 miles of ONSR

Federal status is coded E (Endangered), T (Threatened) or C (Candidate), regulated by the Endangered Species Act

State Status is either E (endangered) or blank. Use and taking of all wildlife species are regulated in the Missouri Wildlife Code with endangered species subject to special restrictions.

State Rank codes: S1 (Critically imperiled); S2 (Imperiled) or S3 (Vulnerable). These are tracked due to their rarity and subject to general regulations in the Wildlife Code.

Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Powder Mill Ferry	T28N R02W	5	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Powder Mill Ferry	T28N R02W	5	
Myotis grisescens	Gray Bat	E	E	S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Myotis grisescens	Gray Bat	E	E	S3	Carter	Grandin SW	T25N R01E	15	
Myotis grisescens	Gray Bat	E	E	S3	Carter	Big Spring	T26N R02E	19	
Myotis grisescens	Gray Bat	E	E	S3	Carter	Grandin SW	T26N R01E	34	
Spilogale putorius interrupta	Plains Spotted Skunk		E	S1	Shannon	Eminence	T30N R04W	36	1982
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	The Sinks	T30N R04W	22	2001
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Eminence	T29N R03W	19	2001
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T26N R01E	10	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T26N R01E	4	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Van Buren North	T28N R01W	21	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T26N R01E	9	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Eminence	T29N R03W	6	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Eminence	T29N R03W	15	2001
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R03W	14	2002
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T26N R01E	10	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T26N R01E	6	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T26N R01E	5	2000
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T26N R01E	12	2000
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Van Buren North	T28N R01W	27	1992
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Alley Spring	T29N R05W	35	2002
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Jam Up Cave	T28N R05W	30	2002
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	17	2004
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	16	2004

Species of Concern, listing of all records within 0.5 miles of ONSR

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Limnothlypis swainsonii	Swainson's Warbler		E	S2	Carter	Big Spring	T27N R01E	32	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	The Sinks	T30N R04W	26	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Eminence	T30N R04W	36	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	The Sinks	T30N R04W	35	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	The Sinks	T30N R03W	32	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Eminence	T30N R03W	32	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Eminence	T29N R04W	2	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	16	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	21	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	21	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	21	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Alley Spring	T29N R04W	29	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	28	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	28	
Limnothlypis swainsonii	Swainson's Warbler		E	S2	Shannon	Powder Mill Ferry	T29N R02W	28	
Bryum cyclophyllum	A Moss			S?	Shannon	Cedargrove	T31N R06W	14	1962
Grimmia olneyi	A Moss			S?	Shannon	Stegall Mountain	T28N R02W	18	1973
Grimmia olneyi	A Moss			S?	Shannon	Powder Mill Ferry	T28N R02W	5	1962
Imshaugia aleurites	A Lichen			S?	Shannon	Eminence	T29N R03W	15	1985
Metzgeria furcata	A Liverwort			S?	Carter	Big Spring	T26N R01E	6	1990
Nowellia curvifolia	A Liverwort			S?	Carter	Big Spring	T26N R01E	6	1990
Aconitum uncinatum	Southern Monkshood			S1	Shannon	Round Spring	T30N R05W	11	2000
Aconitum uncinatum	Southern Monkshood			S1	Shannon	Round Spring	T30N R05W	1	1998
Aconitum uncinatum	Southern Monkshood			S1	Shannon	Round Spring	T30N R05W	3	
Caecidotea serrata	Serrated Cave Isopod			S1	Shannon	Alley Spring	T29N R05W	26	

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Campanula rotundifolia	Harebell			S1	Shannon	Jam Up Cave	T27N R06W	4	1992
Campanula rotundifolia	Harebell			S1	Shannon	Jam Up Cave	T27N R06W	4	1992
Campanula rotundifolia	Harebell			S1	Shannon	Jam Up Cave	T28N R05W	30	1992
Campanula rotundifolia	Harebell			S1	Shannon	Pine Crest	T27N R06W	5	2003
Geum virginianum	Pale Avens			S1	Shannon	Jam Up Cave	T28N R05W	30	1992
Homaliadelphus sharpii	Sharp's Homaliadelphus			S1	Shannon	Jam Up Cave	T28N R05W	4	1973
Hypnum cupressiforme var. filiforme	A Moss			S1	Shannon	Eminence	T29N R03W	15	1985
Phlox carolina ssp. carolina	Carolina Phlox			S1	Shannon	Stegall Mountain	T28N R02W	4	
Riccardia multifida	A Liverwort			S1	Carter	Big Spring	T26N R01E	6	1990
Rimelia subisidiosa	A Lichen			S1	Shannon	Round Spring	T30N R05W	1	1985
Alasmidonta marginata	Elktoe			S2	Carter	Van Buren North	T28N R01W	34	
Berberis canadensis	American Barberry			S2	Texas	Pine Crest	T28N R07W	36	1999
Berberis canadensis	American Barberry			S2	Shannon	Jam Up Cave	T27N R06W	4	1984
Berberis canadensis	American Barberry			S2	Shannon	Pine Crest	T27N R06W	5	1985
Berberis canadensis	American Barberry			S2	Shannon	Pine Crest	T27N R06W	5	1986
Berberis canadensis	American Barberry			S2	Shannon	Pine Crest	T27N R06W	5	1985
Berberis canadensis	American Barberry			S2	Shannon	Jam Up Cave	T27N R06W	3	1987
Berberis canadensis	American Barberry			S2	Shannon	Pine Crest	T27N R06W	6	1985
Berberis canadensis	American Barberry			S2	Shannon	Jam Up Cave	T27N R06W	4	1992
Berberis canadensis	American Barberry			S2	Shannon	Jam Up Cave	T28N R05W	30	1987
Berberis canadensis	American Barberry			S2	Shannon	Jam Up Cave	T27N R06W	4	1987
Caecidotea salemensis	Salem Cave Isopod			S2	Shannon	Round Spring	T30N R05W	1	
Caecidotea salemensis	Salem Cave Isopod			S2	Shannon	Alley Spring	T29N R05W	26	
Calopogon tuberosus	Grass Pink Orchid			S2	Shannon	Stegall Mountain	T28N R02W	4	2005
Delphinium exaltatum	Tall Larkspur			S2	Shannon	Cedargrove	T31N R06W	14	1986

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Delphinium exaltatum	Tall Larkspur			S2	Shannon	Round Spring	T30N R04W	20	1984
Delphinium exaltatum	Tall Larkspur			S2	Shannon	Jam Up Cave	T28N R05W	4	1985
Delphinium exaltatum	Tall Larkspur			S2	Shannon	Alley Spring	T29N R04W	30	1999
Delphinium exaltatum	Tall Larkspur			S2	Shannon	Round Spring	T30N R05W	4	2006
Delphinium exaltatum	Tall Larkspur			S2	Shannon	Alley Spring	T29N R04W	19	1999
Delphinium exaltatum	Tall Larkspur			S2	Shannon	Round Spring	T30N R04W	20	1984
Delphinium exaltatum	Tall Larkspur			S2	Shannon	Alley Spring	T28N R05W	3	1985
Eurybia furcata	Forked Aster			S2	Texas	Pine Crest	T28N R07W	36	1990
Eurybia furcata	Forked Aster			S2	Texas	Pine Crest	T28N R07W	35	2006
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	20	1985
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	30	1986
Eurybia furcata	Forked Aster			S2	Shannon	Pine Crest	T27N R06W	6	2006
Eurybia furcata	Forked Aster			S2	Shannon	Cedargrove	T31N R06W	14	1988
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	17	1985
Eurybia furcata	Forked Aster			S2	Shannon	Alley Spring	T29N R04W	30	1980
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	17	1986
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	29	1985
Eurybia furcata	Forked Aster			S2	Shannon	Pine Crest	T27N R06W	5	1988
Eurybia furcata	Forked Aster			S2	Shannon	Eminence	T29N R03W	19	2000
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T27N R06W	4	1992
Eurybia furcata	Forked Aster			S2	Shannon	Alley Spring	T28N R05W	2	1985
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	8	1985
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	30	1986
Eurybia furcata	Forked Aster			S2	Shannon	Pine Crest	T28N R06W	32	1985
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	8	1985

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Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	30	1992
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T27N R06W	4	1986
Eurybia furcata	Forked Aster			S2	Texas	Pine Crest	T28N R07W	36	2006
Eurybia furcata	Forked Aster			S2	Texas	Pine Crest	T28N R07W	36	2005
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T28N R05W	20	1985
Eurybia furcata	Forked Aster			S2	Shannon	Jam Up Cave	T27N R06W	5	1989
Eurybia furcata	Forked Aster			S2	Shannon	Eminence	T29N R03W	15	1990
Eurybia macrophylla	Big-leaved Aster			S2	Shannon	Jam Up Cave	T28N R05W	4	1989
Eurybia macrophylla	Big-leaved Aster			S2	Shannon	Jam Up Cave	T27N R06W	4	1992
Eurybia macrophylla	Big-leaved Aster			S2	Texas	Pine Crest	T28N R07W	36	2006
Eurybia macrophylla	Big-leaved Aster			S2	Texas	Pine Crest	T28N R07W	35	1990
Eurybia macrophylla	Big-leaved Aster			S2	Texas	Pine Crest	T28N R07W	34	2006
Eurybia macrophylla	Big-leaved Aster			S2	Shannon	Pine Crest	T27N R06W	6	2003
Galium boreale ssp. septentrionale	Northern Bedstraw			S2	Shannon	Jam Up Cave	T27N R06W	4	1992
Galium boreale ssp. septentrionale	Northern Bedstraw			S2	Shannon	Pine Crest	T27N R06W	6	2006
Galium boreale ssp. septentrionale	Northern Bedstraw			S2	Shannon	Jam Up Cave	T28N R05W	30	1987
Galium boreale ssp. septentrionale	Northern Bedstraw			S2	Shannon	Jam Up Cave	T27N R06W	3	1987
Galium boreale ssp. septentrionale	Northern Bedstraw			S2	Shannon	Jam Up Cave	T27N R06W	5	1987
Galium boreale ssp. septentrionale	Northern Bedstraw			S2	Shannon	Jam Up Cave	T27N R06W	4	1987
Lampetra appendix	American Brook Lamprey			S2	Carter	Grandin SW	T25N R01E	2	
Lampetra appendix	American Brook Lamprey			S2	Shannon	Powder Mill Ferry	T29N R02W	28	
Lampetra appendix	American Brook Lamprey			S2	Shannon	Powder Mill Ferry	T29N R02W	35	
Lemna trisulca	Star Duckweed			S2	Shannon	Powder Mill Ferry	T29N R02W	21	2007
Lemna trisulca	Star Duckweed			S2	Carter	Big Spring	T26N R01E	6	1990
Lemna trisulca	Star Duckweed			S2	Shannon	Alley Spring	T29N R05W	25	1987

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Lemna trisulca	Star Duckweed			S2	Carter	Big Spring	T26N R01E	4	1987
Ligumia recta	Black Sandshell			S2	Carter	Van Buren North	T28N R01W	27	
Liparis loeselii	Loesel's Twayblade			S2	Carter	Van Buren North	T28N R01W	21	1983
Ludwigia microcarpa	A False Loosestrife			S2	Shannon	Powder Mill Ferry	T29N R02W	31	1987
Macrochelys temminckii	Alligator Snapping Turtle			S2	Shannon	Jam Up Cave	T28N R05W	29	2004
Notropis ozarcanus	Ozark Shiner			S2	Carter	Van Buren North	T27N R01W	4	1992
Notropis ozarcanus	Ozark Shiner			S2	Texas	Pine Crest	T28N R07W	36	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Round Spring	T30N R04W	7	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Round Spring	T30N R04W	21	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Eminence	T29N R03W	9	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Powder Mill Ferry	T29N R02W	16	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Eminence	T29N R03W	20	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Alley Spring	T29N R05W	25	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Powder Mill Ferry	T29N R02W	33	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Bartlett	T28N R05W	9	
Notropis ozarcanus	Ozark Shiner			S2	Shannon	Pine Crest	T28N R06W	31	
Notropis ozarcanus	Ozark Shiner			S2	Carter	Big Spring	T26N R01E	6	
Notropis ozarcanus	Ozark Shiner			S2	Carter	Big Spring	T26N R01E	13	
Sylvilagus aquaticus	Swamp Rabbit			S2	Carter	Big Spring	T26N R01E	11	1990
Sylvilagus aquaticus	Swamp Rabbit			S2	Carter	Big Spring	T26N R01E	24	
Sylvilagus aquaticus	Swamp Rabbit			S2	Carter	Big Spring	T26N R01E	25	
Toxolasma lividus	Purple Lilliput			S2	Shannon	Jam Up Cave	T28N R06W	36	
Toxolasma lividus	Purple Lilliput			S2	Shannon	Exchange	T28N R01W	4	
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T27N R06W	5	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Alley Spring	T28N R05W	2	1990

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Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Alley Spring	T29N R05W	25	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	20	2004
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	30	1992
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	8	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Eminence	T29N R03W	17	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Eminence	T29N R03W	19	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	29	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T27N R06W	4	2000
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Alley Spring	T29N R04W	30	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	17	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	20	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Eminence	T29N R03W	15	1988
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Eminence	T29N R03W	20	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	8	1985
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Jam Up Cave	T28N R05W	17	1984
Trautvetteria caroliniensis	False Bugbane			S2	Shannon	Pine Crest	T27N R06W	5	1988
Waldsteinia fragarioides ssp. fragarioides	Barren Strawberry			S2	Shannon	Jam Up Cave	T28N R05W	4	1984
Waldsteinia fragarioides ssp. fragarioides	Barren Strawberry			S2	Shannon	Pine Crest	T27N R06W	6	2003
Zigadenus elegans ssp. glaucus	White Camas			S2	Shannon	Pine Crest	T27N R06W	6	1985
Zigadenus elegans ssp. glaucus	White Camas			S2	Shannon	Jam Up Cave	T28N R05W	30	1985
Zigadenus elegans ssp. glaucus	White Camas			S2	Shannon	Jam Up Cave	T27N R06W	4	1992
Zigadenus elegans ssp. glaucus	White Camas			S2	Shannon	Jam Up Cave	T27N R06W	4	1987
Zigadenus elegans ssp. glaucus	White Camas			S2	Shannon	Pine Crest	T27N R06W	5	2003
Cypripedium reginae	Showy Lady-slipper			S2S3	Shannon	Powder Mill Ferry	T29N R03W	13	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Round Spring	T30N R04W	7	1998

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Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Round Spring	T30N R04W	20	
Dendroica cerulea	Cerulean Warbler			S2S3	Carter	Big Spring	T26N R01E	6	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	17	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	17	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	16	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	16	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	16	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	16	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	16	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	16	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	16	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	19	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	20	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	20	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	20	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Eminence	T29N R03W	20	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	21	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	21	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	21	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	21	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	29	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	29	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	29	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	29	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	29	

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Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R05W	25	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	30	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	30	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R04W	30	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	28	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	28	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R05W	35	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R05W	35	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R05W	35	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T29N R05W	35	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	33	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	34	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T29N R02W	34	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Bartlett	T28N R05W	4	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Bartlett	T28N R05W	4	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T28N R05W	3	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Alley Spring	T28N R05W	3	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Stegall Mountain	T28N R02W	4	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T28N R02W	3	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Stegall Mountain	T28N R02W	3	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Powder Mill Ferry	T28N R02W	2	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Stegall Mountain	T28N R02W	2	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Stegall Mountain	T28N R02W	2	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Stegall Mountain	T28N R02W	2	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	8	

Species of Concern, listing of all records within 0.5 miles of ONSR

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Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	8	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	8	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	9	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	9	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Bartlett	T28N R05W	10	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Van Buren North	T28N R02W	12	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Van Buren North	T28N R02W	12	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	17	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	20	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R06W	25	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R05W	30	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R06W	36	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R06W	36	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R06W	36	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R06W	36	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T28N R06W	35	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T27N R06W	4	
Dendroica cerulea	Cerulean Warbler			S2S3	Shannon	Jam Up Cave	T27N R06W	3	
Dendroica cerulea	Cerulean Warbler			S2S3	Carter	Van Buren North	T28N R01W	33	
Dendroica cerulea	Cerulean Warbler			S2S3	Carter	Van Buren North	T28N R01W	33	
Dendroica cerulea	Cerulean Warbler			S2S3	Carter	Van Buren North	T28N R01W	33	
Dendroica cerulea	Cerulean Warbler			S2S3	Carter	Van Buren North	T28N R01W	27	
Eurycea spelaea	Grotto Salamander			S2S3	Shannon	Powder Mill Ferry	T29N R02W	9	1998
Eurycea spelaea	Grotto Salamander			S2S3	Carter	Van Buren North	T28N R01W	21	1999
Eurycea spelaea	Grotto Salamander			S2S3	Shannon	Van Buren North	T28N R01W	9	

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Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Ichthyomyzon gagei	Southern Brook Lamprey			S2S3	Carter	Big Spring	T27N R01E	32	
Ichthyomyzon gagei	Southern Brook Lamprey			S2S3	Shannon	Powder Mill Ferry	T29N R02W	28	
Ichthyomyzon gagei	Southern Brook Lamprey			S2S3	Shannon	Round Spring	T30N R05W	2	
Ichthyomyzon gagei	Southern Brook Lamprey			S2S3	Carter	Grandin SW	T25N R01E	2	
Ichthyomyzon gagei	Southern Brook Lamprey			S2S3	Shannon	Cedargrove	T31N R06W	4	
Typhlichthys subterraneus	Southern Cavefish			S2S3	Dent	Cedargrove	T32N R06W	20	1991
Typhlichthys subterraneus	Southern Cavefish			S2S3	Shannon	Cedargrove	T31N R06W	11	2008
Typhlichthys subterraneus	Southern Cavefish			S2S3	Carter	Big Spring	T26N R01E	24	
Allocapnia pygmaea	Pygmy Snowfly			S3	Shannon	Round Spring	T30N R04W	7	1987
Ambystoma annulatum	Ringed Salamander			S3	Shannon	Cedargrove	T31N R06W	13	
Arrhopalites clarus	Clarus Cave Springtail			S3	Shannon	Powder Mill Ferry	T29N R03W	13	
Arrhopalites clarus	Clarus Cave Springtail			S3	Shannon	Alley Spring	T29N R05W	26	
Bromus latiglumis	A Brome			S3	Shannon	Powder Mill Ferry	T29N R02W	21	1994
Bromus latiglumis	A Brome			S3	Shannon	Round Spring	T30N R05W	1	2002
Calamagrostis porteri ssp. insperata	Oferhollow Reed Grass			S3	Texas	Pine Crest	T28N R07W	35	2006
Calamagrostis porteri ssp. insperata	Oferhollow Reed Grass			S3	Texas	Pine Crest	T28N R07W	36	2006
Calamagrostis porteri ssp. insperata	Oferhollow Reed Grass			S3	Texas	Pine Crest	T28N R07W	26	1990
Calamagrostis porteri ssp. insperata	Oferhollow Reed Grass			S3	Texas	Pine Crest	T28N R07W	35	
Cambarus hubrichti	Salem Cave Crayfish			S3	Shannon	Cedargrove	T31N R06W	10	1989
Cambarus hubrichti	Salem Cave Crayfish			S3	Shannon	Gladden	T31N R05W	21	No D
Cambarus hubrichti	Salem Cave Crayfish			S3	Shannon	Cedargrove	T31N R06W	11	1977
Cambarus hubrichti	Salem Cave Crayfish			S3	Carter	Big Spring	T26N R01E	6	1977
Carex tetanica	Rigid Sedge			S3	Shannon	Stegall Mountain	T28N R02W	4	2005
Carex tetanica	Rigid Sedge			S3	Shannon	Powder Mill Ferry	T29N R02W	30	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Powder Mill Ferry	T29N R02W	28	

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Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Bartlett	T28N R05W	9	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Pine Crest	T28N R06W	31	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Round Spring	T30N R05W	2	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Powder Mill Ferry	T29N R02W	33	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Powder Mill Ferry	T29N R02W	35	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Jam Up Cave	T28N R06W	35	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Carter	Grandin SW	T25N R01E	2	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Texas	Pine Crest	T28N R07W	36	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Round Spring	T30N R04W	7	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Round Spring	T30N R04W	20	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Round Spring	T30N R04W	21	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Jam Up Cave	T28N R05W	17	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Pine Crest	T28N R06W	31	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Eminence	T29N R03W	7	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Eminence	T29N R03W	9	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Shannon	Powder Mill Ferry	T29N R02W	16	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Carter	Big Spring	T26N R01E	6	
Etheostoma euzonum erizonum	Current Saddled Darter			S3	Carter	Big Spring	T26N R01E	13	
Hiodon tergisus	Mooneye			S3	Shannon	Eminence	T29N R03W	9	
Notropis texanus	Weed Shiner			S3	Shannon	Round Spring	T30N R05W	2	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Alley Spring	T29N R05W	25	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Alley Spring	T29N R05W	25	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Alley Spring	T29N R05W	36	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Stegall Mountain	T28N R02W	18	
Ochrotomys nuttalli	Golden Mouse			S3	Carter	Big Spring	T26N R01E	5	

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Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Ochrotomys nuttalli	Golden Mouse			S3	Carter	Grandin SW	T26N R01E	35	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	23	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	26	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	26	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	26	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	26	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	26	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	26	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Powder Mill Ferry	T29N R02W	14	
Ochrotomys nuttalli	Golden Mouse			S3	Shannon	Exchange	T28N R01W	4	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Jam Up Cave	T28N R05W	4	2002
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Texas	Pine Crest	T28N R07W	36	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Eminence	T29N R03W	16	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Powder Mill Ferry	T29N R02W	16	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Powder Mill Ferry	T29N R02W	21	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Powder Mill Ferry	T29N R02W	28	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Powder Mill Ferry	T29N R02W	33	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Powder Mill Ferry	T29N R02W	33	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Stegall Mountain	T28N R02W	4	

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Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Stegall Mountain	T28N R02W	2	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Van Buren North	T28N R02W	12	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Jam Up Cave	T28N R06W	36	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Exchange	T28N R01W	4	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Shannon	Van Buren North	T28N R01W	16	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Carter	Van Buren North	T28N R01W	34	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Carter	Big Spring	T27N R01E	30	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Carter	Big Spring	T26N R01E	6	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Carter	Big Spring	T26N R01E	25	
Ptychobranchus occidentalis	Ouachita Kidneyshell			S3	Carter	Van Buren North	T28N R01W	27	
Solidago riddellii	Riddell's Goldenrod			S3	Shannon	Stegall Mountain	T28N R02W	7	1990
Stenonema bednariki	A Heptageniid Mayfly			S3	Shannon	Cedargrove	T31N R06W	4	1999
Stenonema bednariki	A Heptageniid Mayfly			S3	Shannon	Pine Crest	T28N R06W	31	1999
Stenonema bednariki	A Heptageniid Mayfly			S3	Texas	Pine Crest	T28N R07W	36	
Stenonema bednariki	A Heptageniid Mayfly			S3	Shannon	Round Spring	T30N R04W	7	
Stenonema bednariki	A Heptageniid Mayfly			S3	Shannon	Eminence	T29N R03W	20	
Stenonema bednariki	A Heptageniid Mayfly			S3	Shannon	Alley Spring	T29N R04W	30	
Stenonema bednariki	A Heptageniid Mayfly			S3	Shannon	Jam Up Cave	T28N R05W	4	
Stenonema bednariki	A Heptageniid Mayfly			S3	Carter	Van Buren North	T27N R01W	4	
Phlox amplifolia	Large-leaved Phlox			S3?	Shannon	Alley Spring	T29N R05W	26	
Zannichellia palustris var. major	Horned Pondweed			S3?	Shannon	Powder Mill Ferry	T29N R02W	16	1997
Noturus flavater	Checkered Madtom			S3S4	Texas	Pine Crest	T28N R07W	36	2007
Noturus flavater	Checkered Madtom			S3S4	Carter	Big Spring	T27N R01E	32	
Noturus flavater	Checkered Madtom			S3S4	Shannon	Pine Crest	T27N R06W	6	
Noturus flavater	Checkered Madtom			S3S4	Shannon	Alley Spring	T29N R05W	25	

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Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Noturus flavater	Checkered Madtom			S3S4	Shannon	Powder Mill Ferry	T29N R02W	28	
Noturus flavater	Checkered Madtom			S3S4	Shannon	Powder Mill Ferry	T29N R02W	35	
Noturus flavater	Checkered Madtom			S3S4	Shannon	Bartlett	T28N R05W	9	
Noturus flavater	Checkered Madtom			S3S4	Shannon	Bartlett	T28N R05W	9	
Noturus flavater	Checkered Madtom			S3S4	Shannon	Jam Up Cave	T28N R06W	35	
Noturus flavater	Checkered Madtom			S3S4	Shannon	Pine Crest	T28N R06W	31	
Noturus flavater	Checkered Madtom			S3S4	Carter	Grandin SW	T25N R01E	2	
Caecidotea antricola	Cave Isopod			S4	Shannon	Round Spring	T31N R05W	34	
Caecidotea antricola	Cave Isopod			S4	Shannon	Round Spring	T30N R05W	1	
Caecidotea antricola	Cave Isopod			S4	Shannon	Round Spring	T30N R04W	7	
Caecidotea antricola	Cave Isopod			S4	Shannon	Round Spring	T30N R04W	19	
Caecidotea antricola	Cave Isopod			S4	Shannon	Powder Mill Ferry	T29N R02W	9	
Caecidotea antricola	Cave Isopod			S4	Shannon	Powder Mill Ferry	T29N R02W	18	
Caecidotea antricola	Cave Isopod			S4	Shannon	Powder Mill Ferry	T29N R02W	21	
Ceratopsyche piatrix	A Net-spinning Caddisfly			S4	Shannon	Round Spring	T30N R04W	19	2003
Ceratopsyche piatrix	A Net-spinning Caddisfly			S4	Shannon	Alley Spring	T29N R05W	25	
Ceratopsyche piatrix	A Net-spinning Caddisfly			S4	Shannon	Alley Spring	T29N R05W	25	
Fontigens aldrichi	Ozark Springsnail			S4	Texas	Pine Crest	T28N R07W	35	
Fontigens aldrichi	Ozark Springsnail			S4	Shannon	Eminence	T30N R03W	31	
Fontigens aldrichi	Ozark Springsnail			S4	Shannon	Powder Mill Ferry	T29N R02W	21	
Hemidactylium scutatum	Four-toed Salamander			S4	Shannon	Powder Mill Ferry	T29N R02W	29	1990
Hemidactylium scutatum	Four-toed Salamander			S4	Shannon	Powder Mill Ferry	T29N R02W	14	1992
Hemidactylium scutatum	Four-toed Salamander			S4	Shannon	Powder Mill Ferry	T29N R02W	23	1997
Elodea canadensis	Broad Waterweed			SU	Shannon	Round Spring	T31N R05W	33	2000
Elodea canadensis	Broad Waterweed			SU	Carter	Big Spring	T26N R01E	6	1990

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Species	Common Name	Federal Status	State Status	State Rank	County	Quadrangle	Twp/Rng	Section	Last seen
Lasionycteris noctivagans	Silver-haired Bat			SU	Shannon	Powder Mill Ferry	T29N R02W	14	
Necturus maculosus louisianensis	Red River Mudpuppy			SU	Shannon	Powder Mill Ferry	T29N R02W	35	2005
Necturus maculosus louisianensis	Red River Mudpuppy			SU	Texas	Pine Crest	T28N R07W	35	
Xenochalepus potomaca	A Leaf Beetle			SU	Shannon	Exchange	T28N R01W	4	1994

APPENDIX F: FEDERALLY AND STATE-LISTED SPECIES

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The U.S. Fish and Wildlife Service use the following categories to determine the federal status of species that are included in appendix F, tables F-1 and F-2.

E: Endangered: A species that is in danger of extinction throughout all or a significant portion of its range.

PE: Proposed Endangered: A species officially proposed for listing as endangered. USFWS has not yet issued final rule on determination.

T: Threatened: A species that is likely to become endangered within the foreseeable future.

C: Candidate: A species that the U.S. Fish and Wildlife Service is reviewing for possible addition to the list of endangered and threatened species.

SC: Species of Concern: A species that the U.S. Fish and Wildlife Service believes might be in need of concentrated conservation actions.

The Missouri Department of Conservation uses the following categories to determine the state status and rank of species that are included in appendix F, tables F-1 and F-2. For those species with multiple state rankings, there is uncertainty about the exact status of their condition.

E: Endangered: A species that is in danger of extinction within the State of Missouri.

S1: Critically Imperiled: Critically imperiled in the nation or state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1,000).

S2: Imperiled: Imperiled in the nation or state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the nation or state. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000).

S3: Vulnerable: Vulnerable in the nation or state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

S4: Apparently Secure: Uncommon but not rare, and usually widespread in the nation or state. Possibly cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals remaining.

SH: Historic: The species occurred historically in the state (with the expectation that it may be rediscovered). Perhaps having not been verified in the past 20 years, and suspected to be still extant.

SU: Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SX: Extirpated: The species is believed to be extirpated from the state.

S? : Unranked: Species is not yet ranked in the state.

TABLE F-1. FEDERALLY AND STATE-LISTED SPECIES KNOWN TO BE PRESENT WITHIN THE OZARK NATIONAL SCENIC RIVERWAYS

Common name	Scientific name	Federal status	State status	State rank
Mammals				
American badger	*Taxidea taxes*			SU
Eastern wood rat	*Neuroma floridana*			S3S4
Golden mouse	*Ochrotomys nuttalli*			S3
Gray bat	*Myotis grisescens*	E	E	S3
Indiana bat	*Myotis sodalis*	E	E	S1
Long-tailed weasel	*Mustela frenata*			S3
Marsh rice rat	*Oryzomys palustris*			SU
Mountain lion[1]	*Puma concolor*			SX
Plains spotted skunk	*Spilogale putorius interrupta*		E	S1
Silver-haired bat	*Lasionycteris noctivagans*			SU
Swamp rabbit	*Sylvilagus aquaticus*			S2
Birds				
Bald eagle	*Haliaeeatus leucocephalus*			S3
Cerulean warbler	*Dendroica cerulea*			S2S3
Northern harrier	*Circus cyaneus*		E	S2
Osprey	*Pandion haliaetus*			S2
Sharp-shinned hawk	*Accipiter striatus*			S2
Swainson's warbler	*Limnothlypis swainsonii*		E	S2
Trumpeter swan	*Cygnus buccinator*			S1
Amphibians				
Grotto salamander	*Eurycea spelaeus*			S2S3
Ozark hellbender	*Cryptobranchus alleganiensis bishopi*	E	E	S1
Red River mudpuppy	*Necturus maculosus louisianensis*			SU
Ringed salamander	*Ambystoma annulatum*			S3
Reptiles				
Alligator snapping turtle	*Macrochelys temminckii*			S2
Fish				
American brook lamprey	*Lampetra appendix*			S2
Current River saddled darter	*Etheostoma euzonum erizonum*			S3
Blue sucker	*Cycleptus elongatus*			S3S4
Checkered madtom	*Noturus flavater*			S3S4
Mississippi silvery minnow	*Hybognathus nuchalis*			S3S4
Ozark shiner	*Notropis ozarcanus*			S2
Paddlefish	*Polyodon spathula*			S3
Southern brook lamprey	*Ichthyomyzon gagei*			S2S3
Southern cavefish	*Typhlichthys subterraneus*			S2S3
Weed shiner	*Notropis texanus*			S3
Highfin carpsucker	*Carpiodes velifer*			S2

TABLE F-1. FEDERALLY AND STATE-LISTED SPECIES PRESENT WITHIN THE OZARK NATIONAL SCENIC RIVERWAYS (CONTINUED)

Common name	Scientific name	Federal status	State status	State rank
Flier	*Centrarchus macropterus*			S3
Lake chubsucker	*Erimyzon sucetta*			S2
Stargazing darter	*Percina uranidea*			S2
Crustaceans				
Salem cave crayfish	*Cambarus hubrichti*			S3
Salem cave isopod	*Caecidotea salemensis*			S2
Serrated cave isopod	*Caecidotea serrata*			S1
Mollusks				
Black sandshell	*Ligumia recta*			S2
Elktoe	*Alasmidonta marginata*			S2
Ouachita kidneyshell	*Ptychobranchus occidentalis*			S3
Purple lilliput	*Toxolasma lividus*			S2
Slippershell mussel	*Alasmidonta viridis*			S2
Insects				
A heptageniid mayfly	*Stenonema bednariki*			S3
A leaf beetle	*Xenochalepus potomaca*			SU
A panorpid scorpionfly	Panorpa braueri			S1
A water boatman	Sigara mathesoni			S3?
Clarus cave springtail	*Arrhopalites clarus*			S3
Pygmy snowfly	*Allocapnia pygmaea*			S3
Swamp metalmark	Calephelis muticum			S3
Vascular plants				
A blazing star	*Liatris scariosa var. nieuwlandii*			S2
A brome	*Bromus latiglumis*			S3
A false loosestrife	*Ludwigia microcarpa*			S2
A sedge	*Carex flaccosperma var. glaucodea*			S2
A sedge	*Carex texensis*			S3
A sedge	*Carex molestiformis*			S2
American barberry	*Berberis canadensis*			S2
Barren strawberry	*Waldsteinia fragarioides ssp. fragarioides*			S2
Bashful bulrush	*Trichophorum planifolium*			S3S4
Big-leaved aster	*Eurybia macrophylla*			S2
Broad waterweed	*Elodea canadensis*			SU
Buffalo clover	*Trifolium reflexum*			S3S4
Butternut	*Juglans cinerea*			S2
Carolina phlox	*Phlox carolina ssp. carolina*			S1
Dense-flowered smartweed	*Polygonum densiflorum*			S1S2
False bugbane	*Trautvetteria caroliniensis*			S2

TABLE F-1. FEDERALLY AND STATE-LISTED SPECIES PRESENT WITHIN THE OZARK NATIONAL SCENIC RIVERWAYS (CONTINUED)

Common name	Scientific name	Federal status	State status	State rank
Forked aster	*Eurybia furcata*			S2
Golden currant	*Ribes odoratum*			S3
Grass pink orchid	*Calopogon tuberosus*			S2
Harebell	*Campanula rotundifolia*			S1
Heart-leaved noseburn	*Tragia cordata*			S2
Heart-leaved plantain	*Plantago cordata*			S3S4
Horned pondweed	*Zannichellia palustris var. major*			S3?
Lance-like spike rush	*Eleocharis lanceolata*			S1
Large-leaved phlox	*Phlox amplifolia*			S3?
Leafy bulrush	*Scirpus polyphyllus*			S3
Loesel's twayblade	*Liparis loeselii*			S2
Low nut-rush	*Scleria verticillata*			S3
Marsh blue violet	*Viola cucullata*			S3
Mountain honeysuckle	*Lonicera dioica*			S3
Northern bedstraw	*Galium boreale ssp. septentrionale*			S2
Oferhollow reed grass	*Calamagrostis porteri ssp. insperata*			S3
Pale avens	*Geum virginianum*			S1
Poison oak	*Toxicodendron pubescens*			S3
Rein orchid	*Platanthera flava*			S2
Riddell's goldenrod	*Solidago riddellii*			S3
Rigid sedge	*Carex tetanica*			S3
Royal catchfly	*Silene regia*			S3
Satin brome	*Bromus nottowayanus*			S3
Shining ladies' tresses	*Spiranthes lucida*			S3
Showy lady-slipper	*Cypripedium reginae*			S2S3
Snow trillium	*Trillium nivale*			S3?
Southern monkshood	*Aconitum uncinatum*			S1
Spotted pondweed	*Potamogeton pulcher*			S2S3
Spreading sedge	*Carex laxiculmis*			S3
Star duckweed	*Lemna trisulca*			S2
Tall larkspur	*Delphinium exaltatum*			S2
Thread-like naiad	*Najas gracillima*			S2
Tradescant aster	*Symphyotrichum dumosum var. strictior*			S2
Tussock sedge	*Carex stricta*			S3
White camas	*Zigadenus elegans ssp. glaucus*			S2
Whitlow grass	*Draba aprica*			S3
Wild leek	*Allium burdickii*			S2
Wild sweet William	*Phlox maculata var. pyramidalis*			S2

TABLE F-1. FEDERALLY AND STATE-LISTED SPECIES PRESENT WITHIN THE OZARK NATIONAL SCENIC RIVERWAYS (CONTINUED)

Common name	Scientific name	Federal status	State status	State rank
Lichens, mosses, liverworts				
A lichen	*Imshaugia aleurites*			S?
A lichen	*Rimelia subisidiosa*			S1
A liverwort	*Metzgeria furcata*			S?
A liverwort	*Nowellia curvifolia*			S?
A lierwort	*Riccardia multifida*			S1
A liverwort	*Aneura pinguis*			S3S4
A moss	*Plagiomnium rostratum*			SU
A moss	*Didymodon revolutus*			S1
A moss	*Bryum cyclophyllum*			S?
A moss	*Grimmia olneyi*			S?
A moss	*Hypnum cupressiforme var. filiforme*			S1
Shaggy moss	*Rhytidiadelphus triquetrus*			S3
Sharp's homaliadelphus	*Homaliadelphus sharpii*			S1
Yellow starry fen moss	*Campylium stellatum var. stellatum*			S3

[1] Species occurrence has been documented within the boundary of Ozark National Scenic Riverways

TABLE F-2. FEDERALLY AND STATE-LISTED SPECIES HISTORICALLY PRESENT WITHIN THE OZARK NATIONAL SCENIC RIVERWAYS

Common name	Scientific name	Federal status	State status	State rank
Mammals				
Gray wolf[1]	*Canis lupus*	E		SX
Red wolf [1]	*Canis rufus*	E		SX
Birds				
Red-cockaded woodpecker[1]	*Picoides borealis*	E		SX

[1] No longer found in Missouri

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As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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Missouri

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