

National Park Service
U.S. Department of the Interior

Pea Ridge National Military Park
Arkansas



Vegetation Management Plan and Environmental Assessment

May 2014



PEA RIDGE NATIONAL MILITARY PARK

VEGETATION MANAGEMENT PLAN AND

ENVIRONMENTAL ASSESSMENT

EXECUTIVE SUMMARY

Pea Ridge National Military Park (park) proposes to develop and implement a vegetation management plan in order to design ways to adjust and/or establish the vegetation patterns that represent the look and feel of the 1862 Battle of Pea Ridge battlefield landscape of the park. The park's General Management Plan (GMP), completed in 2006, set the goals for landscape management at the park. The overarching goals of the GMP are "returning the battlefield landscape to the 1862 appearance" and "providing views of the battlefield that convey the open space and woodlands present at the time of the battle." The landscape of Pea Ridge was a highly human-modified landscape in 1862. The park proposes the development of a vegetation management plan to establish methods by which to create, then maintain, those patterns to maximize benefits to natural and cultural resources.

This Environmental Assessment (EA) evaluates four alternatives: a no action alternative and three action alternatives, one of which is the preferred action alternative (preferred alternative). Under the no action alternative, the park would continue its existing management of the vegetation at the park. Implementing the preferred alternative would promote active vegetation restoration and long-term plant community sustainability, support protection and preservation of cultural resources, improve the visitor experience, and provide more effective management of the vegetation within the park.

This EA has been prepared in compliance with the National Environmental Policy Act to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet objectives of the proposal, 2) evaluates potential issues and impacts on the park's resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts. Impact topics evaluated in detail in this EA are soils; vegetation; wildlife; visual resources; cultural landscapes, archeological sites, and historic structures/objects; visitor experience; park operations; and socioeconomics. Some impact topics were dismissed because they are not present or the alternatives considered would result in no noticeable effects. In addition, the National Park Service is using this plan/EA to satisfy the requirements of Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (16 United States Code 470, et seq.) pursuant to regulations contained in 36 Code of Federal Regulations 800.8(c) – Protection of Historic Properties.

No major adverse effects were identified as a result of any of the alternatives during an analysis of effects. The public, regulatory agencies, and other stakeholders will have an opportunity to comment on this EA. Comments received will be considered in the final evaluation of effects.

SUMMARY

Public Comment

If you wish to comment on this EA, you may post comments online using the National Park Service Planning, Environment and Public Comment (PEPC) website at: <http://parkplanning.nps.gov/peri>; or mail comments to: Superintendent, Pea Ridge National Military Park, P.O. Box 700, 15930 E Highway 62, Garfield, AR 72732.

This EA will be on public review for 30 days. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made available to the public 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.

CONTENTS

EXECUTIVE SUMMARY I

Public Comment ii

ACRONYMS AND ABBREVIATIONS v

PURPOSE AND NEED 1

Introduction 1

Purpose of and Need for Action 3

Objectives of General Management Plan Related to Vegetation Management 3

Purpose and Significance of Pea Ridge National Military Park 19

Related Laws, Regulations, Policies, Orders, and Planning Documents 19

Scoping Process for this EA 24

Issues and Impact Topics 25

ALTERNATIVES 33

Introduction 33

Alternatives 33

Mitigation and Best Management Practices 55

Comparison of Alternatives 58

How Alternatives Meet Objectives 58

Summary of Environmental Consequences 64

Alternatives or Alternative Elements Considered but not Carried Forward for Analysis 64

Environmentally Preferable Alternative 64

NPS Preferred Alternative 65

AFFECTED ENVIRONMENT 73

Introduction 73

Vegetation 73

Wildlife 77

Visual Resources 78

Cultural Resources 79

Visitor Experience 82

Park Operations 84

Socioeconomics 84

ENVIRONMENTAL CONSEQUENCES 87

General Methods 87

Cumulative Impacts 88

Vegetation 91

Wildlife 99

Visual Resources 106

Cultural Resources 111

Visitor Experience 117

Park Operations 123

Socioeconomics 128

CONTENTS

CONSULTATION AND COORDINATION 133

- National Historic Preservation Act, Section 106 Consultation 133
- U.S. Fish and Wildlife Service, Section 7 Consultation 134
- Environmental Assessment Review and List of Recipients 134
- Compliance with Federal and State Regulations 135

LIST OF PREPARERS AND CONTRIBUTORS 137

- National Park Service, Pea Ridge National Military Park 137
- National Park Service, Midwest Regional Office 137
- National Park Service, Environmental Quality Division 137
- National Park Service, Heartland Inventory and Monitoring Network 137
- ERO Resources Corporation 137
- Mundus Bishop Landscape Architects 137

REFERENCES 139

APPENDICES 145

APPENDIX A. HISTORIC VEGETATION MAP – PEA RIDGE NATIONAL MILITARY PARK 147

APPENDIX B. VEGETATION MANAGEMENT PLAN TOOLS AND METHODS 149

APPENDIX C. CONSULTATION LETTERS 153

APPENDIX D. PUBLIC SCOPING SUMMARY 155

FIGURES

- Figure 1. Project Area 2
- Figure 2. GMP Management Zones 5
- Figure 3. Pea Ridge Battle Routes 10
- Figure 4. Historic Vegetation Map at Pea Ridge National Military Park (circa 1862) 15
- Figure 5. Existing Vegetation Map at Pea Ridge National Military Park (circa 2014) 17
- Figure 6. Elements Common to All Action Alternatives 37
- Figure 7. Alternative B: Functional Agrarian Landscape 41
- Figure 8. Alternative C: Visual Agrarian Landscape 47
- Figure 9. Alternative D: Natural Agrarian Landscape 53

TABLES

- Table 1. Historic (circa 1862) and Existing (circa 2014) Vegetation Conditions 12
- Table 2. Impact Topics Retained and Relevant Laws, Regulations, and Policies 26
- Table 3. Mitigation Measures and Best Management Practices 55
- Table 4. Vegetation Conditions – Comparison of Alternatives 59
- Table 5. Degree to Which Each Alternative Fulfills the Purpose, Need, and Objectives of the Project 63
- Table 6. Impact Summary 67
- Table 7. List of Classified Structures within the Park 82
- Table 8. Vegetation types and acreages 91
- Table 9. Environmental Compliance Requirements 135

ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLR	Cultural Landscape Report
Corps	U.S. Army Corps of Engineers
DO	Director's Order
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPMP	Exotic Plant Management Plan
FMP	Fire Management Plan
FONSI	Finding of No Significant Impact
GMP	General Management Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
National Register	National Register of Historic Places
Park	Pea Ridge National Military Park
PEPC	Planning, Environment, and Public Comment
SHPO	State Historic Preservation Office
USFWS	U.S. Fish and Wildlife Service

PEA RIDGE NATIONAL MILITARY PARK

VEGETATION MANAGEMENT PLAN AND

ENVIRONMENTAL ASSESSMENT

PURPOSE AND NEED

INTRODUCTION

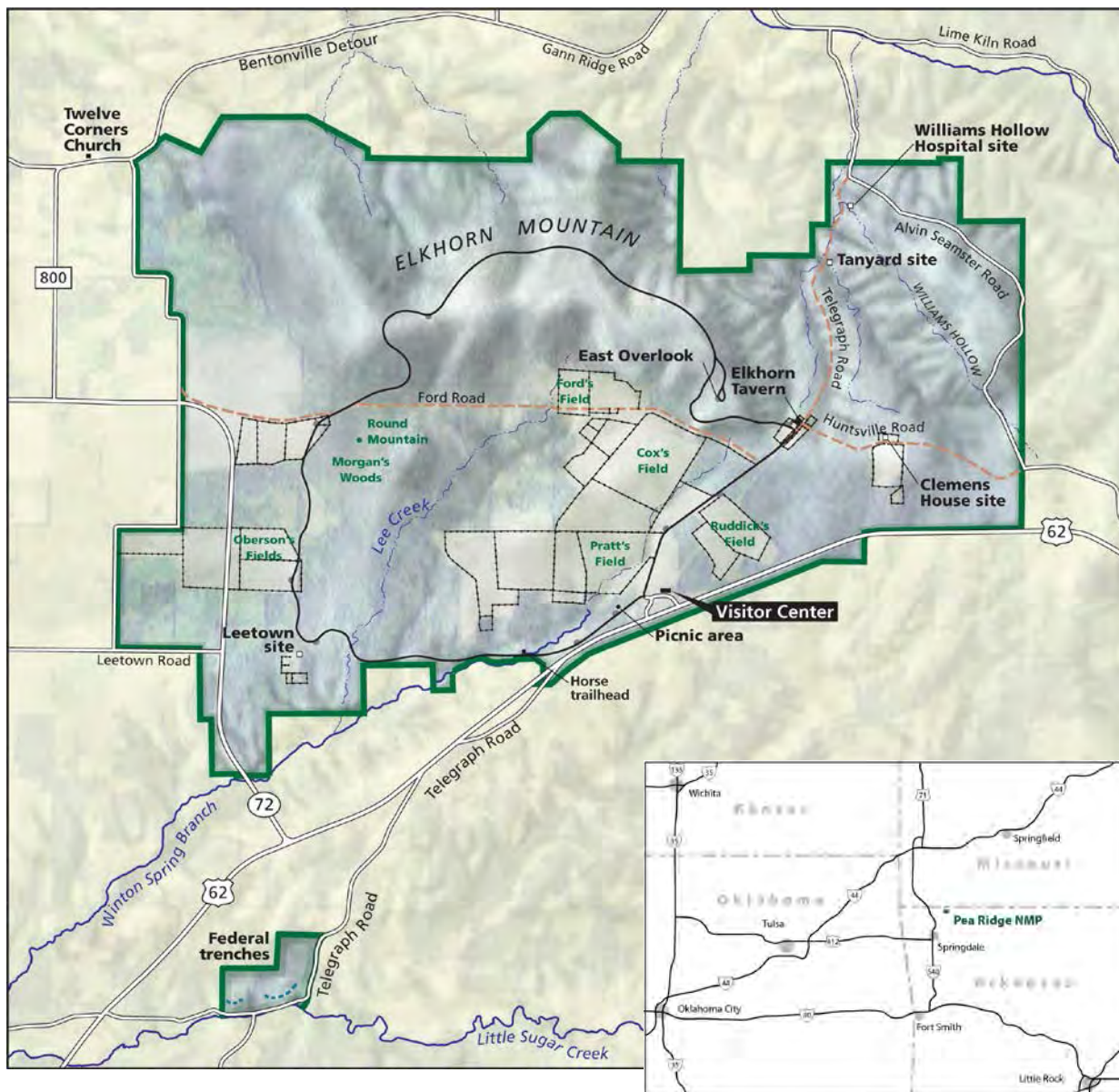
This Environmental Assessment (EA) examines alternatives for vegetation management actions by the National Park Service (NPS) at Pea Ridge National Military Park (park). The park was established by Congress on July 20, 1956 to “preserve and protect the landscapes and resources associated with the Battle of Pea Ridge” and “interpret the battle as an integral part of the social, political, and military history of the Civil War” (70 Statute (Stat.) 592). The Battle of Pea Ridge (also known as the Battle of Elkhorn Tavern) in northwest Arkansas was the largest Civil War battle west of the Mississippi River and essentially secured northwest Arkansas and the state of Missouri for the Union. The name of the battle was derived from the nearby city of Pea Ridge, supposedly named for the wild “turkey peas” or “hog peanuts” that were harvested by the indigenous American Indian tribes.

The park’s General Management Plan (GMP), completed in 2006, set the goals for landscape management at the park. The overarching goals of the GMP are “returning the battlefield landscape to the 1862 appearance” and “providing views of the battlefield that convey the open space and woodlands present at the time of the battle.” A map of the project location is shown in Figure 1.

The purpose of this Vegetation Management Plan (plan/EA) is to design ways to adjust and/or establish the vegetation patterns that represent the look and feel of the 1862 landscape. The park proposes the development of a vegetation management plan to establish methods by which to create, then maintain, those patterns to maximize benefits to natural and cultural resources. Implementing a vegetation management plan would protect and preserve cultural and natural resources, improve the visitor experience, and provide more effective management of the vegetation within the park.

This plan/EA describes four alternatives – three action alternatives for vegetation management and the no action alternative that continues current vegetation management practices. The plan/EA was prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508; Department of the Interior regulations *Implementation of NEPA of 1969*, 43 CFR Part 46; and NPS Director’s Order (DO)-12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making*. In coordination with the Arkansas State Historic Preservation Office (SHPO), the park is using this plan/EA to satisfy the requirements of Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (16 United States Code (USC) 470, et seq.) pursuant to regulations contained in 36 CFR 800.8(c) – Protection of Historic Properties.

FIGURE 1. PROJECT AREA



Note: "Oberson's" and "Clemens'" have been represented in various historic and current publications for the park. Several different spellings have been used for these terms. The spellings used in this plan/EA are consistent with the GMP, as well as historic base maps created for the park.

PURPOSE OF AND NEED FOR ACTION

Project Purpose

The purpose of the proposed plan/EA is to develop a strategy to modify and/or establish the vegetation patterns in the park to represent the look and feel of the 1862 battlefield landscape. The plan/EA would promote active vegetation restoration and support protection and preservation of cultural resources. The proposed plan is being prepared to facilitate implementing the park's landscape management goals outlined previously in the park's GMP (NPS 2006).

Project Need

Natural and man-made changes to the landscape of the park area and environs have occurred over the past 150 years since the time of the battle. A vegetation management plan is needed to provide the framework necessary to achieve the goals in the GMP, primarily to return the battlefield landscape to its 1862 appearance. The plan/EA is also needed to allow the NPS to establish, and then implement, methods by which to maintain those vegetation patterns to maximize benefits to natural and cultural resources.

Objectives in Taking Action

The NPS considers objectives to be those goals that must be achieved to a large degree for the action to be considered a success (NPS 2011a). All alternatives selected for detailed analysis must meet project objectives and resolve the purpose of and need for the action. Objectives must be grounded in the park's enabling legislation, purpose, significance, and mission goals, and must be compatible with direction and guidance provided by the GMP, strategic plan, and/or other management guidance.

The objectives of the proposed action are to:

- Enhance the park's vegetation management practices to support the overriding goal of returning the battlefield's landscape to its 1862 appearance to as great a degree as feasible.
- Convey the visual character of the battlefield to the visitor by orchestrating views and vistas, including the contrast of open fields to the surrounding woodlands, through vegetation management.
- Achieve and maintain healthy fields and forests characteristic of the Arkansas Highlands Zone, as identified in the GMP.
- Develop a plan that provides practical guidelines with site-specific methodologies that would allow the park to achieve and maintain the landscape with reasonable maintenance costs, in concert with other park guidance documents.

OBJECTIVES OF GENERAL MANAGEMENT PLAN RELATED TO VEGETATION MANAGEMENT

The GMP was developed to guide park managers when making decisions about how to best protect park resources, how to provide a meaningful visitor experience, how to manage visitor

use, and what types of facilities are necessary to fulfill the purposes for which the park was established. However, the GMP states that “decisions about site-specific actions will be deferred to more detailed planning efforts.” Therefore, the GMP serves as the foundation for development of this plan/EA.

In the development of the GMP, both NPS staff and the general public expressed their desires for the park’s future, some of which include. . . “returning the battlefield landscape to the 1862 appearance” and “ensuring that visitors understand and appreciate the significance of Pea Ridge National Military Park.” More detailed information regarding establishment, management, and threats to vegetation are included in Appendix B.

GMP Management Zones

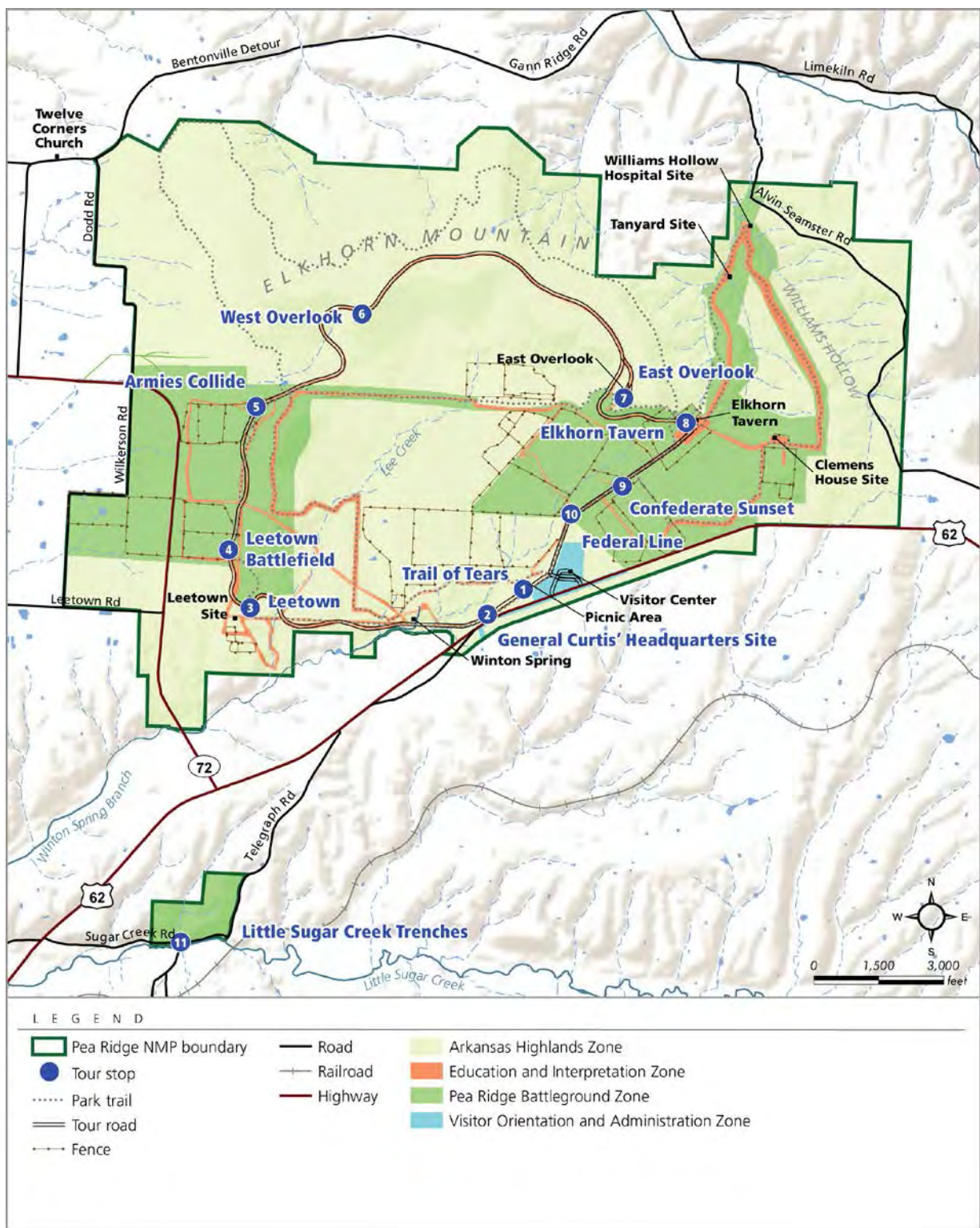
Five management zones were developed for the GMP. Within the zones, specific management strategies are prescribed for different areas in the park to achieve a combination of desired resource conditions and visitor experiences. The management zones were used as a guide for the vegetation management strategies described in *Chapter 2: Alternatives*. The park’s GMP management zones are described in the following paragraphs. A map of the zones is shown in Figure 2.

Arkansas Highlands Zone

The park is located in the Ozark Plateau Physiographic Zone, a vast upland area that includes most of southwestern Missouri and northwestern Arkansas. Rolling tablelands, rocky highlands, narrow valleys, and deep ravines define this region. The park's hardwood forests, small prairies, and timbered slopes and hollows of Elkhorn Mountain are characteristic features of the Ozark Plateau. They provide reminders of the plateau's natural landscape and its influence on the Battle of Pea Ridge. Management in the Arkansas Highlands Zone would work to preserve these characteristics, enabling visitors to familiarize themselves with the natural environment of 1862 Arkansas and gain an appreciation of the experiences of the soldiers who campaigned and fought at Pea Ridge.

Desired Resource Conditions. Management in the Arkansas Highlands Zone would seek to reestablish the natural landscape features of the Ozark Plateau, the physiographic region that helps define the cultural landscape of the Pea Ridge battlefield. Natural prairies would be maintained or restored. Woodlands would be preserved or allowed to reestablish in areas cleared for agriculture. Cultural landscape features such as historic roads and traces would be rehabilitated to provide access within this area.

FIGURE 2. GMP MANAGEMENT ZONES



PURPOSE AND NEED

The Arkansas Highlands Zone does not contain the most critical portions of the battlefield, but some important features of the 1862 battlefield landscape would be located in this zone.

Historic fields would be maintained to give visitors a sense of what the combatants saw.

Control or removal of exotic species would occur to encourage native species and natural systems. Exotic species would be managed to provide screening from auditory and visual intrusions where appropriate.

Visitor Experience. Visitors would have opportunities to experience the natural and cultural character of rural Arkansas as it generally appeared to the combatants. Areas in this zone would be experienced via hiking or horseback riding.

Pea Ridge Battleground Zone

Management in the Pea Ridge Battleground Zone would focus on retaining and enhancing the historic character of the landscape that defined the 1862 Pea Ridge battlefield. Changes in land uses, transportation systems, and the relationship between prairie, fields, and forests currently combine to obscure the historic landscape and inhibit visitor understanding of the largest Civil War battle west of the Mississippi River. Maintaining or restoring open fields, historic circulation patterns, fencing, historic woodlands, and other landscape features would enhance the integrity of the historic battlefield landscape.

Desired Resource Conditions. The battlefield landscape would be returned to its 1862 appearance to as great a degree as feasible, consistent with NPS policy on historic landscapes. The rural, agrarian setting for the Battle of Pea Ridge featured agricultural fields, orchards, open prairies, extensive wooded areas, and a modest network of roads and trails. These landscape characteristics helped define the way the battle unfolded; their representation is essential to visitor understanding of this pivotal battle.

Visitor Experience. Visitors would gain a sense of the physical environment of the battlefield as it appeared in 1862. Access to these areas was pivotal to the outcome of the battle and interpretive programs and would combine to immerse visitors in the history and significance of the battle. Areas in this management zone would be experienced via hiking or horseback riding on historic traces and trails.

Education and Interpretation Zone

The Battle of Pea Ridge was a decisive turning point in the Civil War west of the Mississippi River. The Union victory at Pea Ridge effectively dashed Confederacy hopes for establishing control over the state of Missouri. By doing so, the battle inflamed a brutal guerilla war that inflicted misery on both soldiers and civilians in Missouri and Arkansas. However, the battle also inspired the erection of one of the first Civil War memorials created jointly by Union and Confederacy veterans of Pea Ridge. Visitors in the Education and Interpretation Zone would have opportunities to learn about and gain an appreciation of the critical features of this fascinating and significant battle and the efforts of Pea Ridge veterans to commemorate the Battle of Pea Ridge and their comrades who were killed in combat.

Desired Resource Conditions. Significant resources in the Education and Interpretation Zone could include artifacts related to the battle and elements of the park's battlefield landscape. These resources would be managed to maintain their historical integrity and ability to support the interpretive and educational programs.

Visitor Experience. Visitors would encounter an array of educational and interpretive media that convey the events surrounding the battle. The areas in the Education and Interpretation Zone would be experienced via auto touring, cycling, hiking, and horseback riding. Facilities include interpretive media, exhibits, audio stations, roads, trails, and parking.



Line of cannon for interpretive purposes at Leetown Battlefield.

Sensitive Resources Zone (Note: this zone is not shown on Figure 2 but is partially included in the buffer areas – see Chapter 2: Alternatives, for a description of buffer areas)

The Sensitive Resources Zone would be dedicated to protecting the remnants of the Union trenches above Little Sugar Creek. These remnants are susceptible to the loss of their remaining physical integrity due to erosion, trampling, and deterioration from vegetative growth.

Desired Resource Conditions. These critical resources would be preserved to minimize or prevent continued deterioration. Restoration of the trenches could occur if sufficient documentation was available to guide such an undertaking. Archeological investigations could provide additional data to guide resource preservation.

Visitor Experience. Only ranger-led visitor access would be allowed to the Sensitive Resources Zone until these areas have been preserved.

Visitor Orientation and Administration Zone

Management in the Visitor Orientation and Administration Zone would focus on providing visitors with overall orientation to the park and providing space for park administration, maintenance, and emergency services.

Desired Resource Conditions. Significant cultural resources in the Visitor Orientation and Administration Zone would be limited to battle-related artifacts. Natural resources in this area would be highly manipulated to accommodate park operations and visitor access.

Visitor Experience. Visitors would gain an overall orientation to the park in the Visitor Orientation and Administration Zone.

Achieving GMP Objectives through the Plan/EA

Through the NEPA analysis for the GMP, the park analyzed four alternatives (including a no action alternative) and identified a preferred alternative, “Exploration and Discovery,” which best meets the management goals of the park and addresses the desired resource conditions within the park. “Exploration and Discovery” was the selected alternative and, according to the GMP, under the selected alternative:

- Visitors would have the opportunity to choose from the widest range of experiences.
- Visitors would have opportunities to immerse themselves in park resources associated with key battle areas and gain an understanding of the history of the Pea Ridge battle.
- Visitors would have many choices in the type, intensity, and duration of their experiences, guided by a variety of interpretive programs and media.
- Under the preferred alternative, about 25% of the park would be included in the Pea Ridge Battleground Zone in order to enhance the historic appearance of the battlefield landscape. The Union trenches would be included in the Sensitive Resources Zone in order to provide the highest level of protection for these critical resources. The Tour Road and the veterans' memorials west of Elkhorn Tavern would be included in the Education and Interpretation Zone. Visitor orientation and contextual interpretation would occur in the visitor center. The visitor center and administrative and maintenance facilities would be located in the Visitor Orientation and Administration Zone. The remainder of the park would be included in the Arkansas Highlands Zone.
- The Tour Road would provide access to the center of the Leetown Battlefield, follow the present route over Elkhorn Mountain, and return to the new visitor center in the southwest corner of the park. The Telegraph Road would be restored to its historic condition. The historic Ford Road would be rehabilitated as a trail to provide additional access to key battle areas. Arkansas Highway 72 would be rerouted outside the park boundary to enhance the historic character of the landscape.
- Visitors would have opportunities to immerse themselves in key battle areas in the Leetown and Elkhorn Tavern battlefields, including Welfley's Knoll. In those areas, visitors would have contact with natural and cultural resources in conditions representing the 1862 battlefield. Other areas featuring interpretive media would provide views of the battlefield that convey the open space and woodlands present at the time of the battle.
- Visitors would have opportunities for interpretive experiences with a variety of media including outdoor exhibit kiosks, wayside exhibits, audio programs, maps, trails, and battlefield overlooks. Visitors would be provided a mix of evocative experiences and informative educational programs.

The action alternatives for this plan/EA, described in *Chapter 2: Alternatives*, have been developed to address the purpose, need, and objectives of this project, as well as to complement the goals of the GMP for park management.

Description of Study Area

Pea Ridge National Military Park is approximately 3 miles east of the city of Pea Ridge, Arkansas, and is 14 miles northeast of Bentonville, Arkansas. In March 1862, the Union Army of the Southwest (Union) led by Brigadier General Samuel R. Curtis defeated the Confederate Army of the West (Confederacy) under the command of Major General Earl Van Dorn in a bloody two-day battle at Pea Ridge in the remote northwest corner of Arkansas. This decisive victory

permanently turned the tide of the Civil War west of the Mississippi River, ensured that Missouri would remain in the Union, and freed Union forces for the campaign to take control of the lower Mississippi River (NPS 2006).

The park was established on July 20, 1956 to commemorate the Battle of Pea Ridge and preserve the site of the battle, the largest Civil War engagement west of the Mississippi River. This 4,300-acre park encompasses nearly 90% of the actual battlefield. Its numerous resources include archeological sites, historic sites, structures, (site-specific) collections, and cultural landscape features associated with the battle and the agrarian community once found at the city of Pea Ridge. For the purposes of this plan/EA, the study area encompasses the park boundaries and, when appropriate, the regional surrounding area.

The Battle of Pea Ridge

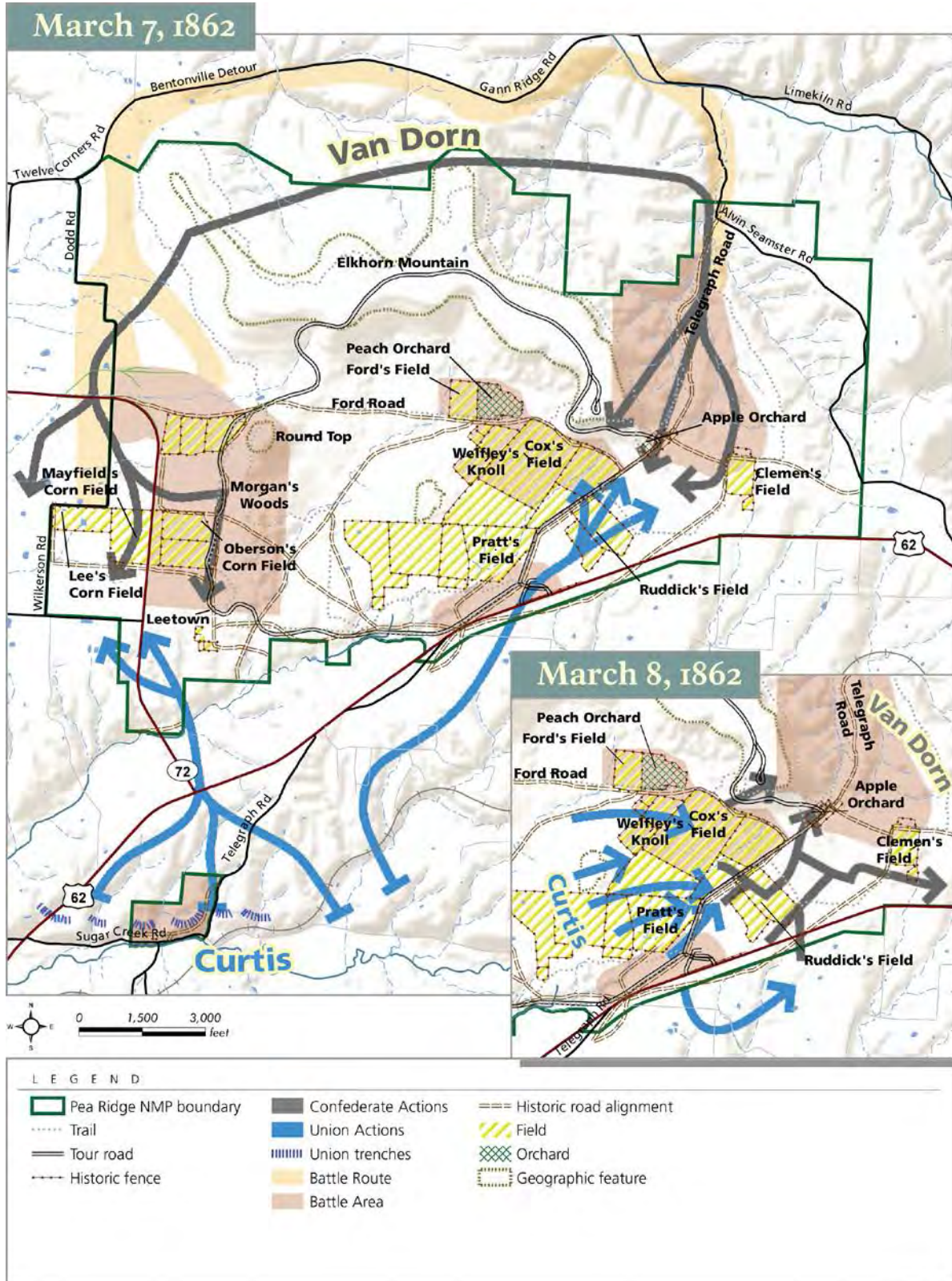
On March 7 and 8, 1862, Union and Confederacy troops met in the Pea Ridge vicinity. The east and west boundaries of the battlefield were delineated by Telegraph Road and Bentonville Detour Road, and on the south by Little Sugar Creek. Union troops were placed in trenches along Sugar Creek and the Wire Road, waiting for the Confederacy to approach on the Wire Road. Major General Earl Van Dorn set out on the night of March 6 to outflank the Union position at Little Sugar Creek, dividing his army into two columns. After gaining knowledge of Van Dorn's approach, the Union marched north to meet Van Dorn's advance on March 7. This movement, combined with the death of two generals (Brigadier General Ben McCulloch and Brigadier General James McIntosh) and the capture of their ranking colonel, brought the Confederacy attack to a halt. Van Dorn led a second column to meet the Union in the Elkhorn Tavern and Tanyard area. By that evening, the Confederacy had the Elkhorn Tavern and Telegraph Road under their control. The next day, Brigadier General Samuel R. Curtis, having reorganized and consolidated the Union, counterattacked near the tavern and gradually forced the Confederacy back. Running short of ammunition, Van Dorn retreated from the battlefield, thereby ending the Battle of Pea Ridge (also known as the Battle of Elkhorn Tavern). Missouri was in Union hands, and most of the Union and Confederacy moved east of the Mississippi River to fight in other campaigns (NPS 2008). Figure 3 shows the battle routes followed by the Confederacy and Union.

Historic and Other Background Information

Extensive research and studies have been completed to document the history of the park, the historic landscape, and the associated Battle of Pea Ridge. According to the GMP, "The information compiled in the park's archeological investigations, the Civil War Sites Advisory Commission's survey data, the historical base map prepared by NPS historian Edwin C. Bearss, and the park's vegetation management plan would provide the documentation for all actions related to landscape management" (NPS 2006). Historic documentation used by park staff as the basis for the proposed alternatives are listed below. The historic map created through this research is included in Appendix A.

- Edwin C. Bearss. 1962. *Historical Base Map for the Battle of Pea Ridge, March 7 and 8, 1862; and Documented Narrative to Support Historical Features and Vegetative Cover Shown on the Pea Ridge Historical Base Map*.
- William I. Shea and Earl J. Hess. 1992. *Pea Ridge, Civil War Campaign in the West*.
- Robert C. Weih. 2006. *Historical Land Cover/Use, Classification of Pea Ridge National Military Park*.

FIGURE 3. PEA RIDGE BATTLE ROUTES



- Steven L. Stephenson. 2012. *Inventory Glades and Develop a Management Plan at Pea Ridge National Military Park*. University of Arkansas; and *Age/Size Class Assessment of Red Cedar and Post Oak at Pea Ridge National Military Park*.
- David D. Diamond, Lee F. Elliott, Michael D. DeBacker, Kevin M. James, and Dyanna L. Pursell. 2013. *Vegetation Classification and Mapping of Pea Ridge National Military Park*. April.
- Thomas L. Foti and George A. Bukenhofer. 1998. *A Description of the Sections and Subsections of the Interior Highlands of Arkansas and Oklahoma*. Journal of the Arkansas Academy of Science, Vol. 52.
- Bruce E. Cutter and Richard P. Guyette. 1994. *Fire Frequency on an Oak-Hickory Ridgetop in the Missouri Ozarks*. University of Notre Dame, American Midland Naturalist, Vol. 132, No. 2. October.
- David H. Journey and David W. Stahle. 2004. *Old-Growth Wooded Pasture in the Ozarks*.
- U.S. Forest Service. 1999. *Ozark-Ouachita Highlands Assessment: Terrestrial Vegetation and Wildlife*. Report 5 of 5. Chapter 2.
- Martin A. Spetich, ed. 2004. Upland oak ecology symposium: history, current conditions, and sustainability. Gen. Tech. Rep. SRS-73. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 311 pp.
- John C. Nelson. 1997. *Presettlement Vegetation Patterns along the 5th Principal Meridian, Missouri Territory, 1815*. University of Notre Dame, American Midland Naturalist, Vol. 137, No. 1.
- Eric Proebsting. 2004. *A Survey of the Methods Used to Study Historic Changes in Land Cover with a GLO Pilot Project at Pea Ridge Park*. May 3.
- Thomas L. Foti. 2004. *Upland Hardwood Forests and Related Communities of the Arkansas Ozarks in the Early 19th Century*. Arkansas Natural Heritage Commission.
- Thomas L. Foti and Susan M. Glenn. 1991. *The Ouachita Mountain landscape at the time of settlement*. Pp. 49-66 in D. Henderson and L.D. Hedrick, eds. Restoration of old growth forests in the Interior Highlands of Arkansas and Oklahoma. Morrilton, AR. Winrock International Institute for Agricultural Development. 190 pp.
- David W. Stahle. 1996-1997. *Tree Rings and Ancient Forest Relics*. University of Arkansas.

Existing (circa 2014) and Historic (circa 1862) Vegetation Conditions

Eight vegetation types have been developed to better categorize areas of the park for vegetation management. The vegetation types have been developed to describe the range of historic vegetation that would have existed at the time of the 1862 battle and the vegetation that currently exists. The vegetation types are fields, open woodlands, orchards, Arkansas Highlands forest, historic trees, glade-like, Round Prairie, and visitor areas.

Table 1 describes each of the vegetation types, the historic vegetation for each type with estimated acreage within the park, the existing vegetation for each type with estimated acreage, and where these types lie within the park management zones defined in the GMP.

Figure 4 shows the historic vegetation conditions at the park to provide a foundation for the plan/EA. Figure 5 shows the existing vegetation conditions (also the “No Action Alternative” – see *Chapter 2: Alternatives*) relative to the historic conditions to display the changes that have occurred naturally to the vegetation since the time of the battle.

TABLE 1. HISTORIC (CIRCA 1862) AND EXISTING (CIRCA 2014) VEGETATION CONDITIONS

Vegetation Type		Historic Conditions (circa 1862) (Historic Vegetation Map)		Existing Conditions (circa 2014)		
	Description	Vegetation Characteristics	Estimated Percentage of Vegetation Type in Park	Vegetation Characteristics	Estimated Percentage of Vegetation Type in Park	Management Zone(s)
Fields	<ul style="list-style-type: none"> • Open fields • Crops • Agricultural pasture • Wood lot 	<p><i>Fields</i></p> <ul style="list-style-type: none"> • Crops such as corn, wheat, oats, hops, sorghum, and Hungarian grass (foxtail millet) • Historic roads used for access to agricultural fields • Fields include areas noted as fields and agricultural pastures on the Historic Vegetation Map <p><i>Wood Lot</i></p> <ul style="list-style-type: none"> • The wood lot is a parcel that was historically used for timber storage – for use or sale • Along the Telegraph Road route of the battle • Along period roads • Open ground with very little underbrush • Grasslands 	Fields – 11% Wood Lot – <1%	<p><i>Fields</i></p> <ul style="list-style-type: none"> • Mowed Grassland (Introduced Grasses) • Ruderal Grassland and Shrubland – Retired crop fields that have not been mowed or burned frequently enough to suppress woody vegetation establishment • Forest or woods that have encroached on historically open fields <p><i>Wood Lot</i></p> <ul style="list-style-type: none"> • Typical Upland Deciduous Woodland and Forest (Oak-Hickory community) • Bottomland Deciduous Woodland and Forest community at Williams Hollow • Mowed Grassland 	Fields - 11% Wood Lot – <1%	<ul style="list-style-type: none"> • Pea Ridge Battleground Zone • Education and Interpretation Zone • Arkansas Highlands Zone
Open Woodlands	<ul style="list-style-type: none"> • Native woodland species – Oak-Hickory community 	<ul style="list-style-type: none"> • Open Forest and Herbaceous Undergrowth • Located on rolling hills with narrow hollows and broad uplands • Low to moderate density • Categorized as Savanna, Dry-Mesic Woodland, and Dry Open Woodland 	63%	<ul style="list-style-type: none"> • Existing woodlands are denser than historic woodlands Vegetation Association – Typical Upland Deciduous Woodland and Forest community 	8%	<ul style="list-style-type: none"> • Pea Ridge Battleground Zone • Education and Interpretation Zone • Arkansas Highlands Zone
Orchards	<ul style="list-style-type: none"> • Groves of same species fruit trees • Peach and apple orchards 	<ul style="list-style-type: none"> • Peach orchard at Ford Farm • Apple orchard at Elkhorn Tavern 	<1%	<ul style="list-style-type: none"> • Mowed Grassland (Introduced Grasses) • Orchards (approximately 38 apple trees replanted at Elkhorn Tavern and 200 peach trees replanted at Ford Farm in 2009) 	<1%	<ul style="list-style-type: none"> • Education and Interpretation Zone • Arkansas Highlands Zone • Pea Ridge Battleground Zone

Objectives of General Management Plan Related to Vegetation Management

Vegetation Type		Historic Conditions (circa 1862) (Historic Vegetation Map)		Existing Conditions (circa 2014)		
	Description	Vegetation Characteristics	Estimated Percentage of Vegetation Type in Park	Vegetation Characteristics	Estimated Percentage of Vegetation Type in Park	Management Zone(s)
Arkansas Highlands Forest	<ul style="list-style-type: none"> Native forest found throughout the Arkansas Highlands of the Ozark Plateau Typical Upland Deciduous Woodland and Forest community Eastern red cedar ("Glade-like") Native woodland species – Oak-Hickory community 	<ul style="list-style-type: none"> A variety of woodland communities that usually include oak, hickory, and scrub oak thickets Forest vegetation as noted on the Historic Vegetation Map (see Figure 4) Categorized as Dry Mesic Forest and Bottomland 	<p>Eastern red cedar - <1%</p> <p>Other hardwoods – 24%</p>	<ul style="list-style-type: none"> Typical Upland Deciduous Woodland and Forest community (Oak-Hickory), and eastern red cedar (percentage shown below under "Glade-like") Dry Deciduous Woodland and Forest Silver Maple Forest-Floodplain Woodlands dominated by silver maple; one location within the park Narrow hollows (i.e., streams such as Lee Creek and Williams Hollow) Bottomland Deciduous Woodland and Forest community (Black Walnut-Red Mulberry-American Elm) Some Ruderal Grassland and Shrubland 	<p>Eastern red cedar – 18%</p> <p>Other hardwoods - 61%</p>	<ul style="list-style-type: none"> Arkansas Highlands Zone
Historic Trees	<ul style="list-style-type: none"> "Witness" trees Native and introduced species that existed at the time of the battle, including post oaks and white oaks Red oak and black oak may have been present 	<p>Approximate percentage of historic tree species are as follows (Weih 2006):</p> <ul style="list-style-type: none"> Post oak – 37% Black oak – 26% Black jack – 18% White oak – 12% Hickory – 2% Red oak – 1% Chinquapin, sycamore, cherry, elm, hackberry, sugar tree, dogwood, pin oak, walnut, and coffee tree – <1% 	n/a	<ul style="list-style-type: none"> Twelve post oaks were identified – all of which were old enough to have been present during the battle Eight white oaks were identified – three of which were old enough to have been present during the battle One red oak and one black oak were identified but neither were from the time of the battle A park study identified five areas of eastern red cedar – some are 101 years old and others are 70 years old but none from the time of the battle were identified 	16 trees total	<ul style="list-style-type: none"> Arkansas Highlands Zone Pea Ridge Battleground Zone

PURPOSE AND NEED

Vegetation Type		Historic Conditions (circa 1862) (Historic Vegetation Map)		Existing Conditions (circa 2014)		
	Description	Vegetation Characteristics	Estimated Percentage of Vegetation Type in Park	Vegetation Characteristics	Estimated Percentage of Vegetation Type in Park	Management Zone(s)
Glade-like	<ul style="list-style-type: none"> Open areas of thin soils and exposed rock that have characteristic woody and herbaceous vegetation and eastern red cedar 	<ul style="list-style-type: none"> Eastern red cedar Glade-like areas accounted for <1% of the park 	<1%	<ul style="list-style-type: none"> Eastern red cedar openings with characteristic herbaceous vegetation on thin soils with exposed bedrock Three sites identified in a park study (1, 3, and 5) (Stephenson 2012) 	18% (percentage also shown above under Arkansas Highlands Forest)	<ul style="list-style-type: none"> Arkansas Highlands Zone
Round Prairie	<ul style="list-style-type: none"> Native Tallgrass Prairie 	<ul style="list-style-type: none"> Native Tallgrass Prairie 	~2%	<ul style="list-style-type: none"> Restored Tallgrass Prairie with little bluestem and big bluestem 	1%	<ul style="list-style-type: none"> Pea Ridge Battleground Zone
Visitor Areas Vegetation	<ul style="list-style-type: none"> At the visitor center (parking, entrance, and view from building) At interpretive spots along the Tour Road (parking areas) At East Overlook 	<ul style="list-style-type: none"> Nonexistent 	n/a	<ul style="list-style-type: none"> Mown lawn and natural areas depending on location 	<1%	<ul style="list-style-type: none"> Visitor Orientation and Administration Zone Education and Interpretation Zone

FIGURE 4. HISTORIC VEGETATION MAP AT PEA RIDGE NATIONAL MILITARY PARK (CIRCA 1862)

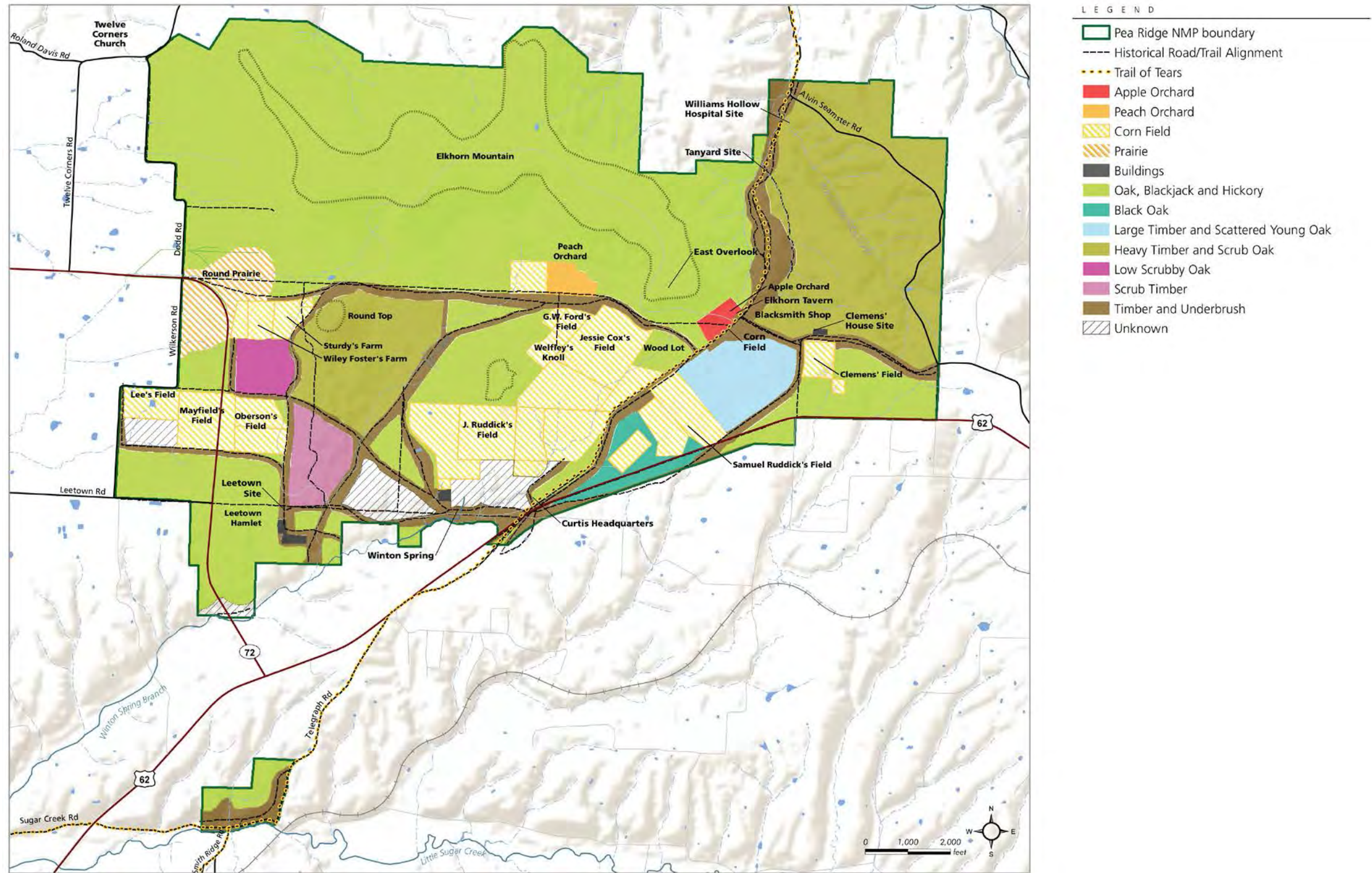
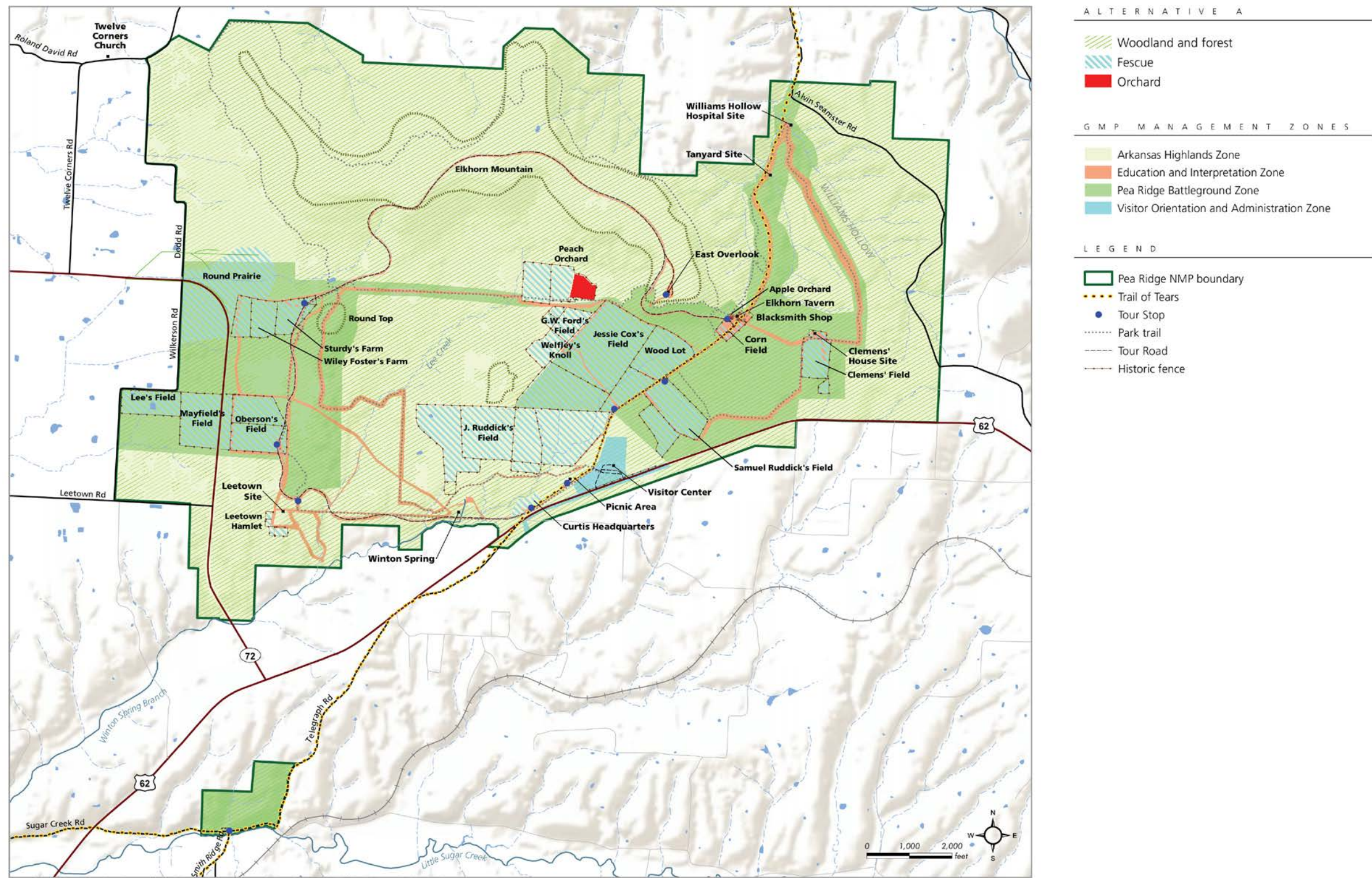


FIGURE 5. EXISTING VEGETATION MAP AT PEA RIDGE NATIONAL MILITARY PARK (CIRCA 2014)



PURPOSE AND SIGNIFICANCE OF PEA RIDGE NATIONAL MILITARY PARK

The purpose and significance of the park, as stated in the GMP (NPS 2006), underlie how the park is managed. The purpose tells why the park was set aside as a national park system unit. The park was established (purpose) to preserve and protect the landscapes and resources associated with the Battle of Pea Ridge; to interpret the battle as an integral part of the social, political, and military history of the Civil War; and to provide roads, trails, markers, buildings, and other improvements and facilities for the care and accommodation of visitors as necessary.

The significance of the park addresses why the area is unique—why it is important enough to our natural and/or cultural heritage to warrant national park designation, and how it differs from other parts of the country. The park is significant for the following reasons:

- The Union victory at Pea Ridge prevented the Confederacy from gaining physical and political control of Missouri. Union control of Missouri subsequently provided a secure logistical base for the Union to embark upon campaigns to control the lower Mississippi River Valley.
- Pea Ridge was the first major battle outside Indian Territory in which the largest number of organized troops from the Cherokee, Choctaw, Chickasaw, and Creek nations fought.
- Pea Ridge National Military Park is the best preserved Civil War battlefield in the United States, encompassing nearly 90% of the combat sites of the Battle of Pea Ridge.
- The Union trenches above Little Sugar Creek, the first entrenchments dug in the Civil War's Trans-Mississippi theater of operations, are the only constructed features remaining from the battle.
- The last distribution center along the northern route of the Trail of Tears, before reaching Indian Territory, was located in Ruddick's Field.

In addition to the park significance statements, the GMP identified three important points about the battle:

- Brigadier General Samuel R. Curtis is the only American military commander known to have successfully redeployed his entrenched army after learning of an intended assault on the Union rear.
- The Union, although outnumbered in terms of troops and artillery, launched the longest and most intense field artillery assault up to that point in the Civil War. The assault represented one of the few successful uses of massed artillery as an offensive tactic during the war.
- About one-third of the Union forces were German and eastern European immigrants from Missouri who made a significant contribution to the Union victory at Pea Ridge.

RELATED LAWS, REGULATIONS, POLICIES, ORDERS, AND PLANNING DOCUMENTS

Several guiding laws and policies, as well as previous planning project reports, provide background and management information for this plan/EA. Relevant plans and policies are described below.

Guiding Laws and Policies

NPS Organic Act of 1916

By enacting the NPS Organic Act of 1916, Congress directed the U.S. Department of the Interior and NPS to manage units “to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations” (16 USC section 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 USC section 1a-1). Despite these mandates, the Organic Act and its amendments afford the NPS latitude when making resource decisions that balance resource preservation and visitor recreation.

Impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values (*NPS Management Policies 2006*). Whether an impact meets this definition depends on the particular resources that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

An impact on any park resource or value may, but does not necessarily, constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- Identified in the park’s general management plan or other relevant NPS planning documents as being of significance.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and it cannot be further mitigated.

National Historic Preservation Act of 1966, as Amended

The NHPA, as amended, protects buildings, sites, districts, structures, and objects that have significant scientific, historic, or cultural value. The act established affirmative responsibilities of federal agencies to preserve historic and prehistoric resources. Effects on properties that are listed on, or that are eligible for listing on, the National Register of Historic Places (National Register) must be taken into account in planning and operations. Any property that may qualify for listing on the National Register must not be inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. The Advisory Council on Historic Preservation (ACHP) is then afforded a reasonable opportunity to comment. The historic preservation review process

mandated by Section 106 is outlined in regulations issued by the ACHP. Revised regulations, known as “Protection of Historic Properties” (36 CFR Part 800), were updated on August 5, 2004.

National Environmental Policy Act of 1969, as Amended

NEPA was passed by Congress in 1969 and took effect on January 1, 1970. This legislation established the country’s environmental policies, including the goal of achieving a productive harmony between human beings and the physical environment for present and future generations. NEPA provides the tools to implement these goals by requiring that every federal agency prepare an in-depth study of the impacts of “major federal actions having a significant effect on the environment” and alternatives to those actions. NEPA also requires that each agency makes that information an integral part of its decision-making process. In addition, NEPA requires that agencies make a diligent effort to involve interested members of the public before agencies make decisions affecting the environment. NEPA is implemented through regulations of the Council on Environmental Quality (CEQ) (40 CFR 1500-1508).

Pea Ridge National Military Park Enabling Legislation

According to the park’s enabling legislation, the park was established on July 20, 1956 “to preserve and protect the landscapes and resources associated with the battle of Pea Ridge; to interpret the battle as an integral part of the social, political, and military history of the Civil War; and provide roads, trails, markers, buildings, and other improvements and facilities for the care and accommodation of visitors as necessary” (70 Stat. 592).

NPS Management Policies 2006

NPS Management Policies 2006 provides guidance for all management decisions, including decisions related to cultural resources. Cultural resources, including cultural landscapes and historic structures, are addressed in section 5.0, which states the NPS cultural resources management program involves “. . . stewardship to ensure that cultural resources are preserved and protected, receive appropriate treatments (including maintenance) to achieve desired conditions, and are made available for public understanding and enjoyment.” The policy further states that “Each park’s resource stewardship strategy will provide comprehensive recommendations about specific actions needed to achieve and maintain the desired resource conditions and visitor experiences for the park’s cultural resources.”

Director’s Order-12 and Handbook (2011)

DO-12 and Handbook (NPS 2011a) provides the instruction or procedures by which the NPS complies with NEPA and for practicing environmental impact assessment and resource conservation. DO-12 and Handbook provide the framework for the NPS’s approach in environmental analysis, public involvement, and making resource-based decisions. The order and handbook require a full and open evaluation, interdisciplinary approach, and technical and scientific analysis of management decisions.

Director's Order-28: Cultural Resource Management

DO-28 (NPS 2002) elaborates on the existing laws for cultural resources including, but not limited to, the 1916 NPS Organic Act, NPS *Management Policies 2006*, and NHPA. DO-28 offers guidance in applying the laws and regulations regarding cultural resource management to establish, maintain, and refine park cultural resource programs.

Executive Order 11593, "Protection and Enhancement of the Cultural Environment"

Executive Order (EO) 11593 mandates that all agencies 1) compile an inventory of the cultural resources for which they are the trustee, 2) nominate all eligible government properties to the National Register, 3) preserve and protect their cultural resources, and 4) ensure that agency activities contribute to the preservation and protection of nonfederally owned cultural resources.

Executive Order 11990, "Protection of Wetlands"

EO 11990, "Protection of Wetlands" is an order to avoid adverse impacts associated with the destruction or modification of wetlands. The order requires agencies to "take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies' responsibilities" (May 24, 1977, 42 Federal Register [FR] 26961). The order applies to acquisition, management, and disposition of federal lands and facilities construction and improvement projects that are undertaken, financed, or assisted by federal agencies, and federal activities and programs affecting land use.

Related Planning Documents

Pea Ridge National Military Park General Management Plan / Environmental Impact Statement

The park's GMP (NPS 2006) proposes vegetation management strategies for different zones of the park. Within the Arkansas Highlands Zone, the GMP indicates the need to restore the natural landscape of the Ozark Plateau, maintain or restore the natural prairies, and preserve or allow the reestablishment of woodlands in areas that were wooded at the time of the battle. Within the Pea Ridge Battleground Zone, the GMP proposes to return the landscape to the 1862 appearance to as great a degree as feasible. The rural agrarian setting for the Battle of Pea Ridge featured agricultural fields, orchards, open prairies, extensive wooded areas, and a modest network of roads and trails. These landscape characteristics helped define the way the battle unfolded and the GMP indicates their representation is essential to visitor understanding of the battle. The GMP proposes these resources be managed to enhance their ability to support the interpretive and educational programs and to maintain their historical integrity.

Fire Management Plan

The Fire Management Plan (FMP) (NPS 2005) outlines a detailed program of actions to be taken by the park to meet the fire management goals for the area. The fire management program at the park was developed to balance the park's goals with the goals of the National Fire Plan (USDA and USDOJ 2000). Park goals are found in the GMP.

Resource management objectives determine whether fire may be used as a tool to manipulate vegetation and how fire will be managed.

Environmental Assessment, Avoca to Gateway, NEPA Study (U.S. Highway 62)

The Arkansas State Highway and Transportation Department is proposing to widen U.S. Highway 62 (Highway 62) from two lanes to four lanes from Avoca to Gateway, including the reconfiguration of the Highway 62 intersection with Arkansas Highway 37 in Benton County, Arkansas. The purpose of the improvements is to provide increased capacity, alleviate traffic congestion, and improve safety. A portion of Highway 62 runs along the southern boundary of the park and would be rerouted as part of this project. The new section would be rerouted south of the existing Highway 62 to avoid the park (south of Avoca and the Arkansas-Missouri railroad line), and the existing Highway 62 would remain a two-lane road and would be used as the entrance route for visitors to the park. Portions of the old Highway 62 right-of-way would also be converted to park lands, which would provide a greater noise buffer between the highway and the park.

Long-Range Interpretive Plan

The Long-Range Interpretive Plan (NPS 2011b) outlines recommendations for future interpretive services, facilities, and media. Park staff, historians, partners, and stakeholders worked together to develop a comprehensive tool that outlines educational and recreational opportunities for visitors to develop intellectual and emotional connections to the natural and cultural resources found within the park. The goal of the plan is to promote the park's resource values through specially planned visitor experiences and excellence in interpretation.

Heartland Exotic Plant Management Plan

The Heartland Inventory and Monitoring Network (HTLN) is part of the nationwide Inventory and Monitoring Program of the NPS. HTLN parks in eight states (Arkansas, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, and Ohio) established an exotic plant management team (EPMT) action plan to control exotic plants cooperatively. This supports restoration of native vegetation in several ecosystem types associated with tallgrass prairies, eastern deciduous forests, interior highlands, and the Mississippi floodplain within the parks. The approach uses a cooperative/collaborative program to achieve economy of scale that augments exotic plant programs existing in the parks, monitors effects for adaptive management, and centralizes data management for parks. The program also requires the allocation of resources to target species and locations, where success is most feasible and critical resources (i.e., threatened species, restoration areas, and significant cultural landscapes) are most threatened. The EPMT plan is designed to be proactive in the treatment of exotic invasive species before threats become severe.

Pea Ridge Cultural Landscape Report/EA

The park is in the process of developing a Cultural Landscape Report and EA (CLR/EA). The CLR/EA follows a Cultural Landscape Inventory completed in 2008 (NPS 2008) that documented the cultural landscape features within the park. The CLR/EA will document the history, significance, and treatment of the cultural landscape at the park, including any changes to its

geographical context, features, materials, and use. The CLR/EA will provide managers, curators, and others with information needed to make management decisions, as well as document any new information about the landscape's historic significance and integrity.

SCOPING PROCESS FOR THIS EA

Scoping is an early and open process to determine the breadth of issues and alternatives to be addressed in an environmental assessment. Park staff and resource professionals of the NPS Natural Resource Stewardship and Science Environmental Quality Division and NPS Midwest Regional Office conducted internal scoping. This interdisciplinary process defined the purpose and need, identified potential actions to address the need, determined the likely issues and impact topics, and identified the relationship of the proposed action to other planning efforts at the park.

The park initiated public scoping with a press release that was sent to the *Arkansas Democrat Gazette*, published on December 19, 2012. A scoping announcement was also posted to the NPS Planning, Environment and Public Comment (PEPC) website on December 13, 2012. The scoping period was defined as December 13, 2012 through January 14, 2013. The Public Scoping Summary details the scoping process for the project (Appendix D).

Two letters were received from the public. One commenter indicated that Alternative D would accomplish the park's purpose, need, and objectives. The correspondence also gave suggestions for vegetation management tools and recommended against using annual food crops, as proposed in Alternative B. The commenter opposes Alternative B due to concerns that the crops it would include would be unsuccessful due to depletion by the current deer population; and the commenter was in favor of any alternative that would increase grassland bird habitat.

The second commenter considers Alternative B the most desirable, followed by Alternatives C and D. The commenter stated that no one can fully appreciate the context of the soldiers' struggle without viewing first-hand the physical challenges they faced, and believes a historically accurate landscape provides a constant reminder that the battle of Pea Ridge impacted a wide agricultural community. The commenter believes Alternative B should be the preferred alternative because it would depict a historically accurate landscape.

In addition, scoping letters were sent to federally recognized tribes to inform them of the proposed plan/EA on September 18, 2012 and to inquire whether affiliated tribes wanted to be involved in the environmental compliance process. The tribes and governments that received letters are:

- Absentee Shawnee Tribe
- Cherokee Nation of Oklahoma
- Choctaw Nation of Oklahoma
- The Osage Nation
- Shawnee Tribe of Oklahoma
- Quapaw Tribe of Oklahoma
- United Keetoowah Band of Cherokee Indians
- The Chickasaw Nation
- Muscogee (Creek) Nation of Oklahoma

The NHPA (16 USC 470 et seq.) requires the consideration of impacts on cultural resources, either listed in or eligible to be listed in, the National Register. Park staff sent a scoping letter to the Arkansas SHPO on August 13, 2012 to solicit input on issues of concern. No response was received from the SHPO by the end of the January 14, 2013 scoping period. Another letter was sent to the SHPO on January 29, 2013 to notify the SHPO that the plan/EA will be used to document compliance with Section 106. A similar letter was sent to the ACHP on October 22, 2013. The park will continue to consult with the SHPO to determine the effects of the action alternatives on eligible historic resources and to develop mitigation for impacts on historic features, if any, from the preferred alternative.

The park also sent a scoping letter on August 15, 2012 to the U.S. Fish and Wildlife Service (USFWS) to solicit input on issues of concern. The USFWS Arkansas Field Office responded to the scoping letter in a letter dated September 5, 2012 concurring with the NPS determination that the proposed plan/EA would have no effect on listed species.

ISSUES AND IMPACT TOPICS

This plan/EA identifies the anticipated impacts of possible actions on certain resources, park visitors, and neighbors. The impacts are organized by topic, such as “vegetation,” “visitor use,” and “park operations.” Impact topics serve to focus the environmental analysis and to ensure the relevance of impact evaluation. Impact topics were developed from the questions and comments brought forth during scoping; site conditions; staff knowledge of the park resources; and any laws, regulations, policies, or orders applicable to the project. Some topics were dismissed from detailed analysis because the resource is not present in the study area, or because the action alternatives would either have no effect on the impact topic or the effects would be slight but detectable, typically temporary, and localized. Some impact topics were retained even though the effects of the alternatives would be slight, temporary, and/or localized because the impact topic is a particularly sensitive resource or was identified as an important topic in scoping.

Impact Topics Selected for Analysis

The issues identified during scoping that are evaluated in this plan/EA are potential effects on the following resources:

- Vegetation
- Wildlife
- Visual resources
- Cultural landscapes, archeological sites, and historic structures/objects
- Visitor experience
- Park operations
- Socioeconomics

Table 2 discusses the retained impact topics; the reasons for retaining the topic; and relevant laws, regulations, and policies.

TABLE 2. IMPACT TOPICS RETAINED AND RELEVANT LAWS, REGULATIONS, AND POLICIES

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
Vegetation	Vegetation management strategies are the key issue in the GMP (NPS 2006) and the purpose of the EA. Vegetation modifications are proposed in the alternatives and, therefore, this topic was retained for further analysis.	NPS Organic Act; NPS <i>Management Policies 2006</i> ; Resource Management Guidelines (NPS-77); Federal Noxious Weed Control Act; EO 13112, "Invasive Species"
Wildlife	Changes in vegetation may alter wildlife habitat and could affect wildlife in the project area. Because the plan/EA alternatives have the potential to affect wildlife habitat, this topic was retained for further analysis.	NPS Organic Act; enabling legislation; NPS <i>Management Policies 2006</i> ; NPS-77
Visual Resources	Modifications to the vegetation proposed in the plan/EA alternatives may alter the views for park visitors; therefore, this topic was retained for further analysis.	NPS <i>Management Policies 2006</i>
Cultural Landscapes, Archeological Sites, and Historic Structures/Objects	Changes to vegetation proposed in the plan/EA may affect the cultural landscape of the park; and ground disturbances may affect archeological sites and historic structures/objects (i.e., disturb buried artifacts); therefore, this topic was retained for further analysis.	Sections 106 and 110 of the NHPA; ACHP implementing regulations regarding the "Protection of Historic Properties" (36 CFR 800); DO-28: <i>Cultural Resource Management Guidelines</i> ; NPS <i>Management Policies 2006</i> ; <i>Secretary of the Interior's Standards for the Treatment of Historic Properties</i> ; NEPA; <i>Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes</i> (1996); <i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> ; DO-28A: <i>Archeology</i> (NPS 2004)
Visitor Experience	The plan/EA alternatives could affect overall visitor understanding of the park, including interpretive and educational opportunities and, therefore, this topic was retained for further analysis.	NPS Organic Act; NPS <i>Management Policies 2006</i>
Park Operations	Park operations and maintenance activities could be affected by the plan/EA alternatives; therefore, this topic was retained for further analysis.	NPS <i>Management Policies 2006</i>
Socioeconomics	Because the alternatives include potential for new sources of income for lessees, this topic was retained for further analysis.	NPS <i>Management Policies 2006</i>

Impact Topics Dismissed from Further Consideration

The following impact topics or issues were eliminated from consideration because either the resources are not present in the areas proposed for management implementation or because the effects, if any, would be slight but detectable, typically temporary, and localized.

Soils. The Natural Resources Conservation Service (NRCS) has surveyed the soils in the park, with most soils mapped as loams (NRCS 2012). In general, Tonti soils are found on ridges, terraces, and stream terraces; Nixa soils are found on ridgetops; Noark and Clarksville soils are found on steep hill slopes; and Secaesh and Elsay soils are found on floodplains. Erosion by local streams and rivers carved the park landscape into its characteristic ridges, plateaus, valleys, and ravines. The impervious surfaces (e.g., parking lots, houses, and driveways) associated with surrounding developments has the potential to increase surface runoff in the park area, impacting local drainages, erosion rates, peak flows, and channel morphology. Increased surficial runoff would enhance stream channel incision. Erosion and incision already threatens horse and foot trails in the park and has potential to threaten the historic context of the park. In the federal trenches (detached unit), earthworks (including rifle pits and trenches) are being muted by surface runoff and erosion.

The action alternatives include activities such as ground clearing, vegetation removal, and potential grading activities for implementation of this plan/EA. Many of these activities would occur in previously disturbed areas, although some activities could occur within undisturbed soils. Soil disturbance could cause erosion; however, mitigation measures would be in place to limit the amount of soil runoff from the proposed activities. Measures to minimize adverse effects on soils during treatment and maintenance activities would include implementing erosion- and sediment-control measures such as installing silt fencing and minimizing disturbance. With mitigation, the alternatives would have local long-term minimal adverse effects. Because impacts on soils would be minimal, this impact topic was dismissed from further analysis in this plan/EA.

Geology. The NPS Organic Act and *NPS Management Policies 2006* direct the NPS to preserve and protect geologic resources and maintain natural geologic and coastal processes.

The Mississippian-age Boone Formation is the primary geologic unit in the park vicinity (NPS 2007). This unit is susceptible to karstification including cave and sinkhole development. Locally, this limestone-rich unit is capped by resistant sandstones, possibly of the Batesville Sandstone unit. This resistant unit caps the highest hills in the region. Dissected plateaus, ridges separated by valleys and ravines, and gently rolling open areas characterize the landscape at the park. These landforms had strong connections to the historical context of the area. Under the action alternatives, few impacts on site geology would occur from the shallow surface excavation and grading required for modifications to the vegetation landscape. As a result, the action alternatives would have little to no impacts on geologic resources in the study area. Because impacts on geologic resources would be minimal, this impact topic was dismissed from further analysis in this plan/EA.

Water Resources. The Clean Water Act; section 10 of the Rivers and Harbors Appropriation Act; EO 12088, "Federal Compliance with Pollution Control Standards"; and *NPS Management Policies 2006* direct the NPS to avoid or minimize human-caused pollution of waters and to avoid obstructing the navigable capacity of waters of the U.S. Two intermittent streams occur within the park boundaries. Under the action alternatives, there would be small areas of excavation, grading, and exposure of soil material, which would increase the potential for sediment to enter the streams until work is complete and vegetation is reestablished. The transport of sediment to the intermittent streams would be minimized using best management practices (BMPs) to contain sediment and control erosion. Because the action alternatives would have no more than a minimal impact on water resources, this impact topic was dismissed from further analysis in this plan/EA.

Floodplains. EO 11988, "Floodplain Management" requires an examination of impacts on floodplains and potential risks involved in placing facilities within floodplains. *NPS Management*

Policies 2006 and *DO-77-2: Floodplain Management* provide guidelines for proposed actions in floodplains. The action alternatives would include modifications to the vegetation within the park. Because the work would not include constructing new permanent structures or discharging fill material into the floodplain, the action alternatives would have no impacts on existing floodplains.

The action alternatives would have no impacts on natural floodplain values (e.g., river processes or aquatic habitat) and the ability of the floodplains within the park to function naturally. There would be no increase in risk to life or property. Because there would be no impacts on floodplains, this impact topic was dismissed from further analysis in this plan/EA.

Wetlands. EO 11990, “Protection of Wetlands”; *NPS Management Policies 2006*; and *DO-77-1: Wetland Protection* direct that wetlands be protected and that wetlands and wetland functions and values be preserved. These orders and policies further direct that direct or indirect impacts on wetlands be avoided when practicable alternatives exist.

The *Vegetation Classification and Mapping of Pea Ridge National Military Park* report (Diamond et.al. 2013) documented that wetlands occur within a marsh at the southwest portion of the park and, based on descriptions in the report, potentially may occur within the areas identified as Bottomland Deciduous Forest and Silver Maple Forest. Buffer zones would be established around these areas for all action alternatives to prevent disturbance from vegetation management activities. Because the buffer zones would ensure that the alternatives would have no impact on wetlands, this topic was dismissed from detailed discussion in this plan/EA.

Land Use. In accordance with *NPS Management Policies 2006*, the NPS must apply appropriate land protection methods to protect park resources and values from incompatible land uses. The overall land use of the park as a depiction of a specific era would not change under any of the action alternatives. The park would be maintained under NPS management as a military park and cultural and historic landscape, with the land use remaining as open space, fields, and wooded areas. The action alternatives would not result in modification of the land use; therefore, this topic was dismissed from further analysis in this plan/EA.

Prime or Unique Farmland. In 1980, the CEQ directed federal agencies to assess the effects of their actions on farmland soils classified as prime or unique by the United States Department of Agriculture, NRCS. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; and specialty crops such as fruits, vegetables, and nuts.

Seven soil map units that occur in the park are prime farmlands and two map units are prime farmland if drained (NRCS 2012). Most of the prime farmlands are in the central and southwest portion of the park. No unique farmlands are within the park. Prime farmland in the park may be affected by a change in vegetation management; however, because the action alternatives would occur in previously disturbed areas, and no prime farmland would be irreversibly converted to other uses, this topic was dismissed from further analysis in this plan/EA.

Special Status Species. Special status species include species listed as threatened or endangered under the Endangered Species Act (ESA) and other species considered sensitive by the park. Based on park resource data and staff knowledge, no federally listed or special status species are present in the park that would be affected by the action alternatives. Because no special status species would be adversely impacted by the alternatives, this topic was dismissed from further analysis in this plan/EA.

Public Health and Safety. In accordance with *NPS Management Policies 2006*, the NPS will seek to provide a safe and healthful environment for visitors and employees. Due to the nature of the proposed activities (vegetation management), the action alternatives would not pose a threat to public health and safety. Because the action alternatives would not impact public health and safety, this topic was dismissed from further analysis in this plan/EA.

Air Quality. The Clean Air Act of 1963 (42 USC 7401 et seq.) was established to promote public health and welfare by protecting and enhancing the nation's air quality. The act establishes specific programs that provide special protection for air resources- and air quality-related values associated with national park system units. Section 118 of the Clean Air Act requires a national park system unit to meet all federal, state, and local air pollution standards. The action alternatives include minor earthwork that would temporarily increase dust and vehicle emissions, which would result in localized effects on air quality. Hydrocarbons, nitrogen oxide, and sulfur dioxide vehicle emissions would rapidly dissipate; and visibility, deposition, and other air quality-related values are not expected to be appreciably impacted. These effects would be temporary, slight, and adverse. Neither overall park air quality nor regional air quality would be more than slightly affected by the temporary increase in emissions. The no action alternative would have no effect on existing air quality. Because the alternatives would have no more than a slight impact or no impact on air quality, this topic was dismissed from further analysis in this plan/EA.

Climate Change. Climate change refers to any significant change in average climatic conditions (e.g., mean temperature, precipitation, or wind) or variability (e.g., seasonality and storm frequency) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change (IPCC) provide evidence that climate change is occurring as a result of rising greenhouse gas (GHG) emissions and could accelerate in the coming decades (IPCC 2007). While climate change is a global phenomenon, it manifests differently depending on regional and local factors. General changes that are expected to occur in the future as a result of climate change include hotter, drier summers; warmer winters; warmer water; higher ocean levels; more severe wildfires; degraded air quality; heavier downpours and flooding; and increased drought. Climate change is a far-reaching long-term issue that could affect the park, its resources, visitors, and management. Although some effects of climate change are considered known or likely to occur, many potential impacts are unknown. Much depends on the rate at which the temperature would continue to rise and whether global emissions of GHGs can be reduced or mitigated. Climate change science is a rapidly advancing field and new information is being collected and released continually.

When considering climate change in an environmental analysis, the NPS must address both how the proposed project contributes to climate change, as indicated by GHG emissions associated with the project, and how climate change would impact park resources, and specifically those resources impacted by the project.

Although implementation activities associated with the action alternatives would contribute to GHG emissions, such emissions would be temporary and/or sporadic. If, for example, agricultural equipment is used for harvesting crops, emissions would continue sporadically over a number of years. Any effects of implementation-related GHG emissions on climate change would not be discernible at a regional scale however, as it is not possible to meaningfully link the GHG emissions of such individual project actions to quantitative effects on regional or global climatic patterns.

PURPOSE AND NEED

Impacts from climate change to the natural and cultural resources in the park could occur over time; however, this plan/EA would incorporate flexible management techniques, using the best available technology, for seed and planting choices and management of other climate-sensitive resources.

Because the action alternatives would result in minimal impacts on climate, climate change was dismissed as an impact topic in this plan/EA.

Lightscape. In accordance with *NPS Management Policies 2006*, the NPS strives to preserve natural ambient lightscapes, which are natural resources and values that exist in the absence of human-caused light. The action alternatives do not include any additional lighting within the park and would have no impacts on the night sky; therefore, lightscape was dismissed as an impact topic in this plan/EA.

Paleontological Resources. *NPS Management Policies 2006* directs the NPS to protect, preserve, and manage paleontological resources. Because the park is not known to contain scientifically important paleontological resources (NPS 2008), it is unlikely there would be any effects on this resource; therefore, paleontological resources was dismissed as an impact topic in this plan/EA.

Ethnographic Resources. The NPS defines ethnographic resources as any “site, subsistence, or other significance in the cultural system of a group traditionally associated with it” (NPS DO-28).

The American Indian tribes traditionally associated with the lands of the park were apprised of the proposed project by letter. No comments were received from the tribes regarding ethnographic resources during the scoping period. Copies of the plan/EA will be forwarded to each associated American Indian tribe for review and comment. If subsequent issues or concerns are identified, appropriate consultations would be undertaken.

One potential ethnographic resource was identified by park staff. A portion of the Northern Route of the Trail of Tears National Historic Trail runs through the southern portion of the park. The park has determined that the Trail of Tears would be addressed in the CLR, and has established a buffer zone around the Trail of Tears to avoid impacts on this resource from vegetation management activities. In addition, appropriate steps would be taken to protect any human remains, funerary objects, sacred objects, or objects of cultural patrimony inadvertently discovered. For these reasons, ethnographic resources was dismissed as an impact topic in this EA.

Indian Trust Resources. Secretarial Order 3175 requires that any anticipated impacts on Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. 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. The order represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. None of the lands of the park are trust resources according to this definition. In addition, neither the Bureau of Indian Affairs (BIA) Eastern Regional office nor the various agencies of the BIA indicated the park contains Indian trust resources; therefore, Indian trust resources was dismissed as an impact topic in this plan/EA.

Museum Collections. Museum collections include historic artifacts, natural specimens, and archival and manuscript material. These collections may be threatened by fire, vandalism, natural disasters, and careless acts. The preservation of museum collections is an ongoing process of

preventive conservation, supplemented by conservation treatment, when necessary. The primary goal is preservation of artifacts in the most stable condition possible to prevent damage and minimize deterioration. The action alternatives would not impact the current museum objects of the park. There would be no impacts on museum collections; therefore, museum collections was dismissed as an impact topic in this plan/EA.

Environmental Justice. EO 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 and/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, 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.

The goal of “fair treatment” is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects, and identify alternatives that may mitigate these impacts. Minority populations make up approximately 24% of the population in Benton County (Census 2013). Residents living below the poverty level are 11.8%, compared with 18.4% statewide. Although minority and low-income populations are present in Benton County, no actions in the alternatives would have disproportionate health or environmental effects on these populations or communities as defined in the Environmental Protection Agency’s “Draft Environmental Justice Guidance” (July 1996); therefore, environmental justice was dismissed as an impact topic in this plan/EA.

Wilderness. The Wilderness Act and NPS *Management Policies 2006* (section 6.2.1, NPS 2006) require that all lands administered by the NPS be evaluated for their suitability for inclusion within the National Wilderness Preservation System. Areas suitable for wilderness designation are those that generally have the qualities of being untrammeled, natural, undeveloped, and offering solitude or a primitive and unconfined type of recreation. The park is not located within existing or proposed wilderness boundaries and, therefore, is not subject to Wilderness Act requirements. Because there would be no direct impacts on wilderness resources and values, this topic was dismissed from further evaluation in this plan/EA.

Natural Soundscapes. An important part of the NPS mission is preservation of natural soundscapes associated with national park system units as indicated in NPS *Management Policies 2006* and DO-47: *Sound Preservation and Noise Management*. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all natural sounds within the park, together with the physical capacity for transmitting natural sound through air, water, or solid material. Acceptable frequencies, magnitudes, and durations of human-caused sound varies among national park system units, as well as potentially throughout each park unit, but are generally greater in developed areas and less in undeveloped areas. The action alternatives would introduce additional noise from implementation of the vegetation modifications, but the additional noise would be slight and temporary. For these reasons, natural soundscapes was dismissed as an impact topic in this plan/EA.

ALTERNATIVES

INTRODUCTION

This chapter describes the range of reasonable alternatives considered to address the purpose, need, and objectives described in *Chapter 1: Purpose and Need* and to address the management goals of the park, as outlined in the GMP. A “no action” alternative (Alternative A) is considered, as required by NEPA and implementing regulations, to establish a baseline against which the effects from the action alternatives can be compared. There are three action alternatives, which prescribe different levels of management and treatment of the landscape relative to the vegetation types described in *Chapter 1: Purpose and Need*.

Initial concepts for management began with internal scoping, which took place at the park in October 2012. Discussions during internal scoping resulted in the identification of three overall vegetation management approaches, which have been more fully developed into the action alternatives described below. Each alternative was assessed based on its ability to meet the purpose, need, and objectives for the project.

Appendix B contains the detailed Vegetation Management Plan that provides prescriptive methods and priorities for park staff to use into the future for vegetation management.

Included at the end of this chapter is a comparison of how well each of the alternatives meets project objectives, a summary comparison of the alternatives, and the environmental effects of each.

ALTERNATIVES

Alternative A – No Action Alternative

The no action alternative provides “a baseline of existing impact continued into the future against which to compare impacts of action alternatives” (Figure 1) (NPS 2011a). Under the no action alternative, the present level of use, management, interpretation, operations, and maintenance would continue. As identified in the 2006 GMP, “park management would retain and enhance a substantial portion of the historic character of the battlefield landscape.” Current management and maintenance activities would continue over time, as park funds allow. Current management activities include the following:

- Thinning the open woodlands (345 acres) and forests (2,625 acres)
- Encouraging natural reforestation in areas that were historically forested (337 acres) but are currently open fields
- Mowing existing nonnative (fescue) grassland areas (463 acres of fields and 30 acres of maintenance mowed areas)
- Maintaining the wildland-urban interface (WUI) by conducting prescribed burns, thinning cedars from the current 759 acres to 4 to 10 acres, and spraying exotic species
- Continuing the implementation of an exotic pest management plan
- Reestablishing orchards at Elkhorn Tavern and Ford Farm (6 acres)

Under the no action alternative, the fewest changes to the existing vegetative landscape would occur. Although the management items listed above would continue to be implemented slowly over time, the natural and man-made changes that have altered the landscapes and resources associated with the Battle of Pea Ridge would not be noticeably changed. The health of the vegetation and forests would continue to deteriorate over time due to issues such as a lack of vegetative diversity, the continued spread of invasive species, and impacts from climate change (e.g., permanently drier or wetter conditions); which would reduce the interpretation value and visitor understanding of the battlefield landscape.

Elements Common to All Action Alternatives

Three action alternatives were determined to meet the park's purpose, need, and objectives for taking action. The following components are actions that are proposed for vegetation management, regardless of which action alternative is selected. Therefore, these components are noted as being common to all action alternatives. Figure 6 shows the locations of these proposed actions within the park.

1. Reestablish the range of vegetation that would have existed at the time of the 1862 battle to varying degrees as noted in each alternative. Each vegetation type currently exists to some extent and includes fields, open woodlands, orchards, Arkansas Highlands forest, historic trees, cedar glade-like areas, the Round Prairie, and visitor areas.
2. Reestablish and maintain the historic Round Prairie to the size, form, and general character that would have existed in winter 1862 around the time of the battle (from the current 61 acres to approximately 66 acres), using native species and the species composition that would have existed at the time.
3. Reestablish the historic cedar glade-like areas within the park to reflect the percentage of the forest species that would have existed in winter 1862 around the time of the battle, as well as to reflect the historic distribution of cedar trees and glade-like areas. Remove cedar trees in areas historically free of cedars. Thin existing cedars (a native conifer that is also an invasive species), currently about 18% (759 acres) of the forested areas in the park to less than 1% (about 4 to 10 acres) of the forested areas in the park, to reestablish the historic mix of species. Regenerate previously overgrown cedar forests with other native species typical of mature deciduous woodlands and forests.
4. Preserve currently known historic trees (16 identified), as well as those yet to be identified in ongoing studies. Historic trees are those that date to the period of significance, namely to winter 1862. Documented historic tree species include post oak and white oak. Red oak and black oak may have been present as well. Historic trees, as well as species that were present circa 1862, would be used to reestablish the native species and increase diversity through recognized silvicultural (e.g., single-tree and/or shelterwood tree¹) methods. Propagation may also be used on a limited basis in size-constrained areas, but will be dependent upon funding and personnel.

¹ The single-tree method is used to obtain a forestwide structure at a small scale where desired stand age and size structure, species composition, and stocking are maintained, whereby a tree of seed-bearing stature/age is selected and the forest around it is managed such that the seeds (acorns) have a proportionally higher success rate for germination. The shelterwood method is similar but a belt or grouping of desired trees is left and the forest around it is managed so that the acorns stand a better chance of germination and recruitment.

5. Exclude nine zones from the plan/EA, as these zones will be addressed under the CLR (developed separately). The nine zones include Leetown Hamlet, Elkhorn Tavern, Federal Trenches, East Overlook, Winton Springs, Winton Home, Trail of Tears, Ford Cemetery, and the Cherokee encampment. Also shown on Figure 6 are areas of interest identified by the United Keetoowah Band of Cherokee Indians. Other than the areas that overlap CLR areas, the “buffer zones” and vegetation treatments for the Keetoowah areas of interest would remain the same as those identified in the action alternatives, as agreed upon during tribal consultation (Eads 2013).
6. Establish a “buffer zone” around sensitive areas such as marshes and wetlands, streams, culturally sensitive areas, and the nine zones to be addressed in the CLR (described in item 5 above). These areas would be avoided during vegetation management activities to prevent impacts on sensitive resources. The minimum buffer zone around sensitive areas would be 100 feet (Bowles, pers. comm. 2013); however, this zone would be increased in areas of high sensitivity (e.g., areas near potential sensitive species habitat), to be determined by park resource specialists on an individual basis. The minimum buffer zones are shown on Figure 6.
7. Maintain tree vegetation along the Tour Road in the natural areas only, to have a 5-foot mown edge on either side of the roadbed, and with a clear area of no trees for a minimum 30-foot distance, as measured from the edge of the roadbed (excluding exceptional or historic trees). Trees with limbs overhanging into the 30-foot area would be trimmed to a height of 15 feet.



Section of Tour Road, prior to 30-foot clearing of trees along road.



Section of Tour Road showing 30-foot clearing of trees from the road.

8. Maintain tree vegetation along hiking trail routes to have a 5-foot-wide by 15-foot-high clear area for the trail to follow. Allow removal of hazard trees within a 65-foot (20-meter) distance from the trail edge (excluding exceptional or historic trees). Historic roads would be maintained to their current width, including shoulders/depressions, and limbs would be trimmed to 15 feet high.

ALTERNATIVES

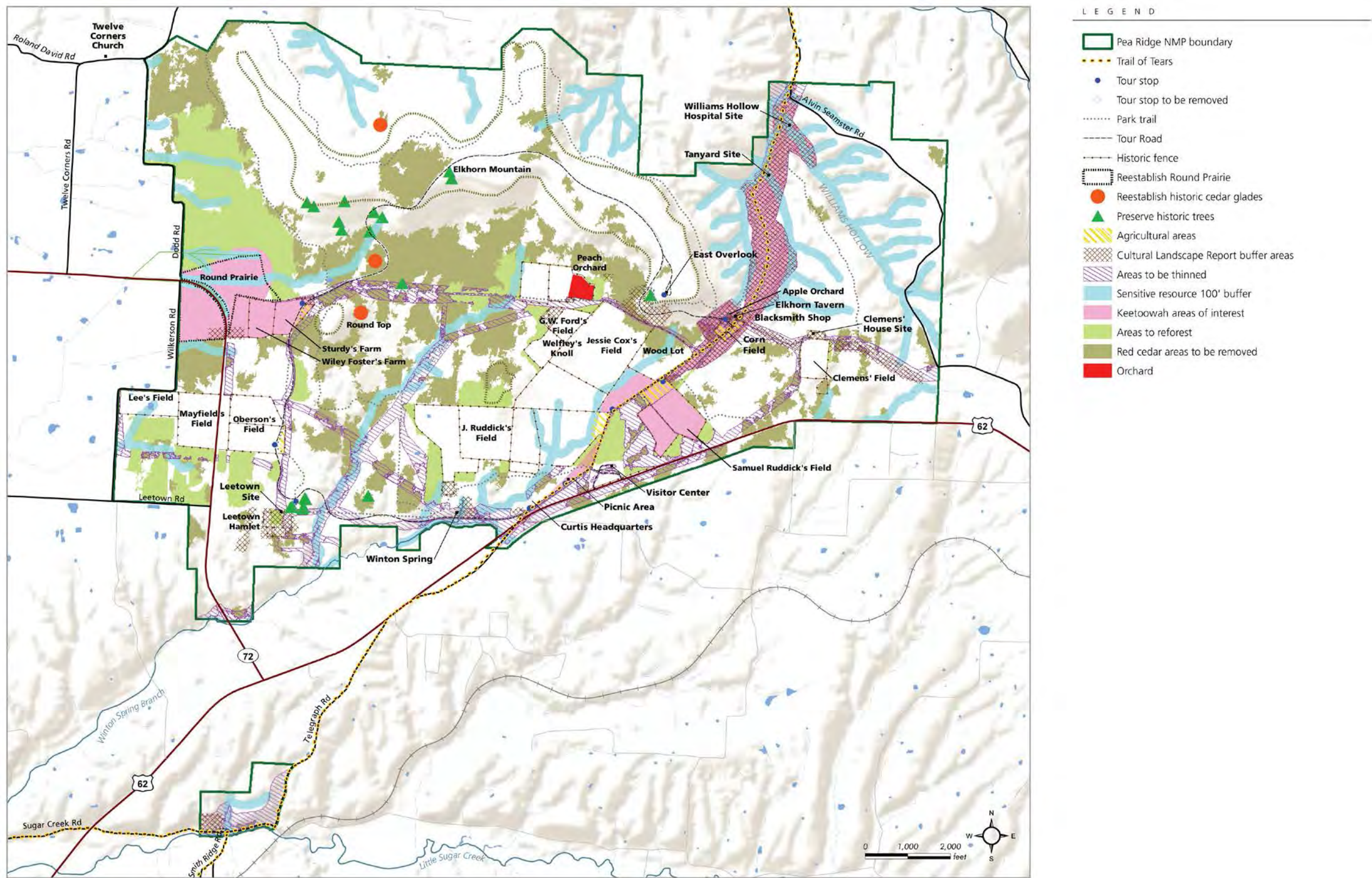
9. Manage fields on an individual basis, according to the management zone in which they are located.
10. Reestablish haying and/or crop leasing to independent farmers or businesses in areas that have agricultural value. The degree of haying and/or crop leasing would vary depending on the vegetation and management techniques proposed for each alternative.



Section of historic road (currently used as a hiking trail). Note the overhanging tree branches in the background, which would be trimmed to provide a 15-foot-high clearance above the trail.

11. Areas that are currently fields, but were historically open woodlands or forests, will be reforested with native species in the patterns and diversity of the historic woodlands and forests (337 acres).
Reforestation will take place by planting trees in dry open woodlands (27 acres) and natural reforestation in the remaining 310 acres. Thin open woodlands (currently 345 acres) and dense forests (currently 2,625 acres). Reestablish a total of 900 acres of open woodlands that were absorbed by the expanding forests to resemble the historic character.
12. In the implementation of vegetation management and reforestation, incorporate successional forest practices and other BMPs for vegetation. For example, to help maintain the aesthetic and forest sustainability over time through the different stages of forest recruitment, it may be necessary for the park to plant more trees than were historically present. In addition, current species composition for a given area would dictate the treatment for that area.
13. Incorporate sustainable agricultural practices (where feasible) by allowing rotating crops, haying operations, and other management techniques to sustain cropland and pastureland and to maintain the aesthetics. For areas that were historically designated as “pastureland,” consider using these areas for cropland because these areas were likely fallow cropland in 1862.
14. Maintain existing orchards (at a minimum).
15. Remove the West Overlook tour stop. This tour stop is shown on current park literature and maps, but would be removed or adapted for a different use (and has therefore not been included on the maps in this plan/EA).
16. Revegetate areas where power lines were removed.

FIGURE 6. ELEMENTS COMMON TO ALL ACTION ALTERNATIVES



Alternative B – Reestablish the Functional Agrarian Landscape

This alternative proposes a literal depiction of the historic landscape of open fields contrasted by surrounding woods that would have existed in winter 1862 around the time of the battle (Figure 7). This alternative would emphasize the cultural nature of the park by reestablishing historic spaces with the specific crops, orchards, pastures, and open woods that would have existed at the time of the battle.

Alternative B would reestablish the historic patterns of open fields and woodlands within the battle grounds and routes and the natural forest using historic species or in-kind species to closely depict the form, function, and aesthetics of the historic vegetation.

Vegetation types that are located in more than one management zone may have different treatments, depending on the management zone in which they are located. However, there would be limited flexibility in the vegetation treatments because of the literal translation of the historic landscape, as described below.

Following are general descriptions of the proposed treatments for each vegetation type under this alternative.

Fields. *Reestablish historic open fields with vegetation that would have existed at the time including corn, wheat, and fields/pasturelands, to cultivated crops planted and managed according to the historic patterns and locations that existed at the time (allowing for rotation of crops). Establish plantings to follow the historic pattern, density, and configuration of the 1862 wood lot (a parcel of land that was historically used for timber storage). These include the following.*

- Corn at Lee's, Mayfield's, Oberson's, and Jesse Cox's fields
- Wheat at Foster's field
- Other crops including oats, hops, sorghum, Hungarian grass (foxtail millet), and others, as applicable
- Agricultural pastures

Open woodlands. *Reestablish the historic open woodlands to the historic character, density, and species that would have existed at the time of the 1862 battle. Actions for open woodlands include the following.*

- Reestablish the diversity and mix of species that would have existed at the time of the battle.

Orchards. *Continue to reestablish historic orchards with vegetation similar to, or to vegetation that would have existed at the time of the battle. Establish plantings to follow the historic pattern, density, and configuration of the 1862 orchards. Orchards include the following.*

- Peach Orchard at Ford Farm (reestablish with up to 1,500 peach trees)
- Apple Orchard at Elkhorn Tavern (maintain as-is)

Arkansas Highlands forest. *Reestablish the forests within the park to the character, density, and species that would have existed at the time of the 1862 battle.*

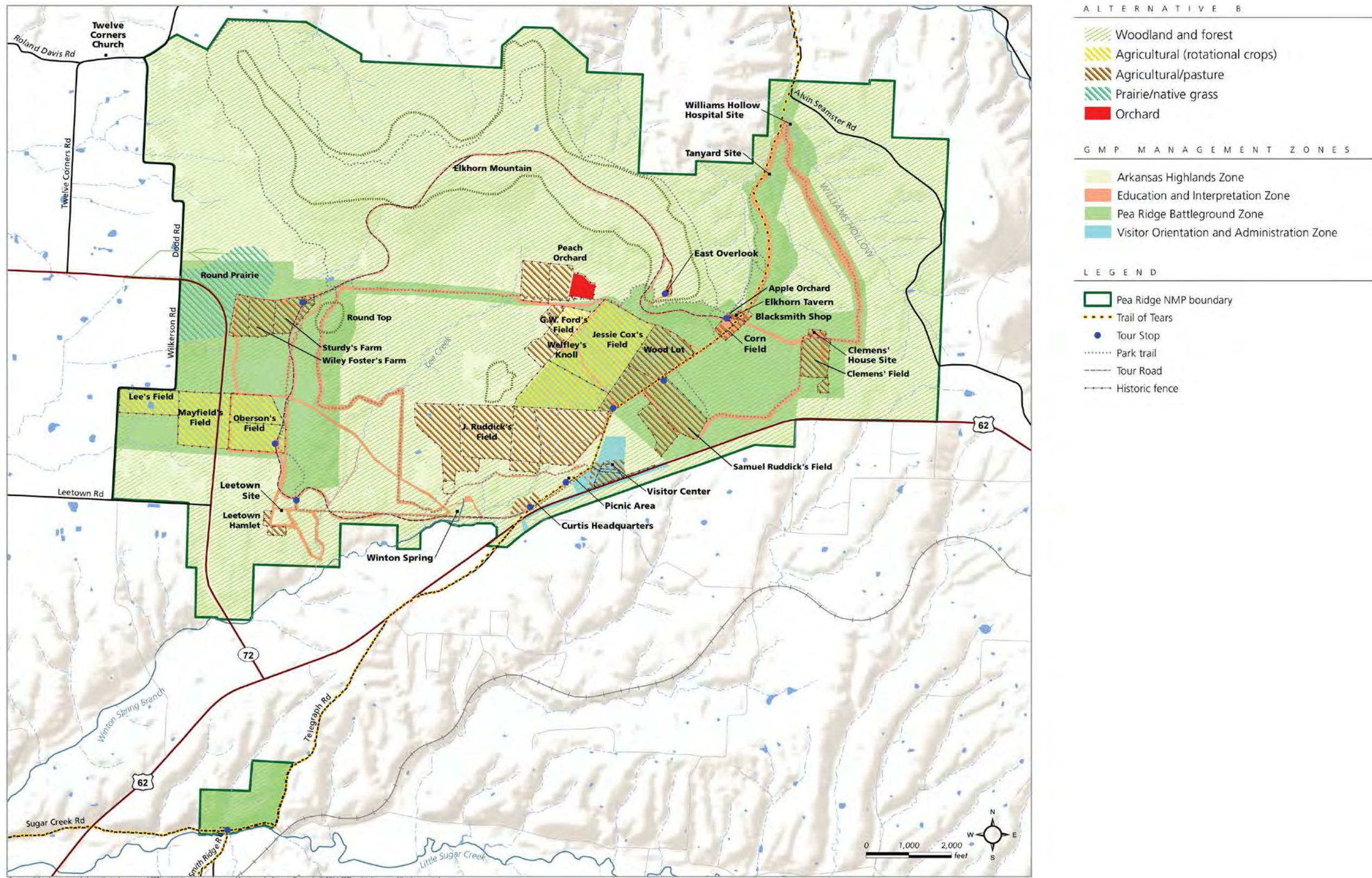
ALTERNATIVES

- Reestablish the natural open forest to reflect the species, diversity, density, and structure that would have existed at the time of the battle. According to a study by Nelson (2007), historic forest densities included Dry-Mesic Forest (basal area of 70 to 80, 90 to 100% canopy cover, and 30 mature trees per acre) and Bottomland Forest (basal area of 70-80, 100% canopy cover, and more than 30 mature trees per acre). The historic documentation would dictate the types and densities of species for reestablishment. Closed forests (i.e., riparian areas) would be reestablished at a rate of more than 40 trees (100% canopy cover) per acre.
- Reestablish areas that are currently fields, open woodlands, or other vegetation types to their historic character as natural forest.

Visitor areas. *Continue the vegetation treatment of the vegetation type in which the visitor area is located.*

- Plant vegetation within each visitor area using the same vegetation of the area in which it is located. For example, at the Leetown Battlefield Overlook, bring the vegetation of the reestablished open field into the parking and interpretive areas.

FIGURE 7. ALTERNATIVE B: FUNCTIONAL AGRARIAN LANDSCAPE



Alternative C – Establish a Visual Agrarian Landscape

This alternative presents an agrarian and natural landscape that would visually represent the open fields and surrounding woodlands that would have existed in 1862 around the time of the battle (Figure 8). This alternative combines the cultural nature of the park with the natural setting. This would be achieved by incorporating vegetation that is a literal depiction of what was present in 1862 with native grasses and other species, depending upon the management zone in which they are located and other guiding documents such as the Long Range Interpretive Plan.

Alternative C would allow for broad flexibility in the selection of species. This alternative would reestablish the historic patterns of open fields and woodlands and the natural forest using in-kind species that depict the form, function, and aesthetics of the historic vegetation, but that would be suited to contemporary conditions (e.g., to accommodate climate change) and maintenance practices. Areas to be restored would be augmented by the Long Range Interpretive Plan and by interpretive areas within the park.

Vegetation types that are located in more than one management zone may have different treatments, depending on the management zone in which they are located, as described below. There would be a greater level of flexibility of management regarding the vegetation treatments. This would allow for a broader range of natural variability within a vegetation type regardless of the management zone. For example, in the Education and Interpretation Zone, the park would have the flexibility to implement treatments that would enhance the interpretive value of the area (e.g., a garden in the Elkhorn Tavern area).

Following are general descriptions of the recommendations for each vegetation type under this alternative.

Fields. *Reestablish historic open fields as native grasses, fescue, cropland, or pasture, depending on the management zone in which it is located, and reestablish the historic wood lot to reflect the historic pattern and configuration of the 1862 wood lot. Vegetation would be visually and structurally similar to vegetation that would have existed at the time, as follows.*

Fields in the Pea Ridge Battleground Zone and Education and Interpretation Zone:

- Reestablish cultivated crops and pastures in the historic patterns and locations in these areas that are highly visible to the visitor, with the greatest interpretive value.
 - Plant vegetation that most closely resembles the color, form, and structure of the historic vegetation, but is not the specific crop present in 1862, such as fescue or native grasses.
 - Plant the specific crops that were present at the time of the battle in areas with higher interpretive value. For example, in the agricultural areas, plant visually prominent portions of the fields with the historic crops present at the time of the battle (such as corn) to enhance the interpretive experience for visitors.
- Reflect the diversity and mix of species in the wood lot that would have existed at the time, but also allow for additional hardy species that are consistent in form and structure to the historic species. For example, the use of native grasses in the wood lot would provide a similar form and structure to what was present in 1862 and would contribute to the overall health of the vegetation in this area through the use of hardier native species.

Fields in the Arkansas Highlands Zone:

- In the Arkansas Highlands Zone, which includes less visible areas, areas that are further from the visitor experience, or areas only accessible by foot, plant native grasses.

Open woodlands. *Reestablish the historic open woodlands to reflect the historic character, including the density, form, and structure (but not necessarily the specific species) of the woodlands. Thin open woodlands to allow for reestablishment of species such as post oak, black oak, and blackjack oak, depending on current species composition for a given area. Open woodlands would receive the same treatments regardless of the management zones in which they are located.*

- Allow more diverse woodlands with a mix of species, as long as the form and structure of the species are similar to historic species.
- Allow for more species than may have existed historically. Consider species that would contribute to the health of the woodlands, taking into consideration the changing climate conditions. For example, red oak density may be managed at higher levels than what existed historically so that mid-level and ground layer component objectives can be achieved as well. This should allow, over time, for the inclusion of historic species and/or climate adapted species to become established.

Orchards. *Reestablish historic orchards to reflect the historic pattern and configuration (but not necessarily the specific species) of the 1862 orchards.*

- Plant new species that are similar in character (form and structure) to the historic vegetation. Consider planting fruit-bearing trees or trees that resemble fruit-bearing trees in form and structure, such as common serviceberry or black cherry.
- Allow plantings in a pattern that reflects the historic pattern in form and composition, but that allows flexibility in the number of new trees planted.

Arkansas Highlands forest. *Reestablish the forest to the character and density (but not necessarily the species composition) that would have existed at the time of the 1862 battle. Thin overgrown areas to promote the health and proliferation of hardier native species, depending on current species composition for a given area. Proposed management techniques include the following.*

Forests within the Pea Ridge Battleground Zone and Education and Interpretation Zone:

- Plant areas that are currently fields or open woodlands, but were historically woodland native forest species, in the patterns, density, and diversity of the 1862 forest. For example, plant blackjack oak or white oak in areas with optimal establishment conditions.
- Reestablish the natural forest to reflect the diversity and mix of species that would have existed at the time of the battle by thinning historic species such as white oak and post oak.
- Allow additional hardy species that are consistent in form and structure to the historic species, such as red oak.

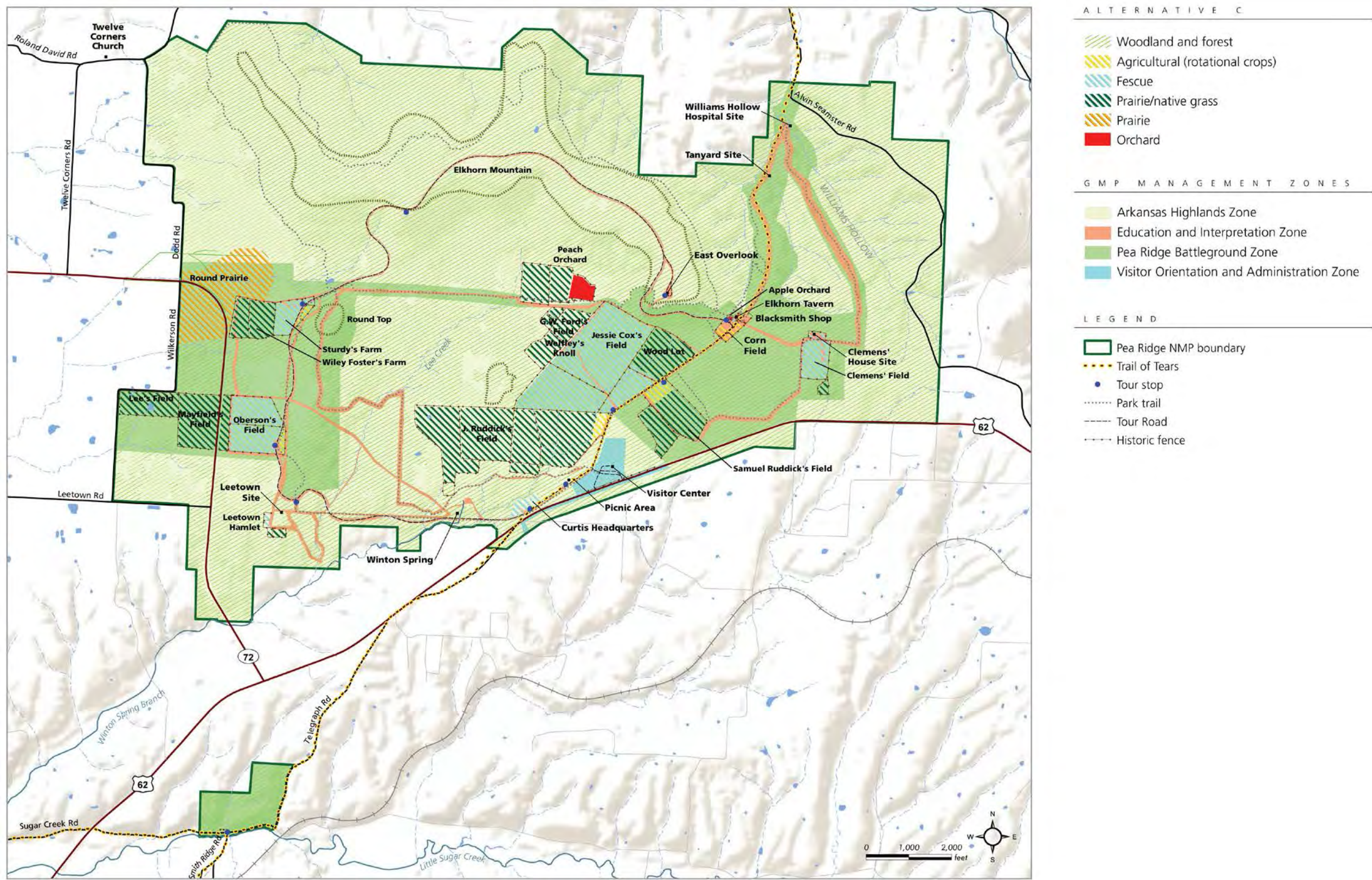
Forests within the Arkansas Highlands Zone:

- Manage the natural forest to allow for flexibility in species composition. For example, the park would thin overgrown areas allowing the species composition to change, but it would be dependent upon which species are currently present, predicted changes in climatic conditions over time, and other maintenance considerations.

Visitor areas. *Maintain a clear area around each visitor area for ease in maintenance, allowing for the addition of low-growing grasses, to be mowed on a regular basis.*

- Maintain low-mown grasses within each visitor area including the visitor center, around the tour stops, and the Leetown Battlefield interpretive area.

FIGURE 8. ALTERNATIVE C: VISUAL AGRARIAN LANDSCAPE



Alternative D – Establish a Natural Agrarian Landscape

This alternative proposes a natural agrarian landscape that would incorporate primarily native vegetation to visually represent the openness of the fields and surrounding woods that would have existed at the time of the 1862 battle (Figure 9). This alternative focuses on the health of the forests and landscape and uses a range of hardy and indigenous species, not historic crops or species, to visually and structurally represent the historic scene.

This alternative would reestablish the historic patterns of open fields and woodlands within the battlefield and the natural forest using native or hardy species that can depict the form and aesthetics of the historic vegetation. This alternative emphasizes a natural landscape using native vegetation to provide a low-maintenance landscape that is most suitable for regional climatic conditions.

Vegetation types that are located in more than one management zone may have different treatments, depending on the management zone in which they are located, as described below. There would be a greater level of flexibility with respect to the vegetation treatments under this alternative compared with Alternatives B and C, as long as the treatments are well adapted to the climatic conditions and low maintenance for park staff.

Following are general descriptions of the recommendations for each vegetation type under this alternative.

Fields. *Reestablish the visual openness of the historic open fields by planting native species that are visually and structurally similar to those that would have existed at the time of the battle. Reestablish the historic wood lot to reflect the historic pattern and configuration of the 1862 wood lot. Treatments for fields under this alternative include the following actions.*

- Plant new native and hardy species such as native grasses to reestablish the historic patterns of the open fields in historic locations.

Fields in the Pea Ridge Battleground Zone and Education and Interpretation Zone:

- Plant vegetation that at a minimum resembles the color of the historic vegetation and, where possible, that resembles the form and structure of the historic vegetation (i.e., plant vegetation of a height that resembles a late winter scene). Various native grasses would be used to represent the form, color, and structure of the historic vegetation. These areas include those visible from the East Overlook (Ford's, Cox's, and Samuel Ruddick's fields), and from the Tour Road (Lee's, Mayfield's, and Oberson's fields).
- For the wood lot, reflect the diversity and mix of species that would have existed at the time, but also allow for additional hardy species that are consistent in form and structure to the historic species. The use of native grasses in the wood lot would provide a similar form and structure to what was present in 1862 and would contribute to the overall health of the vegetation in this area through the use of hardier native species.

Fields in the Arkansas Highlands Zone:

- Plant new native and hardy species and varieties that provide cover for historically open fields using native grasses and other species that are similar in color to historic species, such as foxtail millet (Hungarian grass).

ALTERNATIVES

Open woodlands. *Manage the open woodlands for the overall health and vigor of the woodlands. Open woodlands would receive the same treatments regardless of the management zones in which they are located.*

- Thin overgrown areas to 100 percent canopy cover to allow more diverse woodlands with a mix of species that promote the overall health of the woodlands.
- Manage open woodlands for a mix of species including historic trees integrated with hardy and native trees. Allow for more species than may have existed historically.

Orchards. *Reestablish historic orchards to reflect the historic pattern and configuration of the 1862 orchards.*

- Plant orchard areas with native grasses or other hardy or native species to reestablish the orchard's historic form and open pattern. Reestablish the orchards as historic space.
- Plant new understory or low-growing vegetation of native and hardy species in a color that reflects the character of the historic orchard ground plane, such as native forbs.
- Consider planting trees that resemble fruit-bearing trees in form and structure within the orchard, such as wild plum, redbud, and dogwood. Allow plantings in a pattern that reflects the historic pattern in form and composition, but that allows flexibility in the number of new trees planted.

Arkansas Highlands forest. *Manage the forests for the overall health and vigor of the forests. Thin overgrown areas to 100 percent canopy cover to promote the health and proliferation of hardier native species.*

Forests in the Pea Ridge Battleground Zone and Education and Interpretation Zone:

- Plant areas that are currently fields or open woodlands but were historically woodland native forest species in the density and species that best optimize the health of the forest.
- Reflect the diversity and mix of species that would have existed at the time, but also allow for additional hardy species that are consistent in form and structure to the historic species, such as red oak, locust, sycamore, and elm.
- Create an open woodland forest with a mix of species including historic trees integrated with hardy and native trees. Allow for more species than may have existed historically.

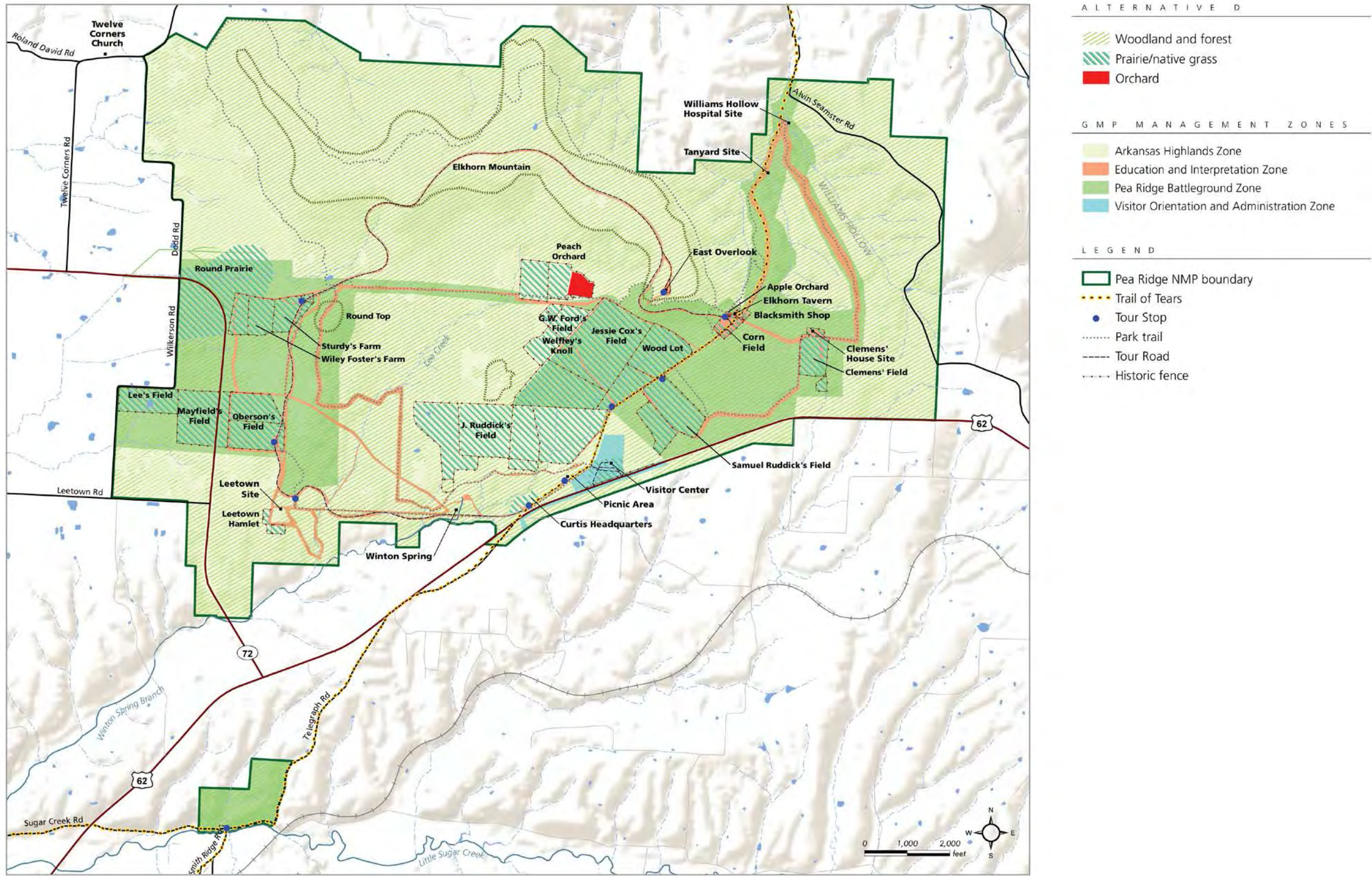
Forests in the Arkansas Highlands Zone:

- Manage the natural forest to allow for flexibility in species composition. For example, the park would thin overgrown areas allowing the species composition to change, but it would be dependent upon which species are currently present, predicted changes in climatic conditions over time, and other maintenance considerations.
- Reestablish areas that are currently fields, open woodlands, or other vegetation types to their historic character as natural forest.
- Create an open woodland forest with a mix of species including historic trees integrated with hardy and native trees, such as red oak, sycamore, locust, and elm. Allow for more species than may have existed historically.

Visitor areas. *Maintain a clear area around each visitor area for ease in maintenance, allowing for the addition of low-growing grasses, to be mowed on a regular basis. Actions for visitor areas include the following:*

- Plant low-growing native or hardy species within each visitor area including the visitor center, around the tour stops, and the Leetown Battlefield interpretive area.
- Plant species that provide cover and low growth, such as native forbs or grasses, but that only require mowing several times a year (not every week).

FIGURE 9. ALTERNATIVE D: NATURAL AGRARIAN LANDSCAPE



MITIGATION AND BEST MANAGEMENT PRACTICES

The NPS places strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, the following protective measures would be implemented as part of any of the action alternatives (Table 3). The NPS would implement an appropriate level of monitoring throughout the treatment and maintenance process to help ensure that protective measures are being properly implemented and are achieving their intended results. These mitigation measures are applicable for contractors and/or park staff.

TABLE 3. MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

General Measures	
<ul style="list-style-type: none"> • The park would ensure the project remains within the treatment limits and parameters established in the compliance documents and that mitigation measures are properly implemented. • Temporary signage would be placed at approach points of implementation zones to alert visitors of mechanical treatments. No implementation activities would be permitted outside these limits. • All protection measures would be clearly stated in the project specifications/special project requirements, and workers would be instructed to avoid conducting activities beyond the project limits as defined by implementation plans or marked limits. • Garbage, trash, and other solid waste associated with project operations would be disposed of weekly, or sooner if warranted, outside the park. • All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. • Contractors would be required to properly maintain equipment used on the project (e.g., mufflers) to minimize noise from equipment use. • All equipment used on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from mechanical fluids. All equipment would be checked daily. • BMPs for drainage and sediment control, per a Stormwater Erosion and Sediment Control Plan, would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas, when needed. Use of BMPs in the project area for drainage area protection would include all or some of the following actions, depending on site-specific requirements: <ul style="list-style-type: none"> ○ Keeping disturbed areas as small as practicable to minimize exposed soil and the potential for erosion ○ Locating waste and excess excavated materials outside of drainages to avoid sedimentation ○ Installing silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) prior to implementation ○ Conducting regular site inspections during the implementation period to ensure erosion-control measures were properly installed and are functioning effectively ○ Storing, using, and disposing of chemicals, fuels, and other toxic materials in a proper manner 	
Soils	
<ul style="list-style-type: none"> • Erosion and sediment control would be required (see the "General Measures" section above). • If applicable, topsoil or native soil would be removed from areas of implementation and stored for later reclamation use. The topsoil would be redistributed as near the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with native genotypes. 	

Vegetation
<ul style="list-style-type: none"> • Orange construction fencing or other highly visible methods for identification would be used around large and historic trees within project limits to minimize the potential for inadvertent impacts from heavy equipment during implementation. Large nontarget trees would be avoided to the extent possible during implementation. • Dense stands of trees would be gradually thinned. A skidsteer loader with tree-cutting attachments would be used if access is available (i.e., grade is less than 30 percent) and there is no potential for damage to sensitive natural or cultural resources. Chainsaws would be used if access is difficult (i.e., grade is 30 percent or greater) and/or damage may occur to sensitive resources from heavy equipment. • Invasion of exotic species could occur following mechanical treatments. To minimize impacts, stands would be gradually thinned, allowing for the establishment of native grasses. • The understory would be monitored following tree removal. Mitigation of exotic species may be in the form of chemical treatment or seeding natives species. Temporary barriers may be provided to protect existing trees, plants, and root zones not proposed for removal. Trees or other plants would not be removed, injured, or destroyed without prior approval. • Ground surface treatment would include grading to natural contours, conserving and replacing topsoil, and, where necessary, hand seeding or planting. In some locations, topsoil placement and mulching with litter and duff would be the primary treatment. If insufficient litter and duff is salvaged from the project area, additional litter and duff may be gathered from adjacent areas on a small scale where approved by the NPS. • Remedial actions would include installing erosion-control structures, reseeding, conserving and replacing topsoil and/or replanting the area, and controlling nonnative plant species. • Introduction of nonnative/noxious plant species would be minimized by implementing several BMPs, including: <ul style="list-style-type: none"> ○ Minimizing soil disturbance ○ Ensuring project personnel make daily checks of clothing, boots, laces, and gear to ensure no invasive plant propagates and no off-site soil is transported to the worksite ○ Pressure washing and/or steam cleaning all equipment to ensure all equipment and machinery are cleaned and weed free before entering the park; equipment used on the project would be inspected by park staff prior to entering the park to ensure compliance with cleanliness requirements and inadequately cleaned equipment would be rejected ○ Covering all haul trucks bringing fill materials from outside the park to prevent seed transport and dust deposition along the road corridor ○ Limiting vehicle parking turnouts to existing roads, parking lots, or access routes ○ Limiting project staging to existing roads, parking turnouts, and other designated areas; no machinery or equipment should access areas outside the project limits ○ Obtaining all fill, rock, or other earth materials from the project area, if possible ○ Restricting hay bales from being used during revegetation or for temporary erosion control ○ Initiating revegetation of disturbed sites immediately following implementation activities • To maximize vegetation restoration efforts after completion of implementation activities, the following measures would be applied: <ul style="list-style-type: none"> ○ Salvaging available topsoil or the top several inches of native soil from project areas for reuse during restoration of disturbed areas ○ Incorporating native litter and duff layer in forested sites for replacement over salvaged topsoil ○ Ensuring the NPS surveys for, and treats, invasive plants prior to and three years after implementation and in accordance with the Exotic Pest Management Plan ○ Until established, protecting/avoiding areas previously revegetated during park-prescribed burns (in accordance with the Fire Management Plan)
Wetlands
<ul style="list-style-type: none"> • Impacts on wetlands would be avoided and minimized to the extent practicable. No wetland fill would occur without authorization from the Corps and appropriate permitting under the Clean Water Act. • Appropriate permits (404 permit and 401 certification) would be acquired should there be any impacts on wetlands.

<p>Water Quality</p> <ul style="list-style-type: none"> • Sediment traps, erosion checks, and/or filters would be constructed above or below all culvert drains (if such drains are required) and in all other ditches before the water (runoff) leaves the project limits. • At all cut and fill areas, erosion and sediment control would be implemented to minimize impacts on water quality. • Surface restoration and revegetation of disturbed soils would be implemented to minimize long-term soil erosion.
<p>Wildlife</p> <ul style="list-style-type: none"> • To reduce noise disturbance and limit impacts on breeding avian and mammalian species, all tree removal would be conducted from October 1 to March 1, where feasible. If trees need to be removed outside of this time frame, they would be identified for removal and evaluated for nesting or roosting use. • Project personnel are prohibited from feeding or approaching wildlife. • Project personnel would report to park personnel any wildlife collisions within 24 hours of an incident. • The clearing limits (project limits) outside of the existing road prism would be clearly marked or flagged prior to implementation. All implementation activities, including staging areas, would be located within previously disturbed areas, if necessary. • The following measures would be taken to limit noise and disturbance from vehicles and equipment used on the project: <ul style="list-style-type: none"> ○ All motor vehicles and equipment would have mufflers conforming to original manufacturer specifications that are in good working order and are in constant operation to prevent excessive or unusual noise, fumes, or smoke. ○ Use of air horns within the park would be limited to emergencies only.
<p>Air Quality</p> <ul style="list-style-type: none"> • Workers would not leave vehicles idling. • Debris resulting from implementation would be hauled from the park to an appropriate disposal location. • Visitors would be asked to not idle their vehicles while waiting during potential traffic delays.
<p>Cultural Resources</p> <ul style="list-style-type: none"> • All activities would comply with the <i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> (48 FR 44716, revised). • Cultural resource surveys would be undertaken in areas of proposed treatment that involve ground disturbance where surveys have not been previously conducted (e.g., during excavation of holes for tree plantings). Surveys would include exploratory shovel testing or metal detection surveys and would be monitored by a paraprofessional under the supervision of a professional NPS archeologist. • Cultural resources that have not been assessed for listing on the National Register would be evaluated and a determination of eligibility obtained. • Prior to prescribed fire treatment, appropriate protection of combustible cultural resources would be undertaken. • Archeological resources in the vicinity of the project area would be identified and delineated for avoidance prior to project work. • Should any archeological resources be uncovered during implementation, as appropriate, work would be halted in the area and a NPS archeologist, SHPO, and appropriate Native American tribes would be contacted for further consultation. Plans for treatment of unanticipated discoveries would be prepared as needed. • NPS cultural resources staff would be available during implementation to advise or take appropriate actions should any archeological resources be uncovered during implementation. In the unlikely event that human remains are discovered during implementation, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed. • The NPS would ensure that all contractors, subcontractors, and lessees are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors, subcontractors, and lessees also would be instructed on procedures to follow in case previously unknown archeological resources are uncovered during implementation. • Equipment and material staging areas would avoid known archeological resources. • Historic roads would not be improved to facilitate prescribed fire treatment.

ALTERNATIVES

COMPARISON OF ALTERNATIVES

Table 4 shows the elements of each alternative and provides a comparison among alternatives.

HOW ALTERNATIVES MEET OBJECTIVES

All of the action alternatives would implement the needed vegetation management improvements to some degree. A comparison of the alternatives and the degree to which each alternative fulfills the purpose, needs, and objectives of the proposed management plan is summarized in Table 5.

TABLE 4. VEGETATION CONDITIONS – COMPARISON OF ALTERNATIVES

Vegetation Type		Historic Conditions – circa 1862 (Historic Vegetation Map)		Alternative A (No Action)/Existing Conditions (circa 2014)		Alternative B Reestablish the Functional Agrarian Landscape		Alternative C Establish a Visual Agrarian Landscape		Alternative D Establish a Natural Agrarian Landscape	
	Description	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park
Fields	<ul style="list-style-type: none">• Open fields• Crops• Agricultural pasture• Wood Lot – staging area for timber storage and cutting – for use or sale	<ul style="list-style-type: none">• Crops such as corn, wheat, oats, hops, sorghum, and Hungarian grass (foxtail millet)• Roads used for access to agricultural fields• Fields include areas noted as fields and agricultural pastures on the Historic Vegetation Map• Wood Lot – along Telegraph Road route of the battle; single-stand trees/open forest and herbaceous undergrowth present historically	Fields – 11% Wood Lot – <1%	<ul style="list-style-type: none">• Mowed Grassland (Introduced Grasses)• Ruderal Grassland and Shrubland – retired crop fields that have not been mowed or burned frequently enough to suppress woody vegetation establishment• Forest or woods that have encroached on historically open fields• Wood Lot – Typical Upland Deciduous Woodland and Forest (Oak-Hickory community); Bottomland Deciduous Woodland and Forest community at Williams Hollow	Fields - 11% Wood Lot – <1%	<ul style="list-style-type: none">• Reestablish historic open fields with cultivated crops and pastureland that would have existed at the time• Reestablish historic wood lot with vegetation similar to, or to vegetation that would have existed at the time of the battle in the historic pattern, density, and configuration of the 1862 wood lot	11%	<p><i>Fields in the Battleground and Education and Interpretive Zones:</i></p> <ul style="list-style-type: none">• Reestablish historic open fields with vegetation that most closely resembles the color, form, and structure of the historic vegetation/species• Reestablish cultivated crops and pastures in the historic patterns and locations in these areas that are highly visible to the visitor, with the greatest interpretive value• Reestablish historic wood lot to reflect the historic pattern and configuration of the 1862 wood lot; reflect diversity and mix of species that would have existed at the time, but allow additional hardy species that are consistent in form and structure to the historic species <p><i>Fields in the Arkansas Highlands Zone:</i></p> <ul style="list-style-type: none">• Reestablish historic open fields with new species and varieties using alfalfa, new corn, and wheat varieties; varieties for haying; and/or native grasses	11%	<p><i>All Fields:</i></p> <ul style="list-style-type: none">• Reestablish visual openness of historic fields (crops and agricultural pasture) by planting native species that are visually and structurally similar to those that would have existed at the time <p><i>Fields in the Battleground and Education and Interpretive Zones:</i></p> <ul style="list-style-type: none">• Plant native species that at a minimum resembles the color of the historic vegetation and, where possible, resembles the form and structure of historic vegetation• For the wood lot, reflect diversity and mix of species that would have existed at the time, but allow additional hardy species that are consistent in form and structure to the historic species <p><i>Fields in the Arkansas Highlands Zone:</i></p> <ul style="list-style-type: none">• Plant new native and hardy species and varieties that provide cover for historically open fields using those similar in color to historic species	11%
Open Woodlands	<ul style="list-style-type: none">• Native woodland species – Oak-Hickory community	<ul style="list-style-type: none">• Open Forest and Herbaceous Undergrowth• Located on rolling hills with narrow hollows and broad uplands• Low to moderate density• Open woodlands occurred along roads that were nonbattle-related and that were part of the battle grounds and routes (i.e., along Telegraph Road, Huntsville Road, and others; and Tanyard)	63%	<ul style="list-style-type: none">• Typical Upland, Herbaceous Woodland, and Forest community• Open Woodlands on upper slopes and denser forests on lower slopes	8%	<ul style="list-style-type: none">• Reestablish historic open woodlands to their historic character with density and species that would have existed at the time of the battle; this includes returning existing fields to open woodlands where they existed historically	21%	<ul style="list-style-type: none">• Allow a more diverse mix of species, as long as the form and structure of the species is similar to historic species• Allow for more species than may have existed historically; consider species that would contribute to the health of the woodlands, taking into consideration the changing climate conditions	21%	<ul style="list-style-type: none">• Create open woodlands with a mix of species including historic trees integrated with hardy and native trees; allow for more species than may have existed historically	21%

Vegetation Type		Historic Conditions – circa 1862 (Historic Vegetation Map)		Alternative A (No Action)/Existing Conditions (circa 2014)		Alternative B Reestablish the Functional Agrarian Landscape		Alternative C Establish a Visual Agrarian Landscape		Alternative D Establish a Natural Agrarian Landscape	
	Description	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park
Orchards	<ul style="list-style-type: none">• Groves of same species of fruit trees• Peach and apple orchards	<ul style="list-style-type: none">• Peach orchard at Ford Farm• Apple orchard at Elkhorn Tavern	<1%	<ul style="list-style-type: none">• Mowed Grassland (Introduced Grasses)• Orchard at Elkhorn Tavern (approximately 200 peach trees and 38 apple trees replanted at Elkhorn Tavern in 2009)	<1%	<ul style="list-style-type: none">• Reestablish historic orchards with vegetation similar to, or with vegetation that would have existed at the time of the battle• Establish trees and understory plantings to follow the historic pattern, density, and configuration of the 1862 orchards	<1%	<ul style="list-style-type: none">• Reestablish historic orchards to reflect the historic pattern and configuration (but not necessarily the specific species) of the 1862 orchard• Plant new species similar in character (form and structure) to historic vegetation• Consider fruit-bearing trees or trees that resemble fruit-bearing trees in form and structure• Plant to reflect the historic pattern in form and composition, but that allows flexibility in the number of new trees	<1%	<ul style="list-style-type: none">• Reestablish historic orchards to reflect the historic pattern and configuration of the 1862 orchards• Reestablish orchards as a historic space; plant orchard areas with native grasses or other hardy or native species to reestablish the historic form and open pattern, or by planting low-growing vegetation of native and hardy species in a color that reflects the character of the historic ground plane• Consider trees that resemble fruit-bearing trees in form and structure• Plant vegetation to reflect the historic pattern of vegetation in form and composition, but that allows flexibility in the number of new trees	<1%
Arkansas Highlands Forest	<ul style="list-style-type: none">• Native forest found throughout the Arkansas Highlands of the Ozark Plateau• Typical Upland Deciduous Woodland and Forest community• Eastern red cedar (Glade-like)• Native woodland species – Oak-Hickory community	<ul style="list-style-type: none">• A variety of woodland communities that usually include oak, hickory, and scrub oak thickets• Most Arkansas Highlands forests were not part of the battlefield	Eastern red cedar – <1% (Glade-like area) Other hardwoods – 24%	<ul style="list-style-type: none">• Typical Upland Deciduous Woodland and Forest community (Oak-Hickory), and Eastern red cedar• Dry Deciduous Woodland and Forest community• The density ranges from open to closed canopy (50% to 100%)• Silver Maple Forest-Floodplain Woodlands dominated by silver maple; one location within the park• Narrow hollows (i.e., streams such as Lee Creek and Williams Hollow)• Bottomland Deciduous Woodland and Forest community (Black Walnut-Red Mulberry-American Elm)• The density ranges from moderate on hills to dense in bottomlands• Morgan’s Woods, Leetown Battlefield, and the Tanyard• Some Ruderal Grassland and Shrubland	Eastern red cedar – 18% (Glade-like area) Other hardwoods – 61%	<ul style="list-style-type: none">• Reestablish the forest within the park to the character, density, and species that would have existed at the time of the 1862 battle• Return areas that are currently fields, open woodlands, or other vegetation types to their historic character as natural forest	Eastern red cedar – <1% (Glade-like area) Other hardwoods – 57%	<p><i>All Forests:</i></p> <ul style="list-style-type: none">• Reestablish natural forest to reflect the character and density (but not necessarily the specific species) that would have existed at the time of the battle <p><i>Forests within the Battleground and Education and Interpretation Zones:</i></p> <ul style="list-style-type: none">• Plant areas that are currently fields or open woodlands, but were historically woodland native forest species, in the patterns, density, and diversity of the 1862 forest• Allow for additional hardy species that are consistent in form and structure to the historic species <p><i>Forests in the Arkansas Highlands Zone:</i></p> <ul style="list-style-type: none">• Reestablish the natural forest to reflect the diversity and structure that would have existed at the time of the battle but with more flexibility in species composition	Eastern red cedar – <1% Other hardwoods – 57%	<p><i>All Forests:</i></p> <ul style="list-style-type: none">• Reestablish forests to reflect the historic character and density that would have existed at the time of the 1862 battle <p><i>Forests in the Battleground and Education and Interpretation Zones:</i></p> <ul style="list-style-type: none">• Return existing fields or existing open woodlands that were historically forested using native species to reflect the historic forest in the patterns, density, and diversity of the 1862 forest• Reflect the diversity and mix of species that would have existed at the time, but also allow additional hardy species that are consistent in form and structure to the historic species• Allow more species than may have existed historically <p><i>Forests in the Arkansas Highlands Zone:</i></p> <ul style="list-style-type: none">• Reestablish the natural forest to reflect the diversity and structure that would have existed at the time of the battle• Return existing fields, open woodlands, or other vegetation types to their historic character as natural forest• Create forests with a mix of species including historic trees integrated with hardy and native trees• Allow for more species than may have existed historically	Eastern red cedar – <1% Other hardwoods – 57%

Vegetation Type		Historic Conditions – circa 1862 (Historic Vegetation Map)		Alternative A (No Action)/Existing Conditions (circa 2014)		Alternative B Reestablish the Functional Agrarian Landscape		Alternative C Establish a Visual Agrarian Landscape		Alternative D Establish a Natural Agrarian Landscape	
	Description	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park	Vegetation Characteristics	Estimated Percentage of Veg, Type in Park
Visitor Areas Vegetation	<ul style="list-style-type: none">• At the visitor center (parking, entrance, and view from building)• At interpretive spots along the Tour Road (parking areas)• At East Overlook	<ul style="list-style-type: none">• Nonexistent	n/a	<ul style="list-style-type: none">• Mown lawn and natural areas depending on location	<1%	<ul style="list-style-type: none">• Manage visitor areas as part of the overall vegetation treatment for the area• Vegetation in visitor areas would be the same as surroundings; for example, at the Leetown Battlefield Overlook, vegetation of the reestablished open field would flow into parking and interpretive areas	<1%	<ul style="list-style-type: none">• Maintain a clear area around each visitor area for ease in maintenance, allowing for the addition of low-growing grasses to be mowed on a regular basis• Maintain low-mown grasses within each visitor area including the visitor center, around the tour stops, and the Leetown Battlefield interpretive area	<1%	<ul style="list-style-type: none">• Maintain a clear area around each visitor area for ease in maintenance• Allow addition of low-growing grasses to be mowed on a regular basis• Plant low-growing native or hardy species within each visitor area including the visitor center, around the tour stops, and the Leetown Battlefield interpretive area• Plant species that provide cover and low growth, but that only require mowing several times a year (not every week)	<1%

TABLE 5. DEGREE TO WHICH EACH ALTERNATIVE FULFILLS THE PURPOSE, NEED, AND OBJECTIVES OF THE PROJECT

Meets Project Purpose, Need, and Objectives?			
Alternative A: No Action	Alternative B: Reestablish the Functional Agrarian Landscape	Alternative C: Establish a Visual Agrarian Landscape	Alternative D: Establish a Natural Agrarian Landscape
<p>The no action alternative would not fulfill project objectives. The natural and man-made changes to the landscape and environs since the time of the battle would not be restored to historic conditions. The goals of restoring the landscape to the look and feel of the 1862 battlefield landscape would not be achieved.</p> <p>The desired resource conditions from the GMP (see <i>Chapter 1: Purpose and Need</i>) would not be achieved under the no action alternative because of the continued deterioration of the park's vegetation and forests.</p>	<p>Alternative B partially fulfills the project objectives. While this alternative would implement needed changes to the vegetation landscape to accurately depict the look and feel of the 1862 battlefield landscape, proposed changes to vegetation would potentially create less diversity in vegetation within the fields and orchards. This would result in a greater susceptibility to invasive species, climate change, and other natural factors. Park natural and cultural resources would be protected and the visitor experience would be enhanced by changes to the vegetation landscape. Long-term maintenance requirements for park staff and costs would be increased by the addition of labor-intensive treatments and vegetation types, such as the planting of crop species that existed at the time of the battle; although leasing croplands and pasturelands to independent farmers, businesses, or partnerships would reduce some of the labor required for implementation and management.</p> <p>Alternative B would adequately address the desired resource conditions described for each management zone, developed within the GMP (see <i>Chapter 1: Purpose and Need</i>) by reestablishing the natural landscape features of the Ozark Plateau, maintaining or restoring the natural prairies, preserving or reestablishing the open woodlands in areas currently cleared for agriculture, and recreating the 1862 battlefield landscape.</p>	<p>Alternative C fulfills the project objectives by implementing needed changes to the vegetation landscape to represent the look and feel of the 1862 battlefield landscape. Proposed changes to vegetation would create more diversity in vegetation, allowing for greater protection from invasive species, climate change, and other natural factors. Park natural and cultural resources would be protected and the visitor experience would be enhanced by changes to the vegetation landscape and enhancement of interpretive values. Long-term maintenance requirements for park staff and current costs would be decreased by the addition of vegetation species with lower maintenance requirements.</p> <p>Alternative C would adequately address the desired resource conditions described for each management zone, similar to Alternative B, but would also allow more flexibility for park staff compared with Alternative B to implement and maintain the vegetation management within the park over the long term. Cultural and historic values would be enhanced, although not to the same level as Alternative B.</p>	<p>Alternative D partially fulfills the project objectives by implementing needed changes to the vegetation landscape to represent the look and feel of the 1862 battlefield landscape. Proposed changes to vegetation would create more diversity in vegetation, allowing for the greatest protection from invasive species, climate change, and other natural factors. Park natural and cultural resources would be protected and the visitor experience would be enhanced by changes to the vegetation landscape, although the vegetation would not be as visually similar to that which existed at the time of the battle. Long-term maintenance requirements for park staff and current costs would be decreased by the addition of native vegetation species with lower maintenance requirements.</p> <p>Alternative D would address the desired resource conditions described for each management zone, but to a lesser extent. Park staff would have more flexibility to implement and maintain the vegetation management within the park over the long term compared with Alternatives B and C; however, the cultural and historic values would not be enhanced to the same level as Alternatives B and C.</p>

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

A summary of potential environmental effects for the alternatives is presented in Table 6.

ALTERNATIVES OR ALTERNATIVE ELEMENTS CONSIDERED BUT NOT CARRIED FORWARD FOR ANALYSIS

Move Horse Trail

Park staff discussed moving the existing horse trail to the northern border of the park (within the WUI), but this element was dismissed because it would not address the purpose, need, and objectives of the project and is considered out of the scope of this plan/EA.

Consider Other Crops for Vegetation Management

Other commercially viable crops, such as alfalfa, were considered for use in vegetation management. This alternative was dismissed, however, because these types of crops would not address the use of historically accurate crops under Alternatives B and C, nor would they meet the definition of “native” species under Alternatives C and D. Although Alternative C includes the use of fescue in several historic fields, this nonnative vegetation species is already present in these fields, and replacing the fescue with another nonnative species would not be practical or address the purpose, need, and objectives of the project.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The environmentally preferable alternative is the alternative required by 40 CFR 1505.2(b), to be identified in a record of decision, that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historic, cultural, and natural resources. The “Environmentally Preferable Alternative” is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources (43 CFR 46.30).

Although an environmentally preferable alternative is identified, it may not be the NPS preferred alternative. The preferred alternative is the alternative the NPS believes would best fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors.

Alternative C is the environmentally preferable alternative for several reasons. Based on the enabling legislation of the park, which is “to preserve and protect the landscapes and resources associated with the battle of Pea Ridge, [and] to interpret the battle as an integral part of the social, political, and military history of the Civil War...” (70 Stat. 592), the historic and cultural resources in the park hold great importance and priority for park management. Alternative C would provide the best balance between the preservation of historic and cultural resources and the protection of the natural resources within the park. Interpretation of the historic battle under Alternative C would have greater priority than under Alternative D. Alternative C would result in the least disturbance of all action alternatives to existing vegetation and wildlife habitat because

much of the fescue fields would remain in fescue and the health of the fields and forests would be a priority.

NPS PREFERRED ALTERNATIVE

The park selected Alternative C as the preferred alternative after consideration of how each alternative met the project purpose, need, and objectives and consideration of the potential environmental consequences. The preferred alternative, Alternative C, presents NPS's preferred management action and defines the rationale for the action in terms of resource protection and management; visitor use, operations, and cost; and other applicable factors. While all of the alternatives considered would meet the project goals to a certain degree, the preferred alternative has the best overall combination of features to meet the project objectives.

TABLE 6. IMPACT SUMMARY

Impact Topic	Alternative A – No Action Alternative	Alternative B – Reestablish the Functional Agrarian Landscape	Alternative C – Establish a Visual Agrarian Landscape	Alternative D – Establish a Natural Agrarian Landscape
Vegetation	<p>The no action alternative would result in both beneficial and adverse direct and indirect impacts on vegetation. The continued vegetation management practices would have an overall direct beneficial impact on maintaining and enhancing vegetation communities within the park by decreasing the amount of invasive species and planting woody vegetation in previously cleared areas. Because the current management and maintenance would not substantively restore the landscape to the 1862 vegetative patterns, especially within the Arkansas Highlands Forests, the project purpose of establishing vegetation patterns representing the look and feel of the 1862 battlefield landscape would not be achieved. The overall health of the open woodlands would continue to deteriorate due to the continued density and fire suppression, resulting in an indirect adverse impact on vegetation. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide long-term slight indirect adverse cumulative impact because the native forests would not be completely restored and the vegetation would not significantly contribute to the visitor’s understanding of the Battle of Pea Ridge. The slight adverse impacts on vegetation from the no action alternative would not likely be significant because the impacts would not alter the overall health of the ecosystems in the park or the natural successional processes in the park, nor would it alter the visitor’s understanding of the Battle of Pea Ridge.</p>	<p>Alternative B would result in both short- and long-term beneficial and adverse impacts on vegetation. The conversion of perennial grassland fields to annual croplands would indirectly impact vegetation by increasing the vulnerability to weeds and susceptibility to erosion and other effects from annually reworking the soil. Planting 1,500 peach trees would indirectly impact vegetation by decreasing the health of the orchard with nonnative species and by reducing species diversity. In the short term, the Open Woodlands and Arkansas Highlands Forests would not reestablish to the same form and species composition, thereby reducing the vegetative cover, which would have a direct adverse impact on vegetation. In the long term, the improvements to the forest and woodlands would reestablish the vegetation composition and form in some locations, resulting in beneficial impacts.</p> <p>As discussed under the no action alternative, the continued vegetation management practices such as thinning, mowing, haying, and planting seedlings would have a beneficial direct impact on vegetation. The surrounding development would have an indirect adverse impact on vegetation by reducing wildlife habitat available, thereby increasing demand for the remaining habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative B would have a parkwide long-term beneficial and long-term slight adverse cumulative impact on vegetation. Alternative B would allow for the proposed vegetation communities to establish, thereby resulting in a beneficial effect on vegetation by improving the health of the vegetation and increasing visitor’s understanding of the Battle of Pea Ridge. Planting crops would have a parkwide long-term slight indirect adverse impact on vegetation by increasing the probability for erosion and exotic species. The parkwide long-term slight adverse indirect and cumulative impacts on vegetation from Alternative B would not likely be significant because, while Alternative B would be replacing existing pasture with croplands within a small section of the park, the overall health of the ecosystems and natural successional processes within the park would be unaffected.</p>	<p>Alternative C would result in both short- and long-term beneficial and adverse direct impacts on vegetation. Parkwide, the vegetation would establish to similar form and function, although not necessarily species composition, as the vegetation in 1862. Overall, the proposed actions under Alternative C would result in a parkwide short-term slight adverse impact and a long-term beneficial impact. Alternative C would allow for the proposed vegetation communities to establish, thereby providing a beneficial effect by increasing visitor’s understanding of the Battle of Pea Ridge and promoting species adapted to current climate conditions. The Open Woodlands and Arkansas Highlands Forest would take time to establish and would have a parkwide direct short-term slight adverse impact on vegetation by reducing vegetative cover. The parkwide direct short-term slight adverse impacts on vegetation from Alternative C would not likely be significant because the impacts would not alter the overall vegetation and natural successional processes within the park.</p> <p>As discussed under the no action alternative, the continued vegetation management practices would have a beneficial impact on vegetation. Increased development surrounding the park would indirectly adversely impact vegetation. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative C would have a parkwide beneficial cumulative impact on vegetation.</p>	<p>Alternative D would result in both short- and long-term beneficial and adverse direct and indirect impacts on vegetation. The direct short-term adverse impacts would result from a reduction in vegetative cover while the changes in species composition occur. Parkwide, the vegetation would establish to similar form and function over the long term, although the species composition may be different than the vegetation in 1862. Overall, the proposed actions under Alternative D would result in a long-term direct and indirect beneficial impact by improving the health of the vegetation, increasing visitor’s understanding of the Battle of Pea Ridge, and planting species adapted to current climate conditions.</p> <p>As discussed under the no action alternative, the continued vegetation management practices would have a beneficial impact on vegetation. The surrounding development would indirectly adversely impact vegetation by reducing available wildlife habitat, thereby increasing demand for the remaining habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative D would have a parkwide direct beneficial cumulative impact on vegetation. Alternative D would allow for the proposed native vegetation communities to establish, thereby providing a beneficial effect on vegetation, and the vegetation would contribute to the visitor’s understanding of the Battle of Pea Ridge. The proposed vegetation changes would take time to establish and would have a parkwide short-term direct slight adverse impact on vegetation due to a reduction in vegetative cover. The parkwide short-term direct slight adverse impacts on vegetation from Alternative D would not likely be significant because the impacts would not alter the overall health of the ecosystems and natural successional processes within the park.</p>

Impact Topic	Alternative A – No Action Alternative	Alternative B – Reestablish the Functional Agrarian Landscape	Alternative C – Establish a Visual Agrarian Landscape	Alternative D – Establish a Natural Agrarian Landscape
Wildlife	<p>The no action alternative would result in both beneficial and adverse cumulative impacts on wildlife. The continued vegetation management practices would have an overall beneficial impact on wildlife by maintaining and enhancing habitat within the park. The mowing of 463 acres of nonnative grassland areas would have a local short-term direct slight adverse impact on wildlife habitat because it could affect breeding birds. The relocation of Highway 62 would have an indirect beneficial impact on wildlife by reducing vehicle traffic and noise and visual disturbances. The surrounding development would have a parkwide long-term indirect adverse impact on wildlife by reducing habitat available and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide direct beneficial impact and a long-term slight direct and indirect adverse cumulative impact on wildlife. The adverse impacts on wildlife from the no action alternative would not likely be significant because the impacts would not substantially alter the overall wildlife, wildlife habitat, or natural processes within the park. The effects from Alternative A and the surrounding development on wildlife and wildlife habitat would occur over a long period and would not likely cause a decrease in wildlife populations.</p>	<p>Alternative B would result in both short- and long-term beneficial and adverse impacts on wildlife. The improvements proposed within the forests and woodlands would enhance wildlife habitat by increasing structural and species diversity. Converting the fields to agricultural crops, agricultural pasture, and orchards would reduce grassland habitat available for birds by 550 acres and could lead to a slight change in bird composition within the park. The crops planted would provide a food source for deer and other wildlife, which could lead to a further increase in the deer population in the park. Overall, the proposed actions under Alternative B would result in both a parkwide beneficial impact and a long-term direct and indirect slight adverse impact on wildlife.</p> <p>As discussed under the no action alternative, the continued vegetation management practices would have a direct beneficial impact on wildlife by maintaining and enhancing habitat within the park and a local direct slight adverse impact from mowing and haying operations, causing temporary disturbance to wildlife. The relocation of Highway 62 would have an indirect beneficial impact on wildlife by reducing vehicle traffic, noise, and visual disturbances. The surrounding development would indirectly adversely impact wildlife by reducing available habitat and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative B would have both a parkwide long-term direct beneficial and a long-term slight direct and indirect adverse cumulative impact on wildlife. The slight adverse impacts could change how wildlife contribute to the visitor experience by reducing grassland habitat; however, the long-term beneficial impacts on wildlife also could lead to a beneficial impact on the visitor experience with wildlife and visitor understanding of the Battle of Pea Ridge by improving wildlife habitat and providing habitat similar to that in 1862. The impacts on wildlife from Alternative B would not likely be significant because the impacts would not substantially alter the overall wildlife, wildlife habitat, or natural processes within the park or region. The alteration of 550 acres of grassland habitat is only 15% of the total park acreage and less than 0.1% of the total acreage in Benton County. Therefore, the overall wildlife habitat in the park and region would not be significantly altered from the implementation of Alternative B and would not likely cause a decrease or significant change in wildlife populations, including bird composition.</p>	<p>Alternative C would result in both short- and long-term beneficial and adverse direct and indirect cumulative impacts on wildlife. The improvements proposed within the forests and woodlands would directly enhance wildlife habitat by increasing structural and species diversity. Converting a small section of the fields to agricultural crops would reduce grassland habitat available for birds by 11 acres, but is unlikely to lead to a change in bird composition. The crops planted would provide a food source for deer and other wildlife, which could lead to a further increase in the deer population; however, the amount of the food source would be minimal. Overall, the proposed actions under Alternative C would result in both a parkwide long-term beneficial impact and a long-term slight adverse impact on wildlife. The slight adverse impacts could change how wildlife contribute to the visitor experience by reducing grassland habitat when compared with the no action alternative; however, the long-term beneficial impacts on wildlife also could lead to a beneficial impact on the visitor experience in viewing wildlife and visitor understanding of the Battle of Pea Ridge by improving wildlife habitat and providing habitat similar to that in 1862.</p> <p>As discussed under the no action alternative, the continued vegetation management practices would have a beneficial impact on wildlife by maintaining and enhancing habitat within the park and a localized direct slight adverse impact from mowing and haying operations, causing temporary disturbance to wildlife. The relocation of Highway 62 would have a beneficial impact on wildlife by reducing vehicle traffic, noise, and visual disturbances. The surrounding development would indirectly adversely impact wildlife by reducing available habitat and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative C would have both a parkwide beneficial and a long-term slight adverse cumulative impact on wildlife. The impacts on wildlife from Alternative C would not likely be significant because the impacts would not substantially alter the overall wildlife, wildlife habitat, or natural processes within the park or region. The alteration of 11 acres of grassland habitat is less than 1% of the total park acreage and less than 0.01% of the total acreage in Benton County. Therefore, the overall wildlife habitat in the park and region would not be significantly altered from Alternative C and would not likely cause a decrease in wildlife populations.</p>	<p>Alternative D would have a beneficial impact on wildlife because the thinning of the forests and woodlands would provide more species and structural diversity, which would increase wildlife habitat. Beneficial impacts would also occur by planting native grasses and other native species within the historic fields, which would increase wildlife habitat. Local short-term direct slight adverse impacts on wildlife would occur from implementation activities because of the temporary disturbance to wildlife and wildlife habitat.</p> <p>As discussed under the no action alternative, the continued vegetation management practices would have a beneficial cumulative impact on wildlife by maintaining and enhancing habitat within the park and a local direct slight adverse cumulative impact from mowing and haying operations, causing temporary disturbance to wildlife. The relocation of Highway 62 would have an indirect beneficial impact on wildlife by reducing vehicle traffic, noise, and visual disturbances. The surrounding development would indirectly adversely impact wildlife by reducing habitat available and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative D would have both a parkwide beneficial and a long-term slight adverse cumulative impact on wildlife. The long-term beneficial impacts on wildlife through wildlife habitat improvements would lead to a beneficial impact on the visitor experience with wildlife. The impacts on wildlife from Alternative D would not likely be significant because the impacts would not alter the overall wildlife, wildlife habitat, or natural processes within the park. The implementation activities would be local and short-term.</p>

Impact Topic	Alternative A – No Action Alternative	Alternative B – Reestablish the Functional Agrarian Landscape	Alternative C – Establish a Visual Agrarian Landscape	Alternative D – Establish a Natural Agrarian Landscape
Visual Resources	<p>The no action alternative would result in parkwide long-term direct slight adverse impacts on visual resources because the natural and man-made changes that have altered the park from its 1862 appearance would not be substantially managed or changed. The continued vegetation management actions would maintain the overall landscape setting, and the visual representation of how vegetation influenced the battle would be diminished, especially from overlooks with large vistas. The relocation of Highway 62 would have a direct beneficial impact on visual resources by moving the highway away from the park. The SWEPCO transmission line would have a local direct adverse effect on the viewshed by diminishing the landscape setting. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have both a parkwide long-term direct beneficial and long-term direct slight adverse cumulative impact on visual resources. The direct slight adverse cumulative impacts on visual resources would reduce how visual resources contribute to the visitor experience of the park and their understanding of the Battle of Pea Ridge. The impacts on visual resources from the no action alternative would not likely be significant because the impacts would not appreciably alter the visual resources from the existing conditions within the park.</p>	<p>Alternative B would result in both beneficial and adverse impacts on visual resources. The reestablishment of historic spaces and vegetation patterns that would have been present in 1862 would have a direct beneficial impact on visual resources by enhancing the historic appearance of the battlefields, removing obscured views, and increasing visitor understanding of the events at the time of the battle. Implementation activities would result in a local short-term direct slight adverse impact on visual resources by altering the landscape during vegetation reestablishment. As discussed under the no action alternative, the surrounding development and the construction of the SWEPCO transmission line would have a local and parkwide long-term direct adverse impact on visual resources by diminishing the landscape setting of the battle. Although increases in surrounding housing development and the temporary implementation activities would have a parkwide short- and long-term direct slight adverse impact on visual resources, the adverse impacts would not substantially diminish visual resources over the long term. The parkwide short-term direct slight adverse impacts on visual resources would not likely be significant because the impacts are not anticipated to appreciably alter visual resources. The proposed modifications to the vegetation under Alternative B would increase visitor understanding of the park and the Battle of Pea Ridge, allowing for a long-term direct beneficial impact on visual resources.</p>	<p>Alternative C would result in both beneficial and adverse short-term and long-term direct and indirect impacts on visual resources. Implementation activities would result in a local short-term direct adverse impact during vegetation reestablishment, although the enhanced visual character of the vegetation would have a long-term direct beneficial impact. The construction of the SWEPCO transmission line would have a local long-term direct adverse impact on visual resources at East Overlook by diminishing the landscape setting. Increased development around the park would have a parkwide long-term direct slight adverse cumulative impact on visual resources, when combined with the proposed actions under Alternative C. Overall, Alternative C would have a cumulative direct beneficial impact on visual resources. The local short-term direct slight adverse impacts on visual resources would not likely be significant because the impacts are not anticipated to appreciably alter visual resources during implementation activities. The proposed modifications to the vegetation under Alternative C would increase visitor understanding of the park and the Battle of Pea Ridge and improve visual resources and visitor understanding, allowing for a long-term direct beneficial impact on visual resources.</p>	<p>Alternative D would result in both beneficial and adverse long-term and short-term direct and indirect impacts on visual resources. The reestablishment of the historic spaces through native species would provide direct beneficial impacts on visual resources, although not as great of an impact as Alternatives B and C, by increasing visitor understanding of the battle. Implementation activities would result in a local short-term direct adverse impact by temporarily closing areas of the park during reestablishment of the vegetation and increased development around the park would have a parkwide long-term direct adverse impact on visual resources by diminishing the landscape setting of the battle. The construction of the SWEPCO transmission line would also have a local long-term direct adverse impact on visual resources at East Overlook by diminishing the landscape setting. Overall, Alternative D would have a cumulative direct beneficial impact on visual resources. The local short-term direct slight adverse impacts on visual resources would not likely be significant because the impacts are not anticipated to appreciably alter visual resources because implementation activities would be temporary. The proposed modifications to the vegetation under Alternative D would increase visitor understanding of the park and the Battle of Pea Ridge, allowing for a long-term direct beneficial impact on visual resources.</p>

Impact Topic	Alternative A – No Action Alternative	Alternative B – Reestablish the Functional Agrarian Landscape	Alternative C – Establish a Visual Agrarian Landscape	Alternative D – Establish a Natural Agrarian Landscape
Cultural Resources – Cultural Landscape, Archeological Sites, Historic Structure/Objects	Buffer zones would ensure the protection of potential historic properties (Table 7, LCS within the park). There would be no effect on known archeological sites under the no action alternative. There would also be no effect on buildings or structures since all are located within treatment exclusion (buffer) zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial from the continued enhancement of the historic landscape. This alternative would have both a long-term direct beneficial impact and long-term direct slight adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. The slight adverse cumulative effects would not be significant because the impacts are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.	Buffer zones would ensure the protection of potential historic properties. There would be no effect on known archeological sites under Alternative B. The NPS would continue to identify potential historic properties within areas of the park proposed for ground disturbance and where previous survey has not taken place. There would also be no effect on buildings or structures since all are located within treatment exclusion zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial as the historic landscape would be recreated in literal translation. Cumulative impacts would have both a long-term direct beneficial impact and long-term direct slight adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. Overall, when combined with cumulative impacts, Alternative B would have a long-term direct beneficial impact on cultural resources by recreating the historic landscape of 1862. The slight direct adverse cumulative effects would not be significant because the impacts are only potential impacts and currently are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.	Buffer zones would ensure the protection of potential historic properties. There would be no effect on known archeological sites under Alternative C. The NPS would continue to identify potential historic properties within areas of the park proposed for ground disturbance and where previous survey has not taken place. There would also be no effect on buildings or structures since all are located within treatment exclusion zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial from the continued enhancement of the historic landscape. Cumulative impacts would have both a long-term direct beneficial impact and long-term slight indirect adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. Overall, when combined with cumulative impacts, Alternative C would have a long-term direct beneficial impact on cultural resources by recreating the historic landscape of 1862. The direct slight adverse cumulative effects would not be significant because the impacts are only potential impacts and currently are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.	<p>Buffer zones would ensure the protection of potential historic properties. Cultural resource surveys would be undertaken in areas of proposed ground disturbance (e.g., mechanical or prescribed fire treatment and plow zones), and where survey has not been conducted previously, to identify potential historic properties, including prehistoric archeological sites and historic artifacts associated with the 1862 battle. Surveys would include metal detection or shovel tests and would be monitored by a paraprofessional under the supervision of a professional NPS archeologist. Significant prehistoric and historic archeological sites identified during new surveys would be preserved by establishing a buffer zone prior to treatment. Historic artifacts located within areas of proposed treatment would be mapped and collected to ensure preservation. Significant prehistoric and historic archeological sites identified during new surveys would be preserved by establishing a buffer zone prior to treatment. Tree planting would not take place within archeological sites or near buildings or structures that could be affected by root bioturbation.</p> <p>There would be no effect on known archeological sites under Alternative D. The NPS would continue to identify potential historic properties within areas of the park proposed for ground disturbance and where previous survey has not taken place. There would also be no effect on buildings or structures since all are located within treatment exclusion zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial from the continued enhancement of the historic landscape. Cumulative impacts would have both a long-term direct beneficial impact and long-term direct slight adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. Overall, when combined with cumulative impacts, Alternative D would have a long-term direct beneficial impact on cultural resources by recreating the historic landscape of 1862. The direct slight adverse cumulative effects would not be significant because the impacts are only potential impacts and currently are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.</p>

Impact Topic	Alternative A – No Action Alternative	Alternative B – Reestablish the Functional Agrarian Landscape	Alternative C – Establish a Visual Agrarian Landscape	Alternative D – Establish a Natural Agrarian Landscape
Visitor Experience	The no action alternative would result in parkwide long-term slight adverse impacts on visitor experience because the natural and man-made changes that have altered the park from its 1862 appearance would not be substantially managed or changed. These current and continuing changes would lead to a reduced interpretation value and visitor understanding of the Battle of Pea Ridge. The continued vegetation management actions would maintain, but not greatly improve, the overall landscape setting, and visitor understanding of how vegetation influenced the battle would be diminished. The relocation of Highway 62 would have an indirect beneficial impact on visitor experience by moving the highway away from the park. The construction of the SWEPCO transmission line could adversely affect the visitor experience in the long term when viewed from some points in the park. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have both a parkwide long-term beneficial and parkwide long-term slight adverse cumulative impact on visitor experience. The impacts on visitor experience from the no action alternative would not likely be significant because the impacts would not appreciably alter the overall visitor experience at the park. The fundamental characteristics of the visitor experience at the park would stay the same under the no action alternative.	Alternative B would result in both long-term beneficial and long-term and short-term adverse impacts on visitor experience. The reestablishment of historic spaces and vegetation patterns that would have been present in 1862 would have a direct beneficial impact on visitor experience by increasing the visitor's immersion in the battlefields, removing obscured views, increasing visitor enjoyment, and providing opportunities for interpretive programs. Implementation activities would result in a local short-term direct slight adverse impact on visitor experience by temporarily closing portions of the park. The construction of the SWEPCO transmission line could also adversely affect the visitor experience in the long term when viewed from some points in the park. As discussed under the no action alternative, the surrounding development would have a local indirect slight adverse impact on visitor experience by diminishing the landscape setting of the battle and by increasing demand on natural spaces in the park. Although increases in surrounding development and the temporary implementation activities would have a parkwide short-term slight adverse impact on visitor experience, the impacts would not substantially detract from the visitor experience over the long term. The parkwide short-term slight adverse impacts on visitor experience would not likely be significant because the temporary impacts would occur within small sections of the park and the surrounding development would not directly affect the battlefields in the park or the interpretation of the battle. The proposed modifications to the vegetation under Alternative B would increase interpretation value and visitor understanding of the park and the Battle of Pea Ridge, allowing for an overall beneficial impact on visitor experience.	Alternative C would result in both long-term beneficial and long-term and short-term adverse impacts on visitor experience. The reestablishment of the historic spaces through species structurally and visually similar to what would have existed in 1862 would provide direct beneficial impacts on visitor experience by increasing interpretation value, visitor understanding, and visitor enjoyment and providing additional opportunities for interpretive programs. Local short-term direct adverse impacts from area closures and landscape modifications would occur during implementation activities. When combined with Alternative C, present implementation activities would result in a local short-term direct adverse impact by temporarily closing areas of the park. The construction of the SWEPCO transmission line could also adversely affect the visitor experience in the long term when viewed from some points in the park. Increased development around the park would have a parkwide long-term indirect adverse cumulative impact on visitor experience. The impacts on visitor experience from implementation activities would not likely be significant because the adverse impacts would be local and short-term, affecting only small sections of the park, and would not appreciably alter the visitor experience. The adverse effects from the surrounding development would not directly affect the battlefields in the park or the interpretation of the battle and, therefore, would not be significant. Overall, Alternative C would have a long-term direct beneficial impact on visitor experience by increasing the interpretation value and visitor understanding of the park and the Battle of Pea Ridge.	Alternative D would result in both long-term beneficial and long-term and short-term adverse impacts on visitor experience. The construction of the SWEPCO transmission line could adversely affect the visitor experience in the long term when viewed from some points in the park. The reestablishment of the historic spaces through native species would provide beneficial impacts on visitor experience by increasing interpretation value, visitor understanding, and visitor enjoyment and providing additional opportunities for interpretive programs; although the benefits would not be as great as those under Alternatives B and C. Local short-term direct adverse impacts would also occur during implementation activities from area closures and landscape modifications. When combined with Alternative D, present implementation activities would result in a local short-term direct adverse cumulative impact by temporarily closing areas of the park, and increased development around the park would have a parkwide long-term indirect adverse cumulative impact on visitor experience. The impacts on visitor experience from implementation activities would not likely be significant because the adverse impacts would be local and short-term, affecting only small sections of the park. The adverse effects from the surrounding development would not directly affect the battlefields in the park or the interpretation of the battle and, therefore, would not be significant. Overall, Alternative D would have a long-term beneficial impact on visitor experience by increasing the interpretation value and visitor understanding of the park and the Battle of Pea Ridge.
Park Operations	Current maintenance and operation activities would continue under the no action alternative. The continued vegetation management actions would result in the continued deterioration in vegetation, interpretation, and education value of the park, which would result in an indirect adverse impact on park operations by preventing park staff from being able to adequately convey the Battle of Pea Ridge. The relocation of Highway 62 would have a direct adverse impact on park operations by the increased costs incurred by the park to maintain this section of road. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide long-term slight adverse impact on park operations because of the deterioration of the vegetation, ability of the interpretive staff to effectively convey the Battle of Pea Ridge, and the long-term continuous maintenance that would be required of park staff. The impacts on park operations from the no action alternative would not likely be significant because the effects would not inhibit the park from providing an effective and safe experience. In addition, the impacts would not significantly affect the park's ability to protect natural resources nor would they affect the park's budget.	Under Alternative B, both long-term beneficial and long-term and short-term adverse impacts on park operations would occur. The implementation of the plan/EA would provide park staff with more guidance on vegetation management activities and increased interpretation and education value, while also requiring additional hours for both the implementation and maintenance of the proposed historic crops, orchards, and pastures, potentially impacting the park budget. However, leasing croplands and pasturelands to independent farmers, businesses, or partnerships would reduce some of the labor required under Alternative B. As discussed under the no action alternative, the relocation of Highway 62 would result in a direct adverse impact on park operations by closing sections of the park during construction and increasing costs incurred by the park to maintain this section of road. The parkwide long-term slight adverse impact would not be significant because the impacts would not require hiring additional staff and would not affect the park's ability to provide an effective and safe experience or to protect natural resources.	Alternative C would result in both parkwide long-term beneficial and long-term slight adverse impacts on park operations. Implementation of the plan/EA would provide park staff with more guidance on vegetation management activities and increase interpretation and education value, while also requiring additional labor hours for both the implementation and maintenance of the proposed historic crops, orchards, pastures, and open woods, potentially impacting the park budget. Maintenance activities would not be as intense as Alternative B because only 11 acres of crops and orchards would be planted, compared with 463 acres proposed in Alternative B. As discussed under the no action alternative, the relocation of Highway 62 would result in a direct adverse impact on park operations by closing sections of the park during construction and increasing costs incurred by the park to maintain this section of road. The parkwide long-term slight adverse impacts from Alternative C would not be significant because the impacts would not require hiring additional staff and would not otherwise appreciably affect park operations.	Alternative D would result in both long-term beneficial and long-term adverse impacts on park operations. Implementation of the plan/EA would have a beneficial impact on park operations because it would provide park staff with more guidance on vegetation management activities and increase interpretation and education value. Alternative D would have a parkwide short-term direct slight adverse impact on park operations because it would require additional labor hours to convert the fields from their current state to prairie and/or native grasses, potentially impacting the park budget. Future maintenance activities would not be as intense as Alternative B or C because native species would be used under Alternative D. As discussed under the no action alternative, the relocation of Highway 62 would result a direct adverse impact on park operations by closing sections of the park during construction and increasing costs incurred by the park to maintain this section of road. The parkwide short-term slight adverse impacts from Alternative D would not be significant because the impacts would not require hiring additional staff or otherwise appreciably affect park operations.

Impact Topic	Alternative A – No Action Alternative	Alternative B – Reestablish the Functional Agrarian Landscape	Alternative C – Establish a Visual Agrarian Landscape	Alternative D – Establish a Natural Agrarian Landscape
Socioeconomics	Current maintenance and operation activities would continue under the no action alternative. This could lead to a long-term indirect slight adverse impact on socioeconomics if the deterioration of the vegetation causes a decrease in visitation. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide long-term indirect slight adverse impact on socioeconomic conditions because of the deterioration of the vegetation. The impacts on socioeconomics from the no action alternative would not likely be significant because impacts on the local and regional economies would not be appreciable.	Under Alternative B, a beneficial impact on socioeconomics would occur. Vegetation management may require outside leasing agreements for both the implementation and maintenance of the proposed historic crops, orchards, and pastures, providing a direct benefit to the park and local/regional farming operations. Forest and woodlands thinning may require outside contractors to complete the activities, providing a direct slight benefit to the local/regional economy. As discussed under the no action alternative, the relocation of Highway 62 is not anticipated to impact socioeconomics because the park would be responsible for maintaining the road within the park.	Alternative C would result in a beneficial impact on socioeconomics. Outside leasing agreements may be required for haying grasslands, benefitting the park and local/regional farming operations. Forest and woodlands thinning may require outside contractors to complete the activities, providing a slight benefit to the local/regional economy. The enhancement of the vegetation may increase visitation by providing better interpretive values for visitors, indirectly resulting in increased spending in gateway communities. Overall, when combined with cumulative impacts, Alternative C would have a long-term beneficial impact on socioeconomics.	Alternative D would result in a beneficial impact on socioeconomics. Outside leasing agreements may be required for haying of grasslands, providing a benefit to the park and local/regional farming operations. Forest and woodlands thinning may require outside contractors to complete the activities, providing a slight benefit to the local/regional economy. The enhancement of the vegetation may increase visitation by providing better interpretive values for visitors, indirectly resulting in increased spending in gateway communities. Overall, when combined with cumulative impacts, Alternative D would have a long-term beneficial impact on socioeconomics.

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the resources or conditions potentially impacted by the alternatives. It is organized by impact topics that were derived from potential issues identified during internal park and external public scoping. More detailed information on park resources may be found in the GMP (NPS 2006).

VEGETATION

Affected Environment

Historical Vegetation

At the time of the 1862 battle, approximately 3,729 acres of deciduous woodlands and forest dominated Elkhorn Mountain and other hills on the north and southeast sections of the park (Figure 4). These woods varied from heavy timber and scrub oak thickets to deciduous woods and forests of oak and blackjack with an undergrowth of hickory and sumac (Bearss 1962; Weih 2006). Approximately 2,707 acres of open woodlands were present throughout the battlefield and contained the majority of the historic roads. Eastern red cedar woodlands were not present at the time of the 1862 battle (Bearss 1962; Weih 2006), although individual trees may have been present in open glade-like areas or in small numbers within the deciduous woods and forests.

Agricultural land was concentrated in the south-central and southeast portions of the park. Approximately 540 acres of crops were grown on the farmed lands and some grass-covered pasturelands were present as well (Figure 4). An apple orchard with approximately 6 acres of apple trees was present near Elkhorn Tavern and a peach orchard with approximately 17 acres of peach trees was present at Ford Farm. A 25-acre wood lot south of Elkhorn Tavern was present, which was used for timber storage – for use or sale. Introduced ornamental species, such as daffodil, yucca, iris, and lilac, were planted at some of the homesites. A network of gravel or dirt roads connected the agricultural parcels (Bearss 1962; Weih 2006).

Lee Creek, Winton Spring Branch, Williams Hollow, and other small creeks flowed south down the slopes of Elkhorn Mountain, although the type of vegetation along these creeks was not recorded. A 75-acre open area of tallgrass prairie surrounded by savanna and dry open woodland was present on the western border of the park (Bearss 1962; Weih 2006; and GLO notes 1836 and 1837).

Existing Vegetation

Since 1862, the vegetation has changed throughout many sections of the park. In order to enhance interpretation of the historic battlefield, many of the historic fields that were used for row crops have been converted to grass for ease of maintenance (Figure 5). Other areas of the park that were put into agricultural use after the battle have been invaded by eastern red cedar (*Juniperus virginiana*) and other trees and shrubs. The existing oak and hickory woodlands are similar in dominant species to the species found in 1862, but have increased in density and have

been affected by various disturbances and fire suppression (James 2008). The existing vegetation types are described in more detail below.



View of Leetown Battlefield (looking northeast). The field is currently primarily fescue grasses.

Mowed Grasses. Fescue and other pasture grasses (Diamond et al. 2012) were planted since the 1862 battle and have been maintained by the park by mowing. Areas with mowed grasses include portions of the 1862 historical crop fields, pasturelands, wood lot, and peach orchard.

Typical (Typic) Upland Deciduous Woodland and Forest (Arkansas Highlands Forest and Open Woodlands).

The most prevalent vegetation association within the park is woodlands and forests dominated by black oak (*Quercus velutina*), other oaks (*Quercus* spp.), and mockernut hickory (*Carya alba*). These occur mostly on the northern and eastern ends of the park

with scattered stands throughout the park (Diamond et al. 2012). Hardwood forests are composed of even-age growth or two cohorts (age classes). The density of the trees ranges from open woodland to closed canopy forests. Native shrubs such as coralberry (*Symphoricarpos orbiculatus*) and flowering dogwood (*Cornus florida*) and small trees dominate the understory, with an often sparse herbaceous layer (Diamond et al. 2012).

In 1862, this association dominated the northern half of the park, ranging from heavy timber to open woodlands surrounding Telegraph Road and other roads. Since 1862, some of the open woodlands and savanna have been invaded by eastern red cedar and ruderal shrubs and grasses. Other areas of open woodlands have become more densely forested over time (Diamond et al. 2012).

Dry Deciduous Woodland and Forest (Arkansas Highlands Forest). Dry woodlands and forests dominated by post oak (*Quercus marilandica*), other oaks, and black hickory (*Carya texana*) cover the top and slopes of Elkhorn Mountain, except where previously disturbed. On the ridgetop and other elevated portions, this association consists of open woodlands with a grassy understory of Virginia wildrye (*Elymus virginiana*). The tree canopy is more closed on the mountain slopes with fewer herbaceous species in the understory (Diamond et al. 2012). Hardwood forests are composed of even-age growth or two cohorts (age classes). Since 1862, open woodlands have decreased in size, transitioning to forest (which has substantially increased) because of cessation of fire, fragmentation of the landscape, and/or subsequent clearing, which caused the invasion of eastern red cedar and ruderal shrubs and grasses that currently exists.



View from East Overlook circa 1940 (looking southwest).

Bottomland Deciduous Woodland and Forest (Arkansas Highlands Forest and Open Woodlands). Bottomland Deciduous Woodlands and Forest occurs along Lee Creek and other small creeks within the project area. Relatively early successional species such as black walnut (*Juglans nigra*) dominate these woods with an understory of coralberry and the nonnative multiflora rose (*Rosa multiflora*) (Diamond et al. 2012). Based on the species described in *Vegetation Classification and Mapping of Pea Ridge National Military Park* (Diamond et al. 2012), wetlands may occur within these woods around streams.

Eastern Red Cedar Woodland and Forest. Eastern red cedar is a common pioneer species that invades old crop fields and other open areas. This native conifer is shade intolerant as a seedling and tends to die out when densely shaded by overstory species (Anderson 2013). Natural regeneration occurs in poor hardwood or pine sites or open pastures (Anderson 2013). Pastures or open grasslands that are not burned provide an optimal growth medium for eastern red cedar because they are highly susceptible to burning (Anderson 2013; Lawson 2013).

Periodic mowing also prevents the establishment of eastern red cedar. Since 1862, eastern red cedar has invaded an estimated 800 acres of old croplands and other areas disturbed after 1862 that were not regularly burned or mowed. Eastern red cedar forms dense stands with little diversity and little herbaceous undergrowth, although other deciduous trees such as American elm (*Ulmus americana*) and common hackberry (*Celtis occidentalis*) also grow in these woods and may eventually replace eastern red cedar (Diamond et al. 2012). At the time of the 1862 battle, these areas were generally savanna (Bearss 1962; Weih 2006).



View from East Overlook (looking southwest), showing the encroachment of the forests since the 1940s.

Ruderal Grassland and Shrubland. In areas that were historically savanna and subsequently became disturbed croplands that have not been mowed or burned frequently, grasslands with a mixture of shrubs and small trees have developed. Common small woody species include Pennsylvania blackberry (*Rubus pensilvanicus*) and coralberry, and common herbaceous species include tall fescue (*Schenodonius phoenix*) and a variety of other grasses and forbs. Most of the areas that are currently Ruderal Grassland and Shrubland were oak and hickory woodlands in 1862 (Bearss 1862).

Restored Prairie. At the time of the 1862 battle, an area called the Round Prairie existed in an extinct Pleistocene lake bed at the western end of the park (Figure 4). Over time, the prairie degraded and in 2001 efforts were taken to restore the prairie by planting native tallgrass species

including big bluestem (*Andropogon gerardi*) and little bluestem (*Schizachyrium scoparium*) (pers. communication with park staff 2013). Currently, big bluestem and little bluestem are the dominant species in the prairie along with other typical tallgrass species, although nonnative grasses such as Kentucky bluegrass (*Poa pratensis*) are also present.

Orchards. In 2009, park staff reestablished the two orchards present in 1862 with the help of local civic organizations. The orchard near Elkhorn Tavern was planted with 38 apple trees. The other orchard, which is adjacent to Ford Road, near Ford Cemetery on the historic Ford Farm, was planted with 200 peach trees (approximately one-third of the historic orchard). The remainder of the area of the historic orchards contains fescue grasses.

Marsh. A cattail (*Typha latifolia*) marsh is in a small ponded area in the southwestern part of the park. This marsh was originally created as a pond in the 1940s. This wetland is dominated by herbaceous species with a few scattered trees including silver maple (*Acer saccharinum*) and common persimmon (*Diospyros virginiana*).

Silver Maple Forest. A forest dominated by young silver maples is present in a poorly drained area on the northwestern boundary of the park. These trees grow on disturbed moist soils along with other trees such as American elm. Based on the species described in *Vegetation Classification and Mapping of Pea Ridge National Military Park* (Diamond et al. 2012), this vegetation association may contain wetland species.

Glade-like. Glades are open areas in forests that are underlain by limestone, sandstone, or other bedrock that contain an uncommon assemblage of native wildflowers, potentially including rare plants (Dale 1983). A survey conducted in 2012 by Dr. Steven Stephenson of the University of Arkansas, Department of Biological Sciences in Fayetteville identified three glade-like areas in the park. These glade-like areas are associated with old eastern red cedar trees and contain prickly pear cactus (*Opuntia humifusa*) and other forbs typically found in glades. No rare plants were found during the survey (Hinterthuer 2003; Stephenson 2012).

At the time of the 1862 battle, the main locations where eastern red cedar grew were likely in these open glade-like areas because the eastern red cedar prefers full sunlight and dry conditions (NRCS 2012). Historically, these conditions were found within the glade-like areas but not within the surrounding forests where no eastern red cedar woodlands were documented (Weih 2006).

Historic Trees. Trees more than 150 years old that were alive at the time of the 1862 battle have been designated as historic trees. Twelve post oaks (*Quercus stellata*) and three white oaks (*Quercus alba*) have been found that were alive at the time of the battle, ranging in age from about 2 years to 262 years old at the time of the battle in 1862. These trees are located along the ridge and southern slope of Elkhorn Mountain and around Leetown.

Invasive and Exotic Species. Invasive nonnative species dominate portions of nearly all open fields, prairie areas, and road corridors in the park. A vascular inventory in 2009 identified 83 nonnative vascular plants in the park. The park has identified 22 nonnative plant species that are of most concern, including Japanese honeysuckle (*Lonicera japonica*), fescue grasses (*Festuca* spp.), spotted knapweed (*Centaurea maculosa*), sericea lespedeza (*Lespedeza cuneata*), and Canada bluegrass (*Poa compressa*). These species have the ability to colonize, overrun, and disrupt ecosystems. Currently, the park treats approximately 500 to 1,000 acres with prescribed burns annually, and another 200 acres of invasive plants are mechanically removed.

Rare Species. An inventory of vascular plants in the park in 2003 identified four species that are tracked by the Arkansas Natural Heritage Commission because they are uncommon or have conservation concerns (Hinterthuer 2003). These species were the Ozark chinquapin (*Castanea pumila* var *ozarkensis*), lobed spleenwort (*Asplenium pinnatifidum*), field pussytoes (*Antennaria neglecta*), and black maple (*Acer nigrum*). The Ozark chinquapin trees were found in the park below the East Overlook and the lobed spleenwort was found on the sandstone bluffs in the park below the East Overlook. The 2003 inventory report did not document if the field pussytoes or black maple were found in the park.

An inventory of vascular plants conducted in 2009 identified 41 plant species as species of conservation status (Williams 2009). No federally listed species are present or are likely to be present in the park; however, three state threatened species (forked aster, *Eurybia furcatus*; ovate-leaved catchfly, *Silene ovate*; and royal catchfly, *Silene regia*) and two state endangered species (caric sedge, *Carex opaca* and small headed pipewort, *Eriocaulon koernickianum*) were noted as likely present in the park during the 2009 survey (Williams 2009). The forked aster is a woodland plant associated with low, wet areas (Center for Plant Conservation (CPC) 2010a); the ovate-leaved catchfly occurs in dry to mesic forests; and the royal catchfly occurs in open woods, glades, meadows, and prairies (CPC 2010b). The caric sedge is found in low areas in prairies, roadside ditches, and poorly drained areas and the small headed pipewort is found in moist to wet sands and sandy silts of seep sites (NatureServe 2013).

WILDLIFE

Affected Environment

The dense forests, open fields, and prairies in the park provide year-round habitat for a variety of wildlife. This habitat is becoming more important as development continues to increase and encroach around the park (NPCA 2009). Common species in the park include white-tailed deer (*Odocoileus virginianus*); coyote (*Canis latrans*); red fox (*Vulpes vulpes*); opossum (*Didelphis marsupialis*); woodchuck (*Marmota monax*); eastern cottontail rabbit (*Sylvilagus floridana*); several species of squirrels, mice, and voles; and numerous migratory songbirds (NPCA 2009; Johnsey and Malinen 1970).

An inventory of vertebrate species was completed at the park in 2009 by the NPS Heartland Inventory and Monitoring Network (Williams 2009). The inventory found 143 vertebrate species in the park, including 67 birds, 19 fish, 18 mammals, 18 amphibians, and 21 reptiles. Of these, eight birds, one fish, three mammals, five amphibians, and two reptiles were listed by the Arkansas Natural Heritage Commission as species of conservation status. No federal- or state-listed vertebrate species were listed in the park. The federally endangered gray bat (*Myotis grisescens*) has been observed in the park; however, no resident populations are present in the park (NPCA 2009). Several federally threatened and endangered species are listed in Benton County, Arkansas; however, the USFWS has concurred that the proposed alternatives would have no effect on the listed species (USFWS 2012). Other bat species have been observed in the park, including the red bat (*Lasiurus borealis*), eastern pipistrelle (*Pipistrellus subflavus*), and northern long-eared bat (*Myotis septentrionalis*), with six potential bat habitats previously surveyed within the park (one cave, two shelters, two bridges, and forested habitat) (Sley et al. 2004).

A continuing concern of visitors (as identified during public scoping) and park staff has been the increase in white-tailed deer populations within the park (NPCA 2009; Grabner et al. 2005). The park is likely to have a higher density of deer due to the overall decline in deer habitat in

northwest Arkansas from urban sprawl, agriculture, and clearing of forests, and because the park provides a haven from predators and hunting (Cribbs and Peitz 2008). White-tailed deer populations have been monitored in the park since 2005 (Peitz 2005). The deer populations have both declined and increased within the eight years of monitoring, with 2013 having a population value 58% above the average value within those years. The decline in population levels in previous years was due to a hemorrhagic outbreak (an acute, infectious, often fatal viral disease of some wild ruminants [Michigan Department of Natural Resources 2013]) and future outbreaks are possible.

In 2009, the park's fish monitoring program documented four species of fish in Pratt Creek (Dodd et al. 2011). The monitoring report indicated the species diversity was moderate and species richness was low, with three of the species intolerant to human disturbance and two that are benthic species that need clean gravel/cobble substrate (Dodd et al. 2011). The fish species observed include southern redbelly dace (*Phoxinus erythrogaster*), orangethroat darter (*Etheostoma spectabile*), banded sculpin (*Cottus carolinae*), and redspot chub (*Nocomis asper*). One federally threatened fish species, the Ozark cavefish (*Amblyopis rosae*), and one federally endangered crustacean species, the cave crawfish (*Cambarus aculabrum*), have been documented by the USFWS as potentially occurring in the park (NPS 2006); however, based on the inventory conducted in 2011 (Dodd et al. 2011), it is unlikely these species are present.

In 2000, the amphibian and reptile monitoring documented 6 species of salamander, 1 species of newt, 11 species of toads and frogs, 2 species of turtles, 1 species of lizard, 3 species of skinks, and 15 species of snakes in the park (Briggler and Pilgrim 2001). The grotto salamander (*Typhlotriton spelaeus*), a state species of concern, has also been observed in the park in Winton, Pratt, and Lee creeks (Bowles, pers. comm. 2013).

The grasslands and forests in the park provide ample habitat for a variety of bird species. Increasingly fragmented landscapes have decreased overall bird habitat within the region surrounding the park due to urban and industrial development (Peitz 2009). According to park staff, more than 100 bird species have been identified in the park, with 30 species identified as regional species of concern. A breeding bird survey conducted in the park in 2008 recorded 63 species of breeding birds (Peitz 2009). From the survey, 16 species found in the park are classified by Partners in Flight as species of continental importance. The species richness for birds in grassland habitat in the park is similar to those reported elsewhere, while the species richness in the woodland habitat was lower than values reported elsewhere. Bird species that commonly nest and breed in the park include scarlet tanagers (*Piranga olivacea*), summer tanagers (*Piranga rubra*), rose-breasted grosbeaks (*Pheucticus ludovicianus*), ovenbirds (*Seiurus aurocapillus*), and various woodland warblers (*Phylloscopus* sp.) (NPCA 2009). Wild turkey (*Meleagris gallopavo*) and northern bobwhite quail (*Colinus virginianus*) are also often found in the fields of the park.

VISUAL RESOURCES

Affected Environment

About 90% of the Civil War battlefield where fighting took place is protected in the park (NPS 2006). Protecting such a large portion of an original battlefield is uncommon among Civil War parks in the national park system, and this protection is essential to the unique visual character of the park. Much of the land that is now protected in the park underwent extensive changes from the time of the battle until the park was established in 1956. Much of the land that now constitutes the park was historically used for agriculture, raising livestock, and homestead sites. These land

uses, along with practices of fire suppression and logging, both before and after the battle, have combined to alter the landscape and influence the character of the park relative to its historic appearance (NPCA 2009).

Visual resources on the battlefield are important in the visitor's understanding of the battle events. Visual resources include replica artillery, fencing, and historic structures; and historic fields, roads, and trails. For more information on the visual resources within the cultural and historic context of the park, see the *Cultural Resources* section in this chapter.

The most popular activity for visitors is to travel the 7-mile Tour Road through the park (Figure 5). Guided by the park brochure, visitors can follow the Tour Road and pull over at 10 interpretive stops identifying important battle sites. Several interpretive exhibits and historic roads, trails, fields, and structures are available for viewing.

Over the past 11 years, in an effort to restore the historic landscape that soldiers witnessed during the Civil War battle, the park removed 11,000 feet of power lines that were interfering with battlefield views, planted more than 2,000 trees in areas that were forested in 1862, rebuilt 17 miles of historic fence lines that help to demarcate battle lines and the placement of artillery, and restored 5 miles of historic roads and road traces. In addition, the park is working to control eastern red cedar trees, which are encroaching on the park's open fields.

Hundreds of species of birds, wildlife, and vegetation also contribute to the visual experience in the park (see the *Wildlife* and *Vegetation* sections).

Most of the park is protected from outside visual and auditory intrusions. However, there are some modern intrusions in the battlefield landscape, such as the visitor center and administrative area, residential development and associated infrastructure around the perimeter of the park such as cell towers, and Arkansas Highway 72 and Highway 62, which bisect the western and southern portions of the park, respectively. In general, visitors have several opportunities to visualize the 1862 landscape, despite the absence of the farm structures that existed at the time of the battle. The landscape is generally representative of the historic conditions, although fire prevention and suppression has resulted in an increase in tree density in some areas of the park. This includes denser areas of forest around the battlefields, trenches, and fields; the invasive eastern red cedar species occurring throughout the park; fields that were previously open agricultural fields and crops, currently dominated by introduced grasses; and asphalt around the trenches (placed there circa 1970 in an effort to provide visitor access). The change in vegetation characteristics has altered views and interpretation of the battlefields and routes, making it somewhat difficult for visitors to visualize how the landscape affected the battle.

CULTURAL RESOURCES

Affected Environment

Following is a summary of the cultural landscape features, archeological sites, and historic structures and objects associated with the park. Cultural landscapes, archeological sites, and historic structures and objects are eligible for the National Register if they meet NPS criteria. These criteria are: association with an important event in history (Criterion A); association with significant person(s) in history (Criterion B); embody characteristics of a type, period, method of construction, or work of a master (Criterion C); or has yielded or is likely to yield information important to prehistory or history (Criterion D) (36 CFR 60.4).

Archeological Sites

The park is in the archeologically rich Ozark Plateau. Numerous sites in the area date human use and occupation to at least 10,000 years ago. Native American occupation continued until the early 19th century when Euroamerican settlement resulted in the forced relocation of Native Americans to reservations.

The identification of prehistoric archeological sites within the park has been limited to small-scale compliance projects (Branan 2011; Coleman 1988; Harcourt 1993). Six prehistoric archeological sites have been identified in the park (3BE12, 3BE13, 3BE305, 3BE512, 3BE513, and 3BE589). None of the prehistoric archeological sites discovered have been assigned to a time period or culture and all were evaluated as not eligible for the National Register. As part of the 5-year Systemwide Archeological Inventory Program (SAIP), the Midwest Archeological Center and the University of Arkansas Department of Anthropology conducted a sampling program to identify additional archeological sites. Of the more than 4,000 shovel tests excavated, 95% were negative for buried archeological deposits (Kay and Herrman 2005).

The second component of the SAIP was a battlefield archeology assessment survey (Carlson-Drexler et al. 2008). Between 2001 and 2003, an intensive metal detector inventory covered all of Oberson's and Cox's fields, most of Foster's field, Clemens' field, the area around Elkhorn Tavern, and the area along the narrow ridge north of Elkhorn Tavern along Telegraph Road, including the east slope and bottom of Middle Ravine. A more limited reconnaissance-level metal detector survey was conducted in the belt of trees between Oberson's and Foster's fields, Morgan's Woods, the area between Clemens' field and Elkhorn Tavern, and the southwestern portion of Broad Ridge. The physical remains of the battlefield are also considered an archeological site (3BE184), evidenced by the patterned deposition of small arms ammunition, larger ordnance, and discarded personal effects identified primarily by metal detectors and by geophysical detection (Kvamme 2002).

Archeological excavation was also undertaken by the NPS in 1965 in an effort to identify the structural remains of the Leetown hamlet and establish the boundaries of an abandoned cemetery where soldiers were believed to have been hastily buried (Wilson 1965). Evidence of structures was found as were the outlines of numerous grave shafts, although the burials appear to have been disinterred at some point in the past. Intact burials are believed to still be present. Other archeological resources include the Union trenches along Little Sugar Creek and the remains of a tannery, which according to historical accounts consisted of four vats, a small log structure, and fencing. At the time of the battle, the building was being used as a field hospital. Historical accounts mention other buildings and/or structures present during the battle that no longer exist, including the outbuildings (barn and corral) associated with the Elkhorn Tavern and buildings associated with the Leetown Hamlet (Bearss 1965). The remains of these structures, if identified, would be considered archeological resources.

Cultural Landscapes

A cultural landscape is defined as "a geographic area, including both cultural and natural resources. . . , associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (NPS Preservation Briefs 36). The park is significant as a historic event or site associated with the Civil War. Pea Ridge is also a "historic site," one of four types identified by the NPS that include designed, vernacular, and ethnographic cultural landscapes.

According to DO-28: *Cultural Resource Management Guidelines* (page 87), a cultural landscape is also:

...a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

The park's 4,300 acres encompass about 90% of the actual battlefield. At the time of the battle, the area included the agricultural community of Leetown, which included a number of farms and homes bounded by woodlands. The natural elements of the cultural landscape include agricultural fields, orchards, open prairie, and woodlands. Topography and drainages played a crucial role in the outcome of the battle and, therefore, are part of the cultural landscape. Named topographic features such as Elkhorn Mountain, Welfley's Knoll, Tanyard Hill, Broad Ridge, and Narrow Ridge, along with drainages such as Big and Little Sugar creeks and Cross Timber Hollow are mentioned in contemporary accounts of the battle and, therefore, constitute important elements of the historic landscape that, along with an unobstructed viewshed, convey the historic setting, feeling, and association of the Civil War battlefield. Contributing to the cultural landscape are some of the built environment features, such as the reconstructed Elkhorn Tavern and the original roads, such as Telegraph Road (now paved), that convey some of the character of the 1862 landscape.

In accordance with the original park Master Plan (NPS 1963) and the GMP (NPS 2006), approximately 600 acres of the park landscape have been restored to the March 1862 appearance using mechanized treatments and prescribed burns.

Historic Structures and Objects

Pea Ridge National Military Park was listed on the National Register in 1966 under Criterion A for its association with a Civil War battlefield significant to history. Since the existing structures present during the 1862 battle were integral to troop movements and the outcome of the battle, they have been evaluated as contributing/noncontributing elements of the National Register-listed military park. Telegraph Road, the Elkhorn Tavern, the archeological remains at Leetown, and the federal earthworks north of Little Sugar Creek are the primary historic resources in the park today, and all are directly linked to the battle of 1862. The federal earthworks, although not actually used in the fight, helped determine the course of the battle, for they presented so formidable a barrier to an approach from the south that Van Dorn was forced to strike from another direction. Telegraph Road, a major avenue for traffic between Missouri and Arkansas, was used by both Union and Confederacy troops for transporting men and supplies before and during the battle. It was crucial to Van Dorn's strategy, and was the scene of actual fighting on both days of the battle (NRHP 1966).

The NPS maintains a computerized List of Classified Structures (LCS) that are eligible for the National Register or are a contributing element to a historic site or district. These structures are listed in Table 7 below. The structures include three roads, the Union earthworks (trenches), the Ford cemetery, the Leetown cemetery where casualties were temporarily interred, the

reconstructed Elkhorn Tavern, and the remains of a tannery used as a temporary field hospital (Bearss 1965). Three monuments commemorating the battlefield have also been erected.

TABLE 7. LIST OF CLASSIFIED STRUCTURES WITHIN THE PARK

Structure	No.	Documentation	NRHP Eligibility
Huntsville Road	HB-01	LCS	Contributing
Elkhorn Tavern	HB-05	LCS	Noncontributing
Monument to Brave Confederate Dead	HB-06	LCS	Contributing
Soldiers Reunited Memorial	HB-07	LCS	Contributing
Ford Road	HB-08	LCS	Contributing
U.S. Army Headquarters Monument	HB-10	LCS	Contributing
Union Trenches	HB-14	LCS	Contributing
Telegraph Road	HB-21	LCS	Contributing
Tannery House Foundation	HB-22-A	LCS	Contributing
Tannery Well	HB-22-B	LCS	Contributing
Ford Cemetery	HB-24	LCS	Noncontributing
Leetown Cemetery	HB-25	LCS	Contributing
Spring Box at Elkhorn Tavern	HB-5.A	LCS	Contributing

Source: LCS compiled by the NPS (accessed June 12, 2013).

The existing Elkhorn Tavern is not the original structure; it is a reproduction of the structure from 1888. Prior to the Civil War, the tavern was well-known locally as a stop for the Overland Stage. Later, the tavern was an unofficial stop on the Butterfield line that passed by on Telegraph Road. The original tavern was burned by Confederacy guerillas in 1863. The structure was rebuilt by Joseph Cox on the original foundations soon after the war's end. Because of a lack of evidence of what the tavern looked like at the time of the battle, the NPS restored the structure to its approximate wartime appearance.

The Trail of Tears is not on the NPS LCS. However, it was listed on the National Register as a multiple property submission as the Cherokee Trail of Tears National Historic Trail in 1987. Between 1836 and 1839, thousands of Cherokee, as well as several other tribes, were relocated by the U.S. government from the Southeast to eastern Oklahoma. The Northern Route of the trail passed through Kentucky, Illinois, Missouri, and northern Arkansas (NPS 2012a). The Trail of Tears encompasses the Springfield to Fayetteville Road – Elkhorn Tavern Segment, also listed on the National Register (2005), within the park (NRHP 2013).

VISITOR EXPERIENCE

Affected Environment

The park provides visitors with opportunities that enhance their understanding of the Battle of Pea Ridge and its pivotal role in the Civil War west of the Mississippi River (NPS 2006). The battlefield at the park is unique due to the lack of monuments, as the park provides more of a “living landscape.” Park visitors have the opportunity to view different areas of the battlefield and the cultural resources associated with the park including historic structures, earthworks, and historic ruins. In addition, the natural resources of the park provide recreational opportunities to visitors, with many visitors coming solely for recreation such as running, hiking, biking, and horseback riding.

The primary visitor experience at the park is centered on interpreting the Civil War battle and the events surrounding the conflicts (NPS 2006). Interpretation of the events includes interpretive signs and exhibits throughout the park placed at the routes and sites of the battles, Elkhorn Tavern, and federal earthworks (NPCA 2009). The automobile tour of the park (the Tour Road) is one of the primary interpretive programs of the park (see the *Visual Resources* section).

The tour stops provide overviews of various features of the park, such as the countryside, the battle scenes, and monuments near the Elkhorn Tavern. A trail follows Telegraph Road in Cross Timber Hollow. Williams Hollow Road connects with Huntsville Road, which in turn connects back to Telegraph Road. Trails follow many of the historic roads within the park. About 10 to 20% of visitors venture beyond the tour stops. The Tour Road was designed to accommodate a one-way single lane of auto, bus, or recreational vehicle traffic. Today, the Tour Road accommodates motorized touring, bicycling, and jogging.

The visitor center serves as the primary facility for preparing visitors to understand and appreciate the park (NPCA 2009). The visitor center provides park visitors with an orientation to the park, an opportunity to view a video about the battle, an opportunity to talk with an interpretive ranger, view exhibits about the battle, and purchase Civil War-related literature (NPS 2006). A museum in the visitor center contains several exhibits and displays more than 90 objects (NPCA 2009). A library of historic documents and books related to the battle is in the visitor center/administrative complex. The library is open to researchers by appointment (NPS 2006). Interpretive signs are also present along the Trail of Tears, which goes through the park. In 2007, the park provided 328 interpretive programs; however, the park has had to reduce the number of interpretive programs due to a lack of funding (NPCA 2009). In fiscal year 2010, 18,945 visitors attended interpretive programs and demonstrations (NPCA 2009).



View of the battlefield from the visitor center.

The park has 9 miles of horse trails and 7 miles of hiking trails (NPS 2011b). Most trails are aligned with historic roads or traces. Many visitors bike through the park along the Tour Road. Equestrian staging is at the end of the two-lane Tour Road. The designated equestrian trail passes through the western part of the battlefield, then proceeds around the north side of Elkhorn Mountain to the Elkhorn Tavern, and then along Telegraph Road back to the staging area.

In addition to the annual anniversary of the battle event (March 7 and 8), other special events are held each year (when funding allows), such as the Hispanic Heritage

Festival, Elkhorn Tavern 1860 Christmas, and the June Festival (NPS 2011b). Living history demonstrations are conducted throughout the year, primarily at the Elkhorn Tavern. The cannon programs are popular with visitors, with demonstrations occurring throughout the year.

Visitation at the park in fiscal year 2012 was 131,907, the highest amount of visitors in the last five years (NPS 2012b). Visitation has fluctuated between 61,000 and 131,000 since 1976 (NPS 2012b). Visitation is highest from May through August, with another peak in October. School groups visit

AFFECTED ENVIRONMENT

the park primarily in April and May. Approximately 40 to 50 military groups come to the park per year (NPCA 2009). Based on staff observations, the average stay in the park is one to three hours.

PARK OPERATIONS

Affected Environment

Park grounds are open seven days a week. The Visitor Center is open seven days a week with seasonal exceptions. The park is currently closed on Thanksgiving Day, Christmas Day, New Year's Day, and all other federal holidays.

Park staff currently consists of the following full-time positions (15 total):

- Superintendent and one law enforcement ranger
- Administrative officer and two administrative assistants in the division of administration
- Facility manager, two maintenance employees, and custodian in the division of facilities management
- Chief of resource management, a biologist, and a laborer in the division of resource management
- Chief of interpretation and two park guides in the division of visitor services and resource protection
- Volunteers in Parks - across all divisions to help augment park staff

Both the Long-Range Interpretive Plan and State of the Parks assessment identified additional park staffing needs in order to conduct important activities within the park including interpretation programs, visitor services, and a survey of the park's boundaries (NPS 2011b; NPCA 2009).

The visitor center provides orientation and key visitor services, including museum exhibits, as well as office space for some staff and the primary maintenance area (NPS 2006). Park entrance fees are also collected at the visitor center. Park staff has converted two former residences for use as office space. An additional maintenance area is used for equipment and materials storage. A new maintenance facility is planned for the park; however, a location for the facility has yet to be determined. The Union trenches are not contiguous with the rest of the park but are open to the public.

Current management and vegetation maintenance in the park includes thinning open woodlands, planting trees, implementing the Exotic Plant Management Plan (EPMP), mowing existing grassland areas, conducting prescribed burns, and reestablishing orchards at the Elkhorn Tavern.

SOCIOECONOMICS

Affected Environment

Local and County Socioeconomic Conditions

The park is in Benton County, Arkansas. The Benton County population was 153,406 in 2000 and the population as of 2010 was 221,344 (an increase of 44%) (Census 2013). This population increase has made it the second largest county in the state.

Bentonville is the county seat with an estimated population of 35,301 in 2010 according to the U.S. Census Bureau (Census 2010a). The largest city in the county is Rogers, with an estimated population in 2010 of 55,964 (Census 2010b). Large retail centers are located outside the park in the cities of Rogers and Bentonville.

Area industry consists largely of hay and livestock operations with a few timber operations scattered throughout the study area. Livestock operations in the region are dominated by cattle farms; however, poultry operations are important to the region as well. The percentage of private nonfarming employment is 46.1% in Benton County, compared with a statewide percentage of 5.2% (Benton County n.d.).

Large employment centers are located near the park. Four corporate headquarters are in the region, including Wal-Mart, Tyson Foods, J.B. Hunt Transport Services, and Daisy Outdoor Products. Although several large businesses have moved into the area over the past several years, these four companies are the major employers for Benton County and northwest Arkansas. Tyson Foods also has several processing plants and distribution centers in the Rogers and Bentonville area.

The median household income for Benton County (2007-2011) was \$52,159 (Census 2013) compared with \$40,149 for the state; the unemployment rate for Benton County was 5.7%, compared with a statewide rate of 7.2% (Bureau of Labor Statistics 2013). The higher rate of mean household income and lower rate of unemployment in Benton County compared with the statewide averages may be primarily attributed to the relatively large concentration of major corporations.

U.S. Census results from 2010 indicated the racial makeup of Benton County was 76% Non-Hispanic white, 1.27% black, 1.9% Native American, 1.8% Asian, 3.1% Pacific Islander, 0.4% Non-Hispanics of some other race, 1.93% Non-Hispanics reporting two or more races, and 15.7% Hispanic or Latino (Census 2013).

Park Economic Conditions

Beginning in 1974, the park leased 15 parcels within the park (totaling 540 acres) to local independent farmers for haying operations, but discontinued the active haying leases in 2004. Annual revenues to the park in 2004 from haying leases were approximately \$10,000, or \$18.52 per acre. Since haying operations ceased, the park spends approximately \$5,000 annually to clear, or “brush hog,” fields that were previously hayed (during years they are not burned through controlled burns).

In 2011, 114,234 visitors to the park spent \$6,047,000 in communities surrounding the park. This spending supported 94 jobs in the local area (NPS 2011c).

ENVIRONMENTAL CONSEQUENCES

This “Environmental Consequences” chapter analyzes both beneficial and adverse impacts that would result from implementing any of the alternatives considered in this plan/EA. This chapter also includes methods used to analyze direct, indirect, and cumulative impacts. Impacts are evaluated based on context, duration, intensity, and whether they are direct, indirect, or cumulative. A summary of the environmental consequences for each alternative is provided in Table 6 in *Chapter 2: Alternatives*. The resource topics presented in this chapter and the organization of the topics correspond to the resource discussions contained in *Chapter 3: Affected Environment*.

This plan/EA assesses whether significant impacts would occur as a result of the proposed action or reasonable alternatives, resulting in an environmental impact statement (EIS), or whether a finding of no significant impact (FONSI) is the appropriate decision document.

GENERAL METHODS

This section describes the environmental impacts, including direct and indirect effects, and their significance for each alternative. The analysis is based on the assumption that the mitigation measures identified in the “Mitigation and Best Management Practices” section of this plan/EA would be implemented for the action alternatives. Overall, the NPS based the impact analyses and conclusions on the review of existing literature and park studies, information provided by experts within the park and other NPS personnel, other agencies, professional judgment and park staff insights, and public input.

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

The following terms are used in the discussion of environmental consequences to assess the impact intensity threshold and the nature of impacts associated with each alternative.

Type: Impacts can be beneficial or adverse. A beneficial impact is an impact that would result in a positive change in the condition or appearance of the resource. An adverse impact is an impact that causes an unfavorable result to the resource when compared with the existing conditions.

Context: This means the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

Duration: Duration of impact is analyzed independently for each resource because impact duration is dependent on the resource being analyzed. Depending on the resource, impacts may last for the implementation period, a single year or growing season, or longer. Impact duration is

described as short-term or long-term for each resource. For the purposes of this analysis, short-term and long-term impacts are defined for each resource.

Direct and Indirect Impacts: Effects can be direct, indirect, or cumulative. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are still reasonably foreseeable. Direct and indirect impacts are considered in this analysis. Cumulative effects are discussed in the next section.

Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial.
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in, or eligible for listing in, the National Register or may cause loss or destruction of significant scientific, cultural, or historical resources.
9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
10. Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

For each impact topic analyzed, an assessment of the potential significance of the impacts according to context and intensity is provided in the “Conclusion” section that follows the discussion of the impacts under each alternative. Resource-specific context is presented in the “Methodologies” section under each resource topic and applies across all alternatives. The intensity of the impacts is presented using the relevant factors from the list above. Intensity factors that do not apply to a given resource topic and/or alternative are not discussed.

CUMULATIVE IMPACTS

Cumulative effects (or impacts) are defined as “the impact on the environment that results from the incremental impact of the 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” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. The CEQ regulations that implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects.

Methods for Assessing Cumulative Impacts

Cumulative impacts were determined by combining the impacts of each action alternative and the no action alternative with other past, present, and reasonably foreseeable future actions. Past actions include activities that influenced and affected the current conditions of the environment near the project area. Ongoing or reasonably foreseeable future projects near the park or the surrounding region might contribute to cumulative impacts. The geographic scope of the analysis includes actions in the project area as well as other actions in the park or surrounding lands, including Benton County and adjoining states, where overlapping resource impacts are possible. The temporal scope includes actions within a range of approximately 10 years.

Once identified, past, present, and reasonably foreseeable actions were then assessed in conjunction with the impacts of the alternatives to determine if they would have any added adverse or beneficial effects on a particular resource, park operation, or visitor use. The impacts of past, present, and reasonably foreseeable future actions vary for each resource. Cumulative effects are considered for each alternative and are presented in the environmental consequences discussion for each impact topic.

Past, Present, and Reasonably Foreseeable Future Actions

The following past, present, and reasonably foreseeable future actions are relevant to the analysis of the effects on resources and values that would result from the alternatives, and are based on actions described in the park’s GMP (NPS 2006) and from internal scoping. The park is undertaking other existing or proposed plans, such as the Pea Ridge National Military Park Long-Range Interpretive Plan and the CLR, but the planning team decided those planning efforts would not contribute incrementally to potential impacts on park resources when combined with vegetation management activities.

Vegetation and Landscape Management

Past, present, and reasonably foreseeable actions regarding management of vegetation by the NPS includes various management techniques such as planting seedlings, restoring the orchards and prairie, mowing and haying operations, and exotic species management. Nonnative plant species have spread throughout the park and the spread of nonnative species would likely continue in the future. The NPS has managed, and continues to manage through its EPMP, vegetation to control invasive and noxious plant species in the park. The NPS has also instituted a WUI plan to reduce hazardous fuels and trees and has implemented prescribed burning under its Fire Management Plan (FMP). These management activities will continue in the future. The park has installed 15 miles of split-rail fence (with an additional 1.5 miles planned), reopened and incorporated historic roads into its trail system, and reopened a segment of the Trail of Tears.

U.S. Highway 62 Improvements

As discussed in *Chapter 1: Purpose and Need*, Arkansas State Highway and Transportation Department is proposing to widen Highway 62 from two lanes to four lanes from Avoca to Gateway. A portion of Highway 62 runs along the southern boundary of the park and would be rerouted outside (south) of the park boundary as part of this project. The existing Highway 62 would be reduced to a two-lane road within the park boundary and would be used for park access. The reduction in lanes would involve heavy equipment to remove the asphalt, regrade the soils, and revegetate the areas that were previously asphalt.

Shipe Road – King’s River 345-kV Transmission Project, Benton and Carroll Counties, Arkansas

Southwestern Electric Power Company (SWEPCO) has submitted an application to the Arkansas Public Service Commission (APSC) to build a new transmission line in Benton and Carroll counties in Northwest Arkansas. The facilities include a proposed 345-kV (345,000-volt) transmission line, approximately 48 miles long, originating at the Shipe Road Station currently under construction west of Centerton in Benton County and terminating at the proposed Kings River Station to be constructed on SWEPCO property northwest of Berryville in Carroll County. Single-pole single-circuit structures would be used, and the average pole height would be 130 to 160 feet, with poles spaced approximately every 800 feet. The right-of-way for the transmission line would be 150 feet wide. The proposed line would most likely be constructed south of Highway 62 and could come within approximately 0.5 mile of the park boundary at the southeast end of the park. The park has determined that, based on the currently proposed alignment (Route 33), the transmission poles would be visible from the East Overlook as well as other places in the park.

Residential Development

Increased residential development around the park has been occurring and is likely to continue into the future, which may affect park resources.

Acreages Used in Impacts Analysis

Table 8 shows the acreages used within each vegetation type and further categorizes the vegetation types, if applicable. These acreages have been used to analyze impacts for each impact topic within this section. Note that not all of the vegetation types are discussed in the impacts analysis as the impacts would be minimal.

TABLE 8. VEGETATION TYPES AND ACREAGES

Vegetation Type	Current Acres in Park	Acres Proposed for Treatment under Alt B	Acres Proposed for Treatment under Alt C	Acres Proposed for Treatment under Alt D
Fields	463*	463*	463*	463*
Fescue (nonnative) Grasses	463*	0	168	0
Native Grasses	0	0	284	463*
Agricultural Crops/Pasture Lands	0	463*	11	0
Interpretive	0	0	.63	0
Open Woodlands**	345	900	900	900
Orchards	6	6	6	6
Arkansas Highlands Forest	2,625	2,471	2,471	2,471
Reforested Areas**	n/a	337	337	337
Historic Trees**	n/a	n/a	n/a	n/a
Glade-like (Eastern Red Cedar)**	759	4-10	4-10	4-10
Round Prairie**	61	66	66	66
Visitor Areas	30	30	30	30

*The total acreage of the fields is 480; however, 17 acres of that total includes roads and other infrastructure and, therefore, is not included in the current acres or acres proposed for treatment.

**To be managed under "Elements Common to All Action Alternatives" (see *Chapter 2: Alternatives*).

VEGETATION

Methodology

For each alternative, the vegetation management actions were analyzed to determine the potential success for meeting the project purpose of establishing vegetation patterns representing the look and feel of the 1862 battlefield landscape. Potential effects on vegetation were evaluated based on the existing vegetation and the natural or human-based processes sustaining them within the park as described in *Chapter 3: Affected Environment*. Short-term impacts on vegetation were considered to be those impacts that would last less than two years, while long-term impacts would be impacts lasting more than two years. Resource-specific context for assessing impacts of the alternatives on the proposed vegetation includes:

- The contribution of vegetation to the visitor experience within the park and the visitor's understanding of the 1862 Battle of Pea Ridge.
- Potential for establishing the proposed vegetation communities considering existing and future geographic, climatic, and other conditions.
- The potential short-term and long-term effects on the overall health of the ecosystems of the park and surrounding lands.

Alternative A – No Action Alternative

Impacts

Under the no action alternative, current management activities would continue to establish healthy landscapes that have a varying degree of similarity to the 1862 landscape, although the pace of these activities would depend on available funding. The impacts would vary depending on

the existing landscape types, as well as the specific activities proposed, which include the following:

- **Fields** – Approximately 463 acres of fields where crops were grown in 1862 would be maintained as mowed pasture grasses and would have a similar open appearance to the historic croplands. This would have no effect on the existing vegetation within the fields.
- **Open Woodlands** – Since the 1862 battle, the open woodlands along the battlefield routes have increased in density, decreasing visibility through the woodlands. Under the no action alternative, the 345 acres of dense woodlands would continue to be thinned but would not be substantially improved. Woodlands would proliferate and density would continue to be detrimental to overall forest health. Additionally, a return to the 1862 landscape could not be achieved, thereby resulting in an indirect adverse impact on vegetation.
- **Orchards** – The orchards at Elkhorn Tavern and Ford Farm (approximately 6 acres total) would be maintained and potentially reestablished to a similar appearance as 1862. This would have no effect on the existing vegetation within the orchards.
- **Arkansas Highlands Forests** – The areas of dense woods that have developed since the battle differ from the open oak forests of the area in the mid-1800s (Foti 2004). Approximately 2,625 acres of forest and woodlands would be thinned slowly over time and managed under the no action alternative. Additionally, in previously forested areas that have been cleared since 1862, eastern red cedar and other trees and shrubs have invaded, forming eastern red cedar woodlands and forest and ruderal grassland and shrublands (see *Chapter 3: Affected Environment*). As park funds allow, approximately 759 acres of existing eastern red cedar woodlands and forest would be thinned to 4 to 10 acres (<1% of the forested areas of the park). The existing ruderal grassland and shrublands would be planted with appropriate native trees and shrubs. This would improve the forest health by reducing the density and removing undesirable species.



Grove with large quantity of cedars, prior to thinning and clearing activities.



Grove following thinning and clearing activities.

Cumulative Impacts

Past actions, including fire suppression and maintenance activities, have allowed for an increase in invasive and noxious species and have resulted in unhealthy forests within the park.

Reasonably foreseeable future actions include continuing vegetation management techniques such as thinning, mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. Proposed and ongoing NPS maintenance and management activities would assist in reestablishing healthy systems where previous activities, such as cessation of fire as well as clearing of the landscape for crops, have allowed the invasion of eastern red cedars and other species. Existing and future residential and commercial development surrounding the park would increase the fragmentation of the existing native plant communities. Development would isolate the native vegetation and diminish the range and size of plant populations within the park. The potential for invasion of undesirable exotic vegetation would increase as development continues and when Highway 62 is regraded for park use. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide long-term slight adverse cumulative impact because the native forests would not be completely restored.

Conclusions

The no action alternative would result in both beneficial and adverse direct and indirect impacts on vegetation. The continued vegetation management practices would have an overall direct beneficial impact on maintaining and enhancing vegetation communities within the park by decreasing the amount of invasive species and planting woody vegetation in previously cleared areas. Because the current management and maintenance would not substantively restore the landscape to the 1862 vegetative patterns, especially within the Arkansas Highlands Forests, the project purpose of establishing vegetation patterns representing the look and feel of the 1862 battlefield landscape would not be achieved. The overall health of the open woodlands would continue to deteriorate due to the continued density and fire suppression, resulting in an indirect adverse impact on vegetation. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide long-term slight indirect adverse cumulative impact because the native forests would not be completely restored and the vegetation would not significantly contribute to the visitor's understanding of the Battle of Pea Ridge. The slight adverse impacts on vegetation from the no action alternative would not likely be significant because the impacts would not alter the overall health of the ecosystems in the park or the natural successional processes in the park, nor would it alter the visitor's understanding of the Battle of Pea Ridge.

Alternative B – Reestablish the Functional Agrarian Landscape

Impacts

Under Alternative B, the surrounding woodlands and forests would be thinned, and the diversity and structure present in 1862 would be reestablished, where possible, based on the historic documentation of Bearss (1962), Foti (2004), and other documentation described in *Chapter 1: Purpose and Need*. The impacts of the proposed management activities for each vegetation type would include the following:

- **Fields** – The existing 463 acres of fields would be converted to the types of fields present at the time of the 1862 battle – 179 acres of rotational crops and 284 acres of agricultural pasturelands (rotational crops and fallow agricultural fields). The converted croplands

would have an indirect impact on existing vegetation by increasing the probability for weed infestations. Sustainable agricultural practices including weed control (as specified in the park's EPMP and the *Mitigation and Best Management Practices* for this plan/EA in *Chapter 2: Alternatives*) would need to be maintained to prevent this detrimental effect. The conversion from perennial grasslands to annual croplands would also indirectly impact the existing vegetation by increasing erosion, which could cause a reduction in topsoil and root systems.

- **Open woodlands** – Reestablishing 900 acres of open woodlands along the battleground routes and within the Arkansas Highlands Forest to the historic character and species would include selective thinning of undesirable species and planting of species in the dry open woodlands (27 acres) that would successfully establish under the current conditions. Establishing historic conditions would take time because many of the dominant tree species at the time of the battle, such as white oak, grows slowly (Tirmenstein 1991a). Other common species present at the time of the battle, such as blackjack oak (Bearss 1962), would reestablish more easily because it establishes well in fields and other open areas (Carey 1992). Additionally, the predicted hotter and drier climate conditions may make it difficult to reestablish some of the trees, such as red oak, which prefers moist conditions (Tirmenstein 1991b). Overall this alternative would directly improve the health of the woodlands by reducing density and invasive species and increasing species diversity.
- **Orchards** – An additional 1,500 peach trees emulating the orchards (approximately 6 acres) found at the time of the 1862 battle would be planted. The apple orchard that was recently reestablished with 38 apple trees would be maintained. Overall this planting would decrease the health of the orchard areas by planting an additional 1,500 nonnative peach trees and would decrease species diversity in this area.
- **Arkansas Highlands Forests** – Under Alternative B, the forests would be thinned (2,471 acres), and the mature forest present at the time of the battle would be restored (approximately 50 to 99% canopy). Similar to the open woodlands, reestablishing the forests to the historic species composition may be difficult in some locations. The existing Eastern Red Cedar Woodlands and Forest would be reduced to 4 to 10 acres within the Arkansas Highlands Forests and Open Woodlands. As with the open woodlands, this thinning would improve the health of the forest by reducing density and increasing species diversity.

Overall, Alternative B would have a short- and long-term slight adverse indirect impact on vegetation because planting annual crops could increase exotic species and erosion, and planting 1,500 peach trees would decrease species diversity. The long-term direct adverse impact would be that the Open Woodlands and Arkansas Highlands Forests are not likely to reestablish quickly to the same form and composition as 1862.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on vegetation. Past actions, including fire suppression and maintenance activities, have allowed for an increase in invasive and noxious species and have resulted in unhealthy forests within the park. Proposed and ongoing NPS maintenance and management activities would assist in reestablishing healthy systems and would have a beneficial impact on vegetation, including implementation of the FMP and EPMP to

control invasive and noxious plant species and thinning and planting seedlings. Existing and future residential and commercial development surrounding the park would increase the fragmentation of the existing native plant communities, isolating the native vegetation and diminishing the range and size of many plant populations. The potential for invasion of undesirable exotic vegetation would increase as development continues and when Highway 62 is regraded for park use. Implementation of the FMP through prescribed burns would have a short-term adverse and long-term beneficial effect on vegetation.

Conclusions

Alternative B would result in both short- and long-term beneficial and adverse impacts on vegetation. The conversion of perennial grassland fields to annual croplands would indirectly impact vegetation by increasing the vulnerability to weeds and susceptibility to erosion and other effects from annually reworking the soil. Planting 1,500 peach trees would indirectly impact vegetation by decreasing the health of the orchard with nonnative species and by reducing species diversity. In the short term, the Open Woodlands and Arkansas Highlands Forests would not reestablish to the same form and species composition, thereby reducing the vegetative cover, which would have a direct adverse impact on vegetation. In the long term, the improvements to the forest and woodlands would reestablish the vegetation composition and form in some locations, resulting in beneficial impacts.

As discussed under the no action alternative, the continued vegetation management practices such as thinning, mowing, haying, and planting seedlings would have a beneficial direct impact on vegetation. The surrounding development would have an indirect adverse impact on vegetation by reducing wildlife habitat available, thereby increasing demand for the remaining habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative B would have a parkwide long-term beneficial and long-term slight adverse cumulative impact on vegetation. Alternative B would allow for the proposed vegetation communities to establish, thereby resulting in a beneficial effect on vegetation by improving the health of the vegetation and increasing visitor's understanding of the Battle of Pea Ridge. Planting crops would have a parkwide long-term slight indirect adverse impact on vegetation by increasing the probability for erosion and exotic species. The parkwide long-term slight adverse indirect and cumulative impacts on vegetation from Alternative B would not likely be significant because, while Alternative B would be replacing existing pasture with croplands within a small section of the park, the overall health of the ecosystems and natural successional processes within the park would be unaffected.

Alternative C – Establish a Visual Agrarian Landscape

Impacts

Under Alternative C, vegetation would be modified and managed to present an agrarian (or “cultural”) and natural landscape that visually represents what would have existed in 1862. However, the species composition may differ from the exact composition in 1862 to allow for ease of maintenance and to adapt to changes in climatic conditions. The impacts of the proposed management activities for each landscape type would include the following:

- **Fields** – Of the 463 acres of existing fields, 296 acres of grassland fields (currently in fescue) would be modified to 11 acres of rotational crops for interpretive value, 284 acres of native grass prairie, and 0.63 acre of interpretive areas. About 168 acres of the existing fescue fields would be maintained as-is. The conversion to well-established grasslands of perennial grasses (fescue and native prairie species) would indirectly lessen the spread of invasive species and minimize the need for sustainable agricultural practices such as weed control compared with Alternative B. This would improve the overall health of the vegetation by reducing invasive species and increasing native ecosystems within the park.
- **Open woodlands** – The open woodlands (900 acres) would be reestablished to the historic character, density, and form, but not necessarily the specific species, by selective thinning of undesirable species and the planting of desirable species in the dry open woodlands (27 acres). By allowing flexibility in the selection of species, natural succession would be followed. For example, blackjack oak, which was prominent in 1862 (Bearss 1862; Foti 2004), commonly establishes in open fields (Carey 1992) and may be used to establish open woodlands relatively quickly. Additionally, planting species that thrive under hotter, drier conditions would be adapted to predicted changes in climate conditions. This would directly improve the overall health of the woodlands by decreasing the density of the woodlands, reducing invasive species, and planting species adapted to current climate conditions.
- **Orchards** – 6 acres of orchards would be planted with species similar in character to the historic vegetation, but not necessarily the specific species, to be more adaptable to present and future conditions. Recently planted peach and apple trees would be maintained. This would have no effect on the existing vegetation in the orchards.
- **Arkansas Highlands Forests** – Similar to Open Woodlands, the forests (2,471 acres) would be reestablished to similar character, density, and form, but not necessarily the same species, to allow for better establishment under existing conditions. The existing Eastern Red Cedar Woodlands and Forests would be reduced to 4 to 10 acres (<1% of the forested areas of the park) within the Arkansas Highlands Forests and Open Woodlands. As with the open woodlands, this would directly improve the health of the forest by reducing density and invasive species and increasing species diversity.

Overall, Alternative C would have a long-term direct beneficial impact because most of the well-established fields would be preserved with native grasses incorporated, and the Open Woodlands and Arkansas Highlands Forests would be reestablished using established successional practices. The short-term impact may be local and slightly adverse because the Open Woodlands and Arkansas Highlands Forests would take time to establish, thereby decreasing the vegetative cover in the short term.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on vegetation. Past actions, including fire suppression and maintenance activities, have allowed for an increase in invasive and noxious species and have resulted in unhealthy forests within the park. Reasonably foreseeable future actions, such as vegetation thinning, mowing, haying, and implementing the EPMP for invasive and noxious plant species would have a beneficial impact on vegetation. Existing and future residential and commercial development surrounding the park would increase the fragmentation of the existing native plant communities, isolating the native vegetation and diminishing the range

and size of some plant populations within the park. The potential for invasion of undesirable exotic vegetation would increase as development continues and when Highway 62 is regraded for park use. Implementation of the FMP through prescribed burns would have a short-term adverse and long-term beneficial effect on vegetation.

Conclusions

Alternative C would result in both short- and long-term beneficial and adverse direct impacts on vegetation. Parkwide, the vegetation would establish to similar form and function, although not necessarily species composition, as the vegetation in 1862. Overall, the proposed actions under Alternative C would result in a parkwide short-term slight adverse impact and a long-term beneficial impact. Alternative C would allow for the proposed vegetation communities to establish, thereby providing a beneficial effect by increasing visitor's understanding of the Battle of Pea Ridge and promoting species adapted to current climate conditions. The Open Woodlands and Arkansas Highlands Forest would take time to establish and would have a parkwide direct short-term slight adverse impact on vegetation by reducing vegetative cover. The parkwide direct short-term slight adverse impacts on vegetation from Alternative C would not likely be significant because the impacts would not alter the overall vegetation and natural successional processes within the park.

As discussed under the no action alternative, the continued vegetation management practices would have a beneficial impact on vegetation. Increased development surrounding the park would indirectly adversely impact vegetation. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative C would have a parkwide beneficial cumulative impact on vegetation.

Alternative D – Establish a Natural Agrarian Landscape

Impacts

Alternative D proposes a natural agrarian landscape that incorporates primarily native vegetation to visually represent what would have existed in 1862. The impacts of the proposed management activities for each landscape type would be:

- **Fields** - The existing 463 acres of fescue and other introduced grasses would be converted to native grass prairie. The conversion to native grasslands would allow species adapted to the conditions of the regional ecosystems to thrive and form patterns similar to the vegetation found before European settlement. Native grasslands would indirectly lessen the spread of invasive species and minimize the need for sustainable agricultural practices, including weed control.
- **Open woodlands** – The 900 acres of open woodlands would be thinned to approximately 100% canopy cover, incorporating selective thinning of undesirable species and encouraging the health and growth of desirable native species. The management techniques for Alternative D would be similar to Alternative C. This would improve the overall health of the woodlands by reducing the density, invasive species, and increase species diversity.
- **Orchards** – 6 acres of orchards would be planted with species similar in character, but not the same species, as the historic vegetation as described for Alternative C. The understory

would be planted with native or hardy grasses. Recently planted peach and apple trees would be maintained. The planting of native or hardy grasses would indirectly lessen the spread of invasive species and minimize the need for sustainable agricultural practices, including weed control.

- **Arkansas Highlands Forests** – As described under Open Woodlands, the forests (2,471 acres) would be thinned to approximately 100% canopy cover and historic trees would be integrated with hardy and native trees. The existing Eastern Red Cedar Woodlands and Forests (759 acres) would be reduced to 4 to 10 acres (<1% of the forested areas of the park) within the Arkansas Highlands Forests and Open Woodlands. As with the open woodlands, this would improve the health of the forest by reducing density and invasive species and increasing species diversity.

Overall, Alternative D would have a long-term beneficial impact through the conversion of the introduced grass fields to native grasslands, the planting of native grasses in the orchards, and the thinning and encouragement of native trees in the open woodlands and forests. However, the short-term impact may be slightly adverse because the fields, open woodlands, and forests would take time to establish, thereby reducing the vegetative cover in the short term.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on vegetation. Past actions, including fire suppression and maintenance activities, have allowed for an increase in invasive and noxious species and have resulted in unhealthy forests within the park. Reasonably foreseeable future actions include continuing vegetation management techniques, such as thinning, mowing, haying, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. Existing and future residential and commercial development surrounding the park would increase the fragmentation of the existing native plant communities, isolating the native vegetation and diminishing the range and size of some plant populations within the park. The potential for invasion of undesirable exotic vegetation would increase as development continues and when Highway 62 is regraded for park use. Implementation of the FMP through prescribed burns would have a short-term adverse and long-term beneficial effect on vegetation.

Conclusions

Alternative D would result in both short- and long-term beneficial and adverse direct and indirect impacts on vegetation. The direct short-term adverse impacts would result from a reduction in vegetative cover while the changes in species composition occur. Parkwide, the vegetation would establish to similar form and function over the long term, although the species composition may be different than the vegetation in 1862. Overall, the proposed actions under Alternative D would result in a long-term direct and indirect beneficial impact by improving the health of the vegetation, increasing visitor's understanding of the Battle of Pea Ridge, and planting species adapted to current climate conditions.

As discussed under the no action alternative, the continued vegetation management practices would have a beneficial impact on vegetation. The surrounding development would indirectly adversely impact vegetation by reducing available wildlife habitat, thereby increasing demand for

the remaining habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative D would have a parkwide direct beneficial cumulative impact on vegetation. Alternative D would allow for the proposed native vegetation communities to establish, thereby providing a beneficial effect on vegetation, and the vegetation would contribute to the visitor's understanding of the Battle of Pea Ridge. The proposed vegetation changes would take time to establish and would have a parkwide short-term direct slight adverse impact on vegetation due to a reduction in vegetative cover. The parkwide short-term direct slight adverse impacts on vegetation from Alternative D would not likely be significant because the impacts would not alter the overall health of the ecosystems and natural successional processes within the park.

WILDLIFE

Methodology

Potential impacts on wildlife are evaluated based on the native species, their habitats, and the natural processes sustaining them within the park, as described in *Chapter 3: Affected Environment*. The NPS Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted to mean that native animal life should be protected and perpetuated as part of the park's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible; otherwise, they are protected from harvest, harassment, or harm by human activities. According to *NPS Management Policies 2006*, the restoration of native species is a high priority (sec. 4.1). Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and the ecological integrity of plants and animals. Short-term impacts on wildlife were considered to be those impacts that would last less than one year, while long-term impacts would be impacts lasting more than one year.

The resource-specific context for assessing impacts of the alternatives on wildlife includes:

- The contribution of wildlife to visitor experience within the park.
- The contribution of wildlife to understanding the Battle of Pea Ridge and the setting in 1862.
- The effects of changes in vegetation on wildlife, their habitats, and the natural processes sustaining them.

Alternative A – No Action Alternative

Impacts

Under the no action alternative, current vegetation management practices would continue, including thinning open woodlands, planting trees in areas that were historically forested but are currently open fields, mowing existing grassland areas, maintaining the WUI interface, continuing to develop and implement the EPMP, and reestablishing the orchards at Elkhorn Tavern and Ford Farm. Tallgrasses would be maintained around fences as habitat for game birds. Approximately 2,625 acres of forest and 345 acres of open woodlands would be thinned and managed under the no action alternative. In addition, the eastern red cedar populations would be reduced from 759 acres to 4 to 10 acres. This would reduce the food source for birds and mammals in the park and reduce nesting and roosting cover for birds, including chipping

sparrows, American robins, song sparrows, and other birds (NRCS 2012). Since this would occur slowly over time, the birds and mammals would likely find food sources and nesting cover from nearby eastern red cedar populations or the blackjack oak or other oak species in the park. Although these actions would modify wildlife habitat, the modifications would occur slowly over time and would not affect wildlife use of the habitat. Thinning of open woodlands and planting trees in open fields would enhance habitat by reducing overgrown forests and expanding wooded habitat. In addition, the thinning of open woodlands would improve oak mast (fruit) production, thereby increasing food sources for wildlife. Approximately 463 acres of existing nonnative grasslands within the park would continue to be mowed. Mowing would directly impact wildlife, specifically breeding birds, because it could cause a disturbance to birds or their nests. Although the prescribed burns could have a direct impact on wildlife within the areas to be burned, the burns would enhance and maintain wildlife habitat over the long term because fires can reduce the amount of exotic species and increase seed production. Deer and other wildlife populations would likely continue to increase in the park due to decreasing habitat in the areas surrounding the park. Overall, the no action alternative would result in both local long-term direct beneficial impacts and short-term slight adverse impacts on wildlife.

Cumulative Impacts

Past and ongoing NPS management of vegetation has maintained and enhanced wildlife habitat within the park. Reasonably foreseeable future actions include continuing direct vegetation management techniques such as mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. Most of these actions would maintain and enhance wildlife habitat, with the exception of mowing and haying, which could directly decrease migratory bird habitat and potentially harm breeding nests. The relocation of Highway 62 would likely improve wildlife habitat by moving the highway away from the park and reducing traffic along the road, which would decrease noise and visual disturbances. Present and future residential and commercial development surrounding the park would indirectly adversely affect wildlife by decreasing surrounding habitat and increasing demand on the ecosystems present in the park. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have both beneficial and adverse direct and indirect cumulative impacts on wildlife.

Conclusions

The no action alternative would result in both beneficial and adverse cumulative impacts on wildlife. The continued vegetation management practices would have an overall beneficial impact on wildlife by maintaining and enhancing habitat within the park. The mowing of 463 acres of nonnative grassland areas would have a local short-term direct slight adverse impact on wildlife habitat because it could affect breeding birds. The relocation of Highway 62 would have an indirect beneficial impact on wildlife by reducing vehicle traffic and noise and visual disturbances. The surrounding development would have a parkwide long-term indirect adverse impact on wildlife by reducing habitat available and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide direct beneficial impact and a long-term slight direct and indirect adverse cumulative impact on wildlife. The adverse impacts on wildlife from the no action alternative would not likely be significant because the impacts would not substantially alter

the overall wildlife, wildlife habitat, or natural processes within the park. The effects from Alternative A and the surrounding development on wildlife and wildlife habitat would occur over a long period and would not likely cause a decrease in wildlife populations.

Alternative B – Reestablish the Functional Agrarian Landscape

Impacts

Under Alternative B, the surrounding woodlands and forests would be thinned, and the diversity and structure present in 1862, based on the historic documentation of Bearss (1962) and other documentation described in *Chapter 1: Purpose and Need*, would be reestablished. This would include reducing the eastern red cedar population from 759 acres to 4 to 10 acres. The existing 463 acres of grassland fields would be converted to 179 acres of rotational crops and 284 acres of agricultural pasture (rotational crops and fallow agricultural fields). The orchards at Elkhorn Tavern and Ford Farm (6 acres) would be planted with 1,500 peach trees, increasing the food source and habitat for birds and small mammals. The thinning of the forests, woodlands, and eastern red cedars would allow for an increase in understory development and diversity of species, and reduce the amount of nonnative species in the park. These actions would indirectly improve wildlife habitat within the park by reducing overgrown forests and expanding wooded habitat, which would increase the variety of species and structural diversity (Christopherson n.d.). An increase in plant species in the understory would create a richer source of food and cover for many wildlife species, improving wildlife habitat (South Dakota Department of Agriculture n.d.). The thinning of the forests, woodlands, and eastern red cedars would directly reduce the food source for birds and mammals in the park and reduce nesting and roosting cover for birds, including chipping sparrows, American robins, song sparrows, and other birds (NRCS 2012). Since this would occur slowly over time, the birds and mammals would likely find food sources and nesting cover from nearby trees in the park, including blackjack oak. Although thinning would directly remove some food sources, it would also improve oak mast (fruit) production, thereby increasing food sources for wildlife. Modifying the fields from fescue grasses to crops and orchards would directly reduce the bird habitat within the park and could lead to a change in bird composition, favoring bird species more adapted to agricultural fields such as wild turkey and northern bobwhite quail. In addition, the crops and orchards would provide a feeding source for white-tailed deer and other wildlife. This increase in food sources could indirectly lead to an increase in deer populations, further exacerbating the overpopulation of deer within the park. Tallgrasses would be maintained around fences as habitat for game birds. Implementation activities would have a short-term direct slight adverse impact on wildlife because of the disturbance to wildlife habitat. Short-term direct impacts on wildlife would also occur from mowing and haying operations. Overall, Alternative B would have a parkwide long-term beneficial impact and a long-term direct slight adverse impact on wildlife and wildlife habitat.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on wildlife. Past and ongoing NPS management of vegetation has maintained and enhanced wildlife habitat within the park by reducing the density of the forests and controlling invasive species. Reasonably foreseeable future actions include continuing vegetation management techniques, such as mowing and haying. Mowing and haying would have a local short-term direct slight adverse effect on wildlife by

disturbing wildlife habitat, specifically to breeding birds. The relocation of Highway 62 would likely indirectly improve wildlife habitat by moving the highway away from the park and reducing vehicle traffic on the road, thereby decreasing noise and visual disturbances. Present and future residential and commercial development surrounding the park would indirectly adversely affect wildlife by decreasing surrounding habitat and increasing demand on the ecosystems in the park. When combined with Alternative B, the impacts on wildlife would result in a parkwide long-term beneficial and long-term slight direct and indirect adverse cumulative impact.

Conclusions

Alternative B would result in both short- and long-term beneficial and adverse impacts on wildlife. The improvements proposed within the forests and woodlands would enhance wildlife habitat by increasing structural and species diversity. Converting the fields to agricultural crops, agricultural pasture, and orchards would reduce grassland habitat available for birds by 550 acres and could lead to a slight change in bird composition within the park. The crops planted would provide a food source for deer and other wildlife, which could lead to a further increase in the deer population in the park. Overall, the proposed actions under Alternative B would result in both a parkwide beneficial impact and a long-term direct and indirect slight adverse impact on wildlife.

As discussed under the no action alternative, the continued vegetation management practices would have a direct beneficial impact on wildlife by maintaining and enhancing habitat within the park and a local direct slight adverse impact from mowing and haying operations, causing temporary disturbance to wildlife. The relocation of Highway 62 would have an indirect beneficial impact on wildlife by reducing vehicle traffic, noise, and visual disturbances. The surrounding development would indirectly adversely impact wildlife by reducing available habitat and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative B would have both a parkwide long-term direct beneficial and a long-term slight direct and indirect adverse cumulative impact on wildlife. The slight adverse impacts could change how wildlife contribute to the visitor experience by reducing grassland habitat; however, the long-term beneficial impacts on wildlife also could lead to a beneficial impact on the visitor experience with wildlife and visitor understanding of the Battle of Pea Ridge by improving wildlife habitat and providing habitat similar to that in 1862. The impacts on wildlife from Alternative B would not likely be significant because the impacts would not substantially alter the overall wildlife, wildlife habitat, or natural processes within the park or region. The alteration of 550 acres of grassland habitat is only 15% of the total park acreage and less than 0.1% of the total acreage in Benton County. Therefore, the overall wildlife habitat in the park and region would not be significantly altered from the implementation of Alternative B and would not likely cause a decrease or significant change in wildlife populations, including bird composition.

Alternative C –Establish a Visual Agrarian Landscape

Impacts

Under Alternative C, vegetation would be modified and managed to present an agrarian and natural landscape that visually represents what would have existed in 1862, based on the historic documentation of Bearss (1962) and other documentation described in *Chapter 1: Purpose and*

Need. This alternative differs from Alternative B by incorporating vegetation that is a literal translation of what was present in 1862 with native grasses and other species, rather than using the specific species that would have been present in 1862. The eastern red cedar populations would be reduced to 4 to 10 acres, as described under the no action alternative and Alternative B, and the forests and woodlands would be thinned. The existing 463 acres of grassland fields would be modified to 11 acres of rotational crops, 284 acres of native grass prairie, and 0.63 acre of interpretive areas; 168 acres of existing fescue would remain the same. The orchards (6 acres) would be planted with species similar in character to the historic vegetation.

As described under Alternative B, the thinning of the forests, woodlands, and eastern red cedar would allow for an increase in understory development and diversity of species and reduce the amount of nonnative species in the park. This would directly improve wildlife habitat in the park by increasing the variety of species and structural diversity (Christopherson n.d.; South Dakota Department of Agriculture n.d.). The thinning of the forests, woodlands, and eastern red cedar would directly reduce the food source for birds and mammals in the park and reduce nesting and roosting cover for birds, including chipping sparrows, American robins, song sparrows, and other birds (NRCS 2012). Since this would occur slowly over time, the birds and mammals would likely find food sources and nesting cover from nearby trees in the park, including blackjack oak. Although thinning would directly remove some food sources, it would also improve oak mast (fruit) production, thereby increasing food sources for wildlife. The modifications of the fields to agricultural crops would decrease grassland habitat for wildlife by 11 acres, which would have a slight parkwide direct adverse impact on wildlife. Approximately 284 acres of existing grassland fields would be enhanced with native grasses, which would provide additional wildlife habitat and would be beneficial for wildlife over the long term. Depending on what types of crops are planted, Alternative C could also provide a food source for wildlife and favor certain species; however, the food source would be minimal, with only 20 acres of crops and orchards proposed. Mowing and haying operations would have a local short-term direct adverse impact on wildlife by reducing habitat and requiring temporary relocation of wildlife. Tallgrasses would be maintained around fences as habitat for game birds. Implementation activities would also have a short-term direct slight adverse impact on wildlife because of the disturbance to wildlife habitat.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on wildlife. Past and ongoing NPS management of vegetation has maintained and enhanced wildlife habitat within the park by reducing the density of the forests and controlling invasive species. Reasonably foreseeable future actions include continuing vegetation management techniques, such as mowing and haying. Mowing and haying would have a local short-term slight direct adverse effect on wildlife by disturbing wildlife habitat, specifically to breeding birds. The relocation of Highway 62 would likely indirectly improve wildlife habitat by moving the highway away from the park and reducing vehicle traffic, thereby decreasing noise and visual disturbances. Present and future residential and commercial development surrounding the park would indirectly adversely affect wildlife by decreasing surrounding habitat and increasing demand on the ecosystems in the park. When combined with Alternative C, the impacts on wildlife would result in a parkwide beneficial and long-term slight adverse cumulative impact.

Conclusions

Alternative C would result in both short- and long-term beneficial and adverse direct and indirect cumulative impacts on wildlife. The improvements proposed within the forests and woodlands would directly enhance wildlife habitat by increasing structural and species diversity. Converting a small section of the fields to agricultural crops would reduce grassland habitat available for birds by 11 acres, but is unlikely to lead to a change in bird composition. The crops planted would provide a food source for deer and other wildlife, which could lead to a further increase in the deer population; however, the amount of the food source would be minimal. Overall, the proposed actions under Alternative C would result in both a parkwide long-term beneficial impact and a long-term slight adverse impact on wildlife. The slight adverse impacts could change how wildlife contribute to the visitor experience by reducing grassland habitat when compared with the no action alternative; however, the long-term beneficial impacts on wildlife also could lead to a beneficial impact on the visitor experience in viewing wildlife and visitor understanding of the Battle of Pea Ridge by improving wildlife habitat and providing habitat similar to that in 1862.

As discussed under the no action alternative, the continued vegetation management practices would have a beneficial impact on wildlife by maintaining and enhancing habitat within the park and a localized direct slight adverse impact from mowing and haying operations, causing temporary disturbance to wildlife. The relocation of Highway 62 would have a beneficial impact on wildlife by reducing vehicle traffic, noise, and visual disturbances. The surrounding development would indirectly adversely impact wildlife by reducing available habitat and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative C would have both a parkwide beneficial and a long-term slight adverse cumulative impact on wildlife. The impacts on wildlife from Alternative C would not likely be significant because the impacts would not substantially alter the overall wildlife, wildlife habitat, or natural processes within the park or region. The alteration of 11 acres of grassland habitat is less than 1% of the total park acreage and less than 0.01% of the total acreage in Benton County. Therefore, the overall wildlife habitat in the park and region would not be significantly altered from Alternative C and would not likely cause a decrease in wildlife populations.

Alternative D –Establish a Natural Agrarian Landscape

Impacts

Alternative D proposes a natural agrarian landscape that would incorporate primarily native vegetation to visually represent what would have existed in 1862. As described in the previous alternatives, the eastern red cedar populations (759 acres) would be reduced to 4 to 10 acres, and the forests and woodlands would be thinned. As described under Alternative B, the thinning of the forests, woodlands, and eastern red cedar would allow for an increase in understory development and diversity of species and reduce the amount of nonnative species in the park. This would directly improve wildlife habitat within the park by increasing the variety of species and structural diversity (Christopherson n.d.; South Dakota Department of Agriculture n.d.). The thinning of the forests, woodlands, and eastern red cedars would directly reduce the food source for birds and mammals in the park and reduce nesting and roosting cover for birds, including chipping sparrows, American robins, song sparrows, and other birds (NRCS 2012). Since this would occur slowly over time, the birds and mammals would likely find food sources and nesting

cover from nearby trees in the park, including blackjack oak. Although thinning would directly remove some food sources, it would also improve oak mast (fruit) production, thereby increasing food sources for wildlife. The existing grassland fields and orchards would be converted to 6 acres of orchards planted with native grasses or other hardy or native species to reestablish the historic form and open pattern of the orchards, and 463 acres of native grass prairie. Overall, a majority of the fields (463 acres) would be enhanced by planting native species, and would provide similar wildlife habitat to what is present now while increasing species diversity. Mowing would occur but would be less frequent when compared with the other action alternatives. Tallgrasses would be maintained around fences as habitat for game birds. Alternative D would not cause an increase in the deer population because no crops would be planted and, therefore, wildlife species composition would be less likely to change than under any of the action alternatives. Alternative D would result in local short-term direct adverse impacts on wildlife from implementation activities.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on wildlife. Past and ongoing NPS management of vegetation has maintained and enhanced wildlife habitat within the park by reducing the density of the forests and controlling invasive species. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing and haying. Mowing and haying would have a local short-term direct slight adverse effect on wildlife by disturbing wildlife habitat, specifically to breeding birds. The relocation of Highway 62 would likely indirectly improve wildlife habitat by moving the highway away from the park and reducing vehicle traffic, thereby decreasing noise and visual disturbances. Present and future residential and commercial development surrounding the park would indirectly adversely affect wildlife by decreasing surrounding habitat and increasing demand on the ecosystems in the park. When combined with Alternative D, the impacts on wildlife would result in a parkwide beneficial and long-term slight adverse cumulative impact.

Conclusions

Alternative D would have a beneficial impact on wildlife because the thinning of the forests and woodlands would provide more species and structural diversity, which would increase wildlife habitat. Beneficial impacts would also occur by planting native grasses and other native species within the historic fields, which would increase wildlife habitat. Local short-term direct slight adverse impacts on wildlife would occur from implementation activities because of the temporary disturbance to wildlife and wildlife habitat.

As discussed under the no action alternative, the continued vegetation management practices would have a beneficial cumulative impact on wildlife by maintaining and enhancing habitat within the park and a local direct slight adverse cumulative impact from mowing and haying operations, causing temporary disturbance to wildlife. The relocation of Highway 62 would have an indirect beneficial impact on wildlife by reducing vehicle traffic, noise, and visual disturbances. The surrounding development would indirectly adversely impact wildlife by reducing habitat available and increasing demand for habitat within the park. Overall, when combined with past, present, and reasonably foreseeable future actions, Alternative D would have both a parkwide beneficial and a long-term slight adverse cumulative impact on wildlife. The long-term beneficial

impacts on wildlife through wildlife habitat improvements would lead to a beneficial impact on the visitor experience with wildlife. The impacts on wildlife from Alternative D would not likely be significant because the impacts would not alter the overall wildlife, wildlife habitat, or natural processes within the park. The implementation activities would be local and short-term.

VISUAL RESOURCES

Methodology

Potential impacts on scenic resources are evaluated based on what is seen by the visitor within the park, which varies depending on the visitor's objectives. Visual resources include the visitor center and the views from the visitor center, tour stops and overlooks along the Tour Road, areas in the battlefield where visitors are able to walk around, and the hiking trails and horse trail in the forests. Therefore, the geographic study area for impacts on scenic resources extends throughout the areas in the park with visitor access, plus those areas outside the park that can be seen by visitors, especially to the north (where housing development has occurred) and south and west (where highways are located). The scenic environment impacts both the visitor anticipation and experience at the site. Short-term impacts on visual resources were considered to be those impacts that would last less than three years, while long-term impacts would be impacts lasting more than three years.

The resource-specific context for assessing impacts of the alternatives on visual resources includes:

- The contribution of visual resources to the visitor experience within the park.
- The contribution of visual resources to understanding the Battle of Pea Ridge and the setting in 1862.
- The effects of changes in vegetation on visual resources.

Alternative A – No Action Alternative

Impacts

Under the no action alternative, the park would retain and enhance a substantial portion of the historic and visual character of the battlefield landscape; however, the natural and man-made changes that have altered the visual character of the landscapes would not be substantially managed or changed. As described in *Chapter 2: Alternatives*, the park would continue to thin open woodlands, plant trees in areas that were historically forested but are currently open fields, mow existing grassland areas, maintain the WUI interface, continue to develop and implement the EPMP and FMP, and reestablish the orchards at Elkhorn Tavern and Ford Farm. By not substantially managing or changing the altered landscape, the interpretation value and visitor understanding of the battlefield landscape would continue to deteriorate over time. The natural and man-made modifications and alterations that have occurred within and adjacent to the battlefield landscape over time have altered it from its 1862 appearance. This is especially apparent from tour stops with large vistas of the battlefield, such as the East Overlook. Because of this, the visual resources that demonstrate how vegetation influenced the Battle of Pea Ridge would be diminished.

Cumulative Impacts

Past and ongoing NPS management of the vegetation has maintained the viewshed within the park. The current conditions of the vegetation affect visual resources because current vegetative conditions do not accurately represent the battlefield landscape and alter and partially obscure views in some areas of the battlefield. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. The relocation of Highway 62 would likely directly improve visitor experience by moving the highway away from the park, thereby decreasing visual disturbances. The construction of the SWEPCO transmission line could directly adversely affect the viewshed from East Overlook. Present and future residential and commercial development surrounding the park would directly adversely affect the viewshed by diminishing the landscape setting and backdrop of the battle. When combined with past, present, and reasonably foreseeable future actions, the no action alternative would have both beneficial and adverse long-term cumulative impacts on visual resources.

Conclusions

The no action alternative would result in parkwide long-term direct slight adverse impacts on visual resources because the natural and man-made changes that have altered the park from its 1862 appearance would not be substantially managed or changed. The continued vegetation management actions would maintain the overall landscape setting, and the visual representation of how vegetation influenced the battle would be diminished, especially from overlooks with large vistas. The relocation of Highway 62 would have a direct beneficial impact on visual resources by moving the highway away from the park. The SWEPCO transmission line would have a local direct adverse effect on the viewshed by diminishing the landscape setting. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have both a parkwide long-term direct beneficial and long-term direct slight adverse cumulative impact on visual resources. The direct slight adverse cumulative impacts on visual resources would reduce how visual resources contribute to the visitor experience of the park and their understanding of the Battle of Pea Ridge. The impacts on visual resources from the no action alternative would not likely be significant because the impacts would not appreciably alter the visual resources from the existing conditions within the park.

Alternative B – Reestablish the Functional Agrarian Landscape

Impacts

Under Alternative B, vegetation would be modified and managed to reflect a literal translation of the historic landscape of 1862 based on the historic documentation of Bearss (1962) and other documentation described in *Chapter 1: Purpose and Need*. Alternative B would reestablish the historic spaces with the specific crops (179 acres), orchards (6 acres), pastures (284 acres), forests (2,625 acres), and open woodlands (900 acres) that would have existed at the time of the battle. The vegetation obscuring the views of the battlefields would be thinned or removed and the vegetation along the battle routes would be thinned. These actions would directly increase visitor understanding of the Battle of Pea Ridge because visitors would have a literal view of the 1862 landscape, which would allow for a better understanding of the battle routes and how vegetation

influenced the battle. Modifications to the landscape would be especially apparent from tour stops with large vistas of the battlefield, such as the East Overlook. The altered landscape would be restored to its original appearance.

Alternative B also proposes to maintain the vegetation along the Tour Road and hiking trail routes more consistently when compared with the no action alternative. This would enhance visual resources for a majority of the visitors to the park who use the Tour Road because views would be less obscured. Temporary direct adverse impacts on visual resources could occur during implementation activities for removal and replacement of vegetation by disrupting views. The proposed vegetation management techniques of Alternative B would enhance interpretive programs at the park because the majority of modern human influences would be reduced and the landscape would better represent the 1862 landscape. Overall, visual resources would be enhanced by the actions in Alternative B because it would recreate the historical landscape that would have existed in 1862.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on visual resources. Past and ongoing NPS management of the vegetation has maintained the viewshed within the park. Reasonably foreseeable future actions such as continuing vegetation management within the park would have a beneficial cumulative impact on visual resources when combined with the actions proposed under Alternative B. The relocation of Highway 62 would directly improve visual resources by moving the visual disturbances away from the park. Present and future residential and commercial development surrounding the park would directly adversely affect visual resources by diminishing the landscape setting of the battle. The construction of the SWEPCO transmission line could directly adversely affect the viewshed from East Overlook. When combined with Alternative B, the impacts on visual resources would result in an overall beneficial cumulative impact.

Conclusions

Alternative B would result in both beneficial and adverse impacts on visual resources. The reestablishment of historic spaces and vegetation patterns that would have been present in 1862 would have a direct beneficial impact on visual resources by enhancing the historic appearance of the battlefields, removing obscured views, and increasing visitor understanding of the events at the time of the battle. Implementation activities would result in a local short-term direct slight adverse impact on visual resources by altering the landscape during vegetation reestablishment. As discussed under the no action alternative, the surrounding development and the construction of the SWEPCO transmission line would have a local and parkwide long-term direct adverse impact on visual resources by diminishing the landscape setting of the battle. Although increases in surrounding housing development and the temporary implementation activities would have a parkwide short- and long-term direct slight adverse impact on visual resources, the adverse impacts would not substantially diminish visual resources over the long term. The parkwide short-term direct slight adverse impacts on visual resources would not likely be significant because the impacts are not anticipated to appreciably alter visual resources. The proposed modifications to the vegetation under Alternative B would increase visitor understanding of the

park and the Battle of Pea Ridge, allowing for a long-term direct beneficial impact on visual resources.

Alternative C – Establish a Visual Agrarian Landscape

Impacts

Under Alternative C, vegetation would be modified and managed to present an agrarian and natural landscape that visually represents what would have existed in 1862. This alternative would differ from Alternative B by incorporating vegetation that is a literal translation of what was present in 1862 with native grasses and other species, rather than using the specific species that would have been present in 1862. The majority of the fields would be converted to native grasses (284 acres) or remain in fescue grasses (168 acres) that visually represent the historical character of 1862, rather than crops or pasture that are proposed in Alternative B. The remainder of the fields would be used to enhance the interpretive program within the park by planting agricultural crops (11 acres) or by incorporating other interpretive features (0.63 acre). The vegetation obscuring the views of the battlefields would be thinned or removed and the vegetation along the battlefield routes would be thinned. Alternative C would also reestablish the historic and natural woodlands and forest by reducing the eastern red cedar population from 759 acres to 4 to 10 acres and planting in-kind species that depict the form, function, and aesthetics of the historic vegetation, but that are more suited to contemporary conditions. Although the species would not be the same species present in 1862, the reestablishment of the structure and visual character of the vegetation historically present would provide a beneficial impact on visual resources because it would still provide visitors with an understanding of the Battle of Pea Ridge. Modifications to the landscape would be especially apparent from tour stops with large vistas of the battlefield, such as the East Overlook. Visual resources would be enhanced from the proposed maintenance of trails and the Tour Road. Local short-term direct adverse impacts would occur during implementation activities from equipment and potential road closures, which could obstruct views and viewsheds.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on visual resources. Past and ongoing NPS management of the vegetation has maintained the viewshed within the park. Reasonably foreseeable future actions, including continuing vegetation management within the park, would have a beneficial cumulative impact on visual resources when combined with the actions proposed under Alternative C. The relocation of Highway 62 would likely directly improve visual resources by moving the highway away from the park, thereby decreasing visual disturbances. Present and future residential and commercial development surrounding the park would directly adversely affect visual resources by diminishing the landscape setting of the battle. The construction of the SWEPCO transmission line could also directly adversely affect the viewshed from East Overlook. When combined with Alternative C, the impacts on visual resources would result in an overall beneficial cumulative impact.

Conclusions

Alternative C would result in both beneficial and adverse short-term and long-term direct and indirect impacts on visual resources. Implementation activities would result in a local short-term direct adverse impact during vegetation reestablishment, although the enhanced visual character of the vegetation would have a long-term direct beneficial impact. The construction of the SWEPCO transmission line would have a local long-term direct adverse impact on visual resources at East Overlook by diminishing the landscape setting. Increased development around the park would have a parkwide long-term direct slight adverse cumulative impact on visual resources, when combined with the proposed actions under Alternative C. Overall, Alternative C would have a cumulative direct beneficial impact on visual resources. The local short-term direct slight adverse impacts on visual resources would not likely be significant because the impacts are not anticipated to appreciably alter visual resources during implementation activities. The proposed modifications to the vegetation under Alternative C would increase visitor understanding of the park and the Battle of Pea Ridge and improve visual resources and visitor understanding, allowing for a long-term direct beneficial impact on visual resources.

Alternative D –Establish a Natural Agrarian Landscape

Impacts

Activities under Alternative D would differ from Alternatives B and C because of the planting of native species that visually represent the openness of the fields and surrounding woodlands that would have been present in 1862. The fields would all be planted with prairie and/or native grass (463 acres), as opposed to crops or fescue. Although the species would not be the same as those present in 1862, the reestablishment of the structure and visual aspect historically present would provide a direct beneficial impact on visual resources because the natural and man-made changes that have occurred in the park would be reduced and the vegetation would visually represent the 1862 Battle of Pea Ridge. The reestablishment of historic spaces with native vegetation would increase visitor understanding of the Battle of Pea Ridge and how vegetation may have influenced the battle. Modifications to the landscape would be especially apparent from tour stops with large vistas of the battle field, such as the East Overlook. Impacts on visual resources would be beneficial because of the proposed maintenance of trails and the Tour Road and the increased health of vegetation in the park. Local short-term direct adverse impacts would occur from implementation activities from equipment and potential road closures, which could obstruct views and viewsheds.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse cumulative impact on visual resources. Past and ongoing NPS management of the vegetation has maintained the viewshed within the park. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing and haying. The relocation of Highway 62 would likely directly improve visual resources by moving the highway away from the park, thereby decreasing visual disturbances. Present and future residential and commercial development surrounding the park would directly adversely affect the visitor experience by diminishing the landscape setting of the battle. The construction of the SWEPCO transmission line could also directly adversely affect the viewshed

from East Overlook. When combined with Alternative D, the impacts on visual resources would result in an overall beneficial cumulative impact.

Conclusions

Alternative D would result in both beneficial and adverse long-term and short-term direct and indirect impacts on visual resources. The reestablishment of the historic spaces through native species would provide direct beneficial impacts on visual resources, although not as great of an impact as Alternatives B and C, by increasing visitor understanding of the battle. Implementation activities would result in a local short-term direct adverse impact by temporarily closing areas of the park during reestablishment of the vegetation and increased development around the park would have a parkwide long-term direct adverse impact on visual resources by diminishing the landscape setting of the battle. The construction of the SWEPCO transmission line would also have a local long-term direct adverse impact on visual resources at East Overlook by diminishing the landscape setting. Overall, Alternative D would have a cumulative direct beneficial impact on visual resources. The local short-term direct slight adverse impacts on visual resources would not likely be significant because the impacts are not anticipated to appreciably alter visual resources because implementation activities would be temporary. The proposed modifications to the vegetation under Alternative D would increase visitor understanding of the park and the Battle of Pea Ridge, allowing for a long-term direct beneficial impact on visual resources.

CULTURAL RESOURCES

Methodology

The following effects analysis for cultural resources is based on three general site types found within the park – archeological sites (both historic and prehistoric); the built environment (buildings, structures, roads, and monuments); and the cultural landscape (a geographic area associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values). The following discussion of effects is generalized based on the type of ground disturbance associated with the vegetation management approaches and the type of cultural resource. The effects on cultural resources are only considered for historic properties or those cultural resources listed or eligible for listing on the National Register (Table 2). Short-term impacts on cultural resources were considered to be those impacts that would last only during the implementation period, while long-term impacts would be impacts that last beyond the implementation period.

A number of significant cultural resources do not require an effects assessment under this plan/EA because they would be addressed under the CLR. These cultural resources or zones include Leetown Hamlet, Elkhorn Tavern, Federal Trenches, East Overlook, Winton Springs, Winton Home, Trail of Tears, Ford Cemetery, and the Cherokee encampment; as well as the specific resources called out in the LCS for the park (see *Chapter 3: Affected Environment*). All known prehistoric archeological sites have been found to be ineligible for the National Register and no further efforts for their protection are required.

The resource-specific context for assessing impacts of the alternatives on cultural resources includes:

- Preservation and protection of historic structures associated with the Battle of Pea Ridge are key to the park's mission and enabling legislation.
- The ability of the landscape elements to fully represent the 1862 Battle of Pea Ridge.
- Protection of archeological resources that have been found in the area related to the 1862 Battle of Pea Ridge.
- Protection of archeological resources at the park and in the surrounding area that signify a national event (the Civil War). Protection of prehistoric archeological resources that have been found in the park.

Alternative A – No Action Alternative

Impacts

Under the no action alternative, the park would retain and enhance a substantial portion of the historic and visual character of the battlefield landscape; however, the natural and man-made changes that have altered the landscape would not be substantially managed or changed. As described in *Chapter 2: Alternatives*, the park would continue to thin open woodlands, plant trees in areas that were historically forested but are currently open fields, mow existing grassland areas, maintain the WUI interface through mechanical and prescribed fire thinning treatment, continue to develop and implement the EPMP and FMP, and reestablish the orchards at Elkhorn Tavern and Ford Farm. Each of these treatments has the potential to affect surface and subsurface archeological deposits. Ground disturbances from tree planting and the reestablishment of orchards could indirectly result in bioturbation (the stirring or mixing of soils by tree roots) of archeological deposits. Prescribed burns have the potential to affect combustible elements of buildings and structures, and fire suppression efforts could affect archeological deposits from the building of fire containment lines. Mechanical thinning may directly affect surface archeological deposits.

Cultural resource surveys would be undertaken in areas of proposed ground disturbance (e.g., mechanical thinning, prescribed fire treatment, and plow zones), and where survey has not been conducted previously, to identify potential historic properties, including prehistoric archeological sites and historic artifacts associated with the 1862 battle. Significant prehistoric and historic archeological sites identified during new surveys would be preserved by establishing a buffer zone prior to treatment. Historic artifacts located within areas of proposed treatment would be mapped and collected to ensure preservation.

Cumulative Impacts

Past and ongoing NPS management of the vegetation has maintained the cultural landscape within the park. The current conditions of the vegetation affect the cultural landscape because the conditions do not accurately represent the battlefield landscape and alter and partially obscure views in some areas of the battlefield. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. Planting seedlings may affect the integrity of buried archeological sites through bioturbation. The elements of prescribed fire and mechanical treatment have the potential to affect known and unknown historic properties from the construction of fire containment lines, mechanical impacts on surface artifacts, and soil

erosion measures. The relocation of Highway 62 would likely indirectly improve the cultural landscape by moving the highway away from the park, thereby decreasing visual disturbances. Present and future residential and commercial development surrounding the park would directly adversely affect the cultural landscape by diminishing the landscape setting and backdrop of the battle. When combined with past, present, and reasonably foreseeable future actions, the no action alternative would have the potential for slight adverse cumulative effects on historic properties.

Conclusions

Buffer zones would ensure the protection of potential historic properties (Table 7, LCS within the park). There would be no effect on known archeological sites under the no action alternative. There would also be no effect on buildings or structures since all are located within treatment exclusion (buffer) zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial from the continued enhancement of the historic landscape. This alternative would have both a long-term direct beneficial impact and long-term direct slight adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. The slight adverse cumulative effects would not be significant because the impacts are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.

Alternative B – Reestablish the Functional Agrarian Landscape

Impacts

Under Alternative B, vegetation would be modified and managed to reflect a literal translation of the historic landscape of 1862, based on the historic documentation of Bearss (1962) and other documentation described in *Chapter 1: Purpose and Need*. Alternative B would reestablish the historic spaces with the specific crops (179 acres), orchards (6 acres), pastures (284 acres), forests (2,471 acres), and open woodlands (900 acres) that would have existed at the time of the battle. Vegetation obscuring the views of the battlefields would be thinned or removed and the vegetation along the battlefield routes would be thinned. These actions would directly enhance the cultural landscape of the park by representing the era in which the battle took place. Removal of 674 acres of eastern red cedar within the woodlands and reestablishment of the natural forest diversity and structure from 1862 would reduce the natural and man-made influences on vegetation that have occurred in the park over the years. This would enhance the cultural landscape and historical character of the park because these natural and man-made changes would be reduced.

Ground-disturbing direct impacts on cultural resources from implementation of Alternative B would include disturbance of subsurface cultural deposits from plowing associated with the reestablishment of active fields, mechanical and prescribed fire forest thinning, planting trees to reestablish historically like orchards; and general reforestation in areas of open fields that were once open woodlands.

Cultural resource surveys would be undertaken in areas of proposed ground disturbance (e.g., mechanical or prescribed fire treatment and plow zones), and where survey has not been conducted previously, to identify potential historic properties, including prehistoric archeological sites and historic artifacts associated with the 1862 battle. Surveys would include metal detection or shovel tests and would be monitored by a paraprofessional under the supervision of a professional NPS archeologist. Historic artifacts located within areas of proposed treatment would be mapped and collected to ensure preservation. Significant prehistoric and historic archeological sites identified during new surveys would be preserved by establishing a buffer zone prior to treatment. Tree planting would not take place within archeological sites or near buildings or structures that could be affected by root bioturbation.

Cumulative Impacts

Past and ongoing NPS management of vegetation has maintained the cultural landscape within the park. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing and haying. Ground disturbances under Alternative B may directly affect the integrity of buried archeological sites and known and unknown historic properties, similar to the no action alternative, although Alternative B would result in greater ground disturbances over a shorter period of time. The relocation of Highway 62 would likely indirectly improve the cultural landscape by moving the highway away from the park, thereby decreasing visual disturbances. Present and future development surrounding the park would directly adversely affect the cultural landscape by diminishing the landscape setting and backdrop of the battle. When combined with past, present, and reasonably foreseeable future actions, Alternative B would have the potential for slight direct adverse cumulative effects on historic properties.

Conclusions

Buffer zones would ensure the protection of potential historic properties. There would be no effect on known archeological sites under Alternative B. The NPS would continue to identify potential historic properties within areas of the park proposed for ground disturbance and where previous survey has not taken place. There would also be no effect on buildings or structures since all are located within treatment exclusion zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial as the historic landscape would be recreated in literal translation. Cumulative impacts would have both a long-term direct beneficial impact and long-term direct slight adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. Overall, when combined with cumulative impacts, Alternative B would have a long-term direct beneficial impact on cultural resources by recreating the historic landscape of 1862. The slight direct adverse cumulative effects would not be significant because the impacts are only potential impacts and currently are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.

Alternative C –Establish a Visual Agrarian Landscape

Impacts

Under Alternative C, vegetation would be modified and managed to present an agrarian and natural landscape that visually represents what would have existed in 1862. This alternative differs from Alternative B by incorporating vegetation that is a literal translation of what was present in 1862 with native grasses and other species, rather than using the specific species that would have been present in 1862. The fields would be left in fescue grasses (168 acres) or converted to native grasses (284 acres) that visually represent the historical character of 1862, rather than the crops or pasture that are proposed in Alternative B. The remainder of the fields would be used to enhance the interpretive program within the park by planting agricultural crops (11 acres) or by incorporating other interpretive features (0.63 acre). Alternative C would also reestablish the historic and natural woodland and forest by reducing the eastern red cedar population (from 759 acres to 4 to 10 acres). The vegetation visually representing the historical character of the era would enhance the cultural landscape by reducing the natural and man-made changes that have occurred in the park. Ground-disturbing impacts under Alternative C would be similar to Alternative B but would disturb 168 fewer acres.

Cultural resource surveys would be conducted in areas where ground disturbance is to occur if they have not already been surveyed (e.g., mechanical or prescribed fire treatment and plow zones), to identify potential historic properties, including prehistoric archeological sites and historic artifacts associated with the 1862 battle. Surveys would include metal detection or shovel tests and would be monitored by a paraprofessional under the supervision of a professional NPS archeologist. Significant prehistoric and historic archeological sites identified during new surveys would be preserved by establishing a buffer zone prior to treatment. Historic artifacts located within areas of proposed treatment would be mapped and collected to ensure preservation. Tree planting would not take place within archeological sites or near buildings or structures that could be affected by root bioturbation.

Cumulative Impacts

Past and ongoing NPS management of vegetation has maintained the cultural landscape within the park. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing and haying. Ground disturbances under Alternative C may directly affect the integrity of buried archeological sites and known and unknown historic properties, similar to the no action alternative, although Alternative C would result in greater ground disturbances over a shorter period of time. The relocation of Highway 62 would likely indirectly improve the cultural landscape by moving the highway away from the park, thereby decreasing visual disturbances. Present and future residential and commercial development surrounding the park would adversely affect the cultural landscape by diminishing the landscape setting and backdrop of the battle. When combined with past, present, and reasonably foreseeable future actions, Alternative C would have the potential for slight adverse cumulative effects on historic properties.

Conclusions

Buffer zones would ensure the protection of potential historic properties. There would be no effect on known archeological sites under Alternative C. The NPS would continue to identify potential historic properties within areas of the park proposed for ground disturbance and where previous survey has not taken place. There would also be no effect on buildings or structures since all are located within treatment exclusion zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial from the continued enhancement of the historic landscape. Cumulative impacts would have both a long-term direct beneficial impact and long-term slight indirect adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. Overall, when combined with cumulative impacts, Alternative C would have a long-term direct beneficial impact on cultural resources by recreating the historic landscape of 1862. The direct slight adverse cumulative effects would not be significant because the impacts are only potential impacts and currently are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.

Alternative D – Establish a Natural Agrarian Landscape

Impacts

Activities under Alternative D would differ from Alternatives B and C by planting native species that visually represent the openness of the fields and surrounding woodlands that would have been present in 1862. The fields would all be planted with prairie and/or native grass (463 acres) as opposed to crops or fescue. Although the species would not be the same species present in 1862, the reestablishment of the structure and visual aspect historically present would provide a beneficial impact on the cultural landscape because the natural and man-made changes that have occurred in the park would be reduced and the vegetation would visually represent what would have existed in 1862. Ground-disturbing impacts under Alternative D would be similar to Alternative B.

Cumulative Impacts

Past and ongoing NPS management of the vegetation has maintained, but not greatly improved, the cultural landscape within the park. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing and haying. Ground disturbances under Alternative D may directly affect the integrity of buried archeological sites and known and unknown historic properties, similar to the no action alternative, although Alternative D would result in greater ground disturbances over a shorter period of time. The relocation of Highway 62 would likely indirectly improve the cultural landscape by moving the highway away from the park, thereby decreasing visual disturbances. Present and future residential and commercial development surrounding the park would directly adversely affect the cultural landscape by diminishing the landscape setting and backdrop of the battle. When combined with past, present, and reasonably foreseeable future actions, Alternative D would have the potential for slight adverse cumulative effects on historic properties.

Conclusions

Buffer zones would ensure the protection of potential historic properties. Cultural resource surveys would be undertaken in areas of proposed ground disturbance (e.g., mechanical or prescribed fire treatment and plow zones), and where survey has not been conducted previously, to identify potential historic properties, including prehistoric archeological sites and historic artifacts associated with the 1862 battle. Surveys would include metal detection or shovel tests and would be monitored by a paraprofessional under the supervision of a professional NPS archeologist. Significant prehistoric and historic archeological sites identified during new surveys would be preserved by establishing a buffer zone prior to treatment. Historic artifacts located within areas of proposed treatment would be mapped and collected to ensure preservation. Significant prehistoric and historic archeological sites identified during new surveys would be preserved by establishing a buffer zone prior to treatment. Tree planting would not take place within archeological sites or near buildings or structures that could be affected by root bioturbation.

There would be no effect on known archeological sites under Alternative D. The NPS would continue to identify potential historic properties within areas of the park proposed for ground disturbance and where previous survey has not taken place. There would also be no effect on buildings or structures since all are located within treatment exclusion zones. The effects on the cultural landscape would be parkwide, long-term, direct, and beneficial from the continued enhancement of the historic landscape. Cumulative impacts would have both a long-term direct beneficial impact and long-term direct slight adverse cumulative effect on cultural landscapes and historic properties by improving the cultural landscape through management activities, the relocation of Highway 62, and diminishing the landscape from present and future residential and commercial development. Overall, when combined with cumulative impacts, Alternative D would have a long-term direct beneficial impact on cultural resources by recreating the historic landscape of 1862. The direct slight adverse cumulative effects would not be significant because the impacts are only potential impacts and currently are not anticipated to appreciably alter historic structures, landscape elements, or archeological resources associated with the Battle of Pea Ridge.

VISITOR EXPERIENCE

Methodology

Potential impacts on visitor experience are assessed based on the affected environment for visitor experience presented in this document. Enjoyment of park resources and values by visitors is part of the fundamental purpose of all parks. Past interpretive and administrative planning documents provided background on changes to visitor experience over time. For this analysis, visitor experience includes visitor understanding, satisfaction, and safety, as well as availability of visitor options. Short-term impacts on the visitor experience were considered to be those impacts that would last only during project implementation activities, while long-term impacts would be impacts extending beyond project implementation activities. Resource-specific context for assessing impacts of the alternatives on visitor experience includes:

- Expectations of visitors to experience an accurate Civil War battle site.
- Visitor understanding of the Battle of Pea Ridge and how the vegetation may have influenced the battle.

- The contribution of the vegetation to visitor experience of the park.
- The ability of visitors to enjoy a safe experience in the park.
- The effects of treatment activities on visitor experience.

Alternative A – No Action Alternative

Impacts

Under the no action alternative, the park would retain and enhance a large portion of the historic character of the battlefield landscape; however, the natural and man-made changes that have altered the landscapes and resources would not be substantially managed or changed. As described in *Chapter 2: Alternatives*, the park would continue to thin open woodlands, plant trees in areas that were historically forested but are currently open fields, mow existing grassland areas, maintain the WUI interface, continue to develop and implement the EPMP to control invasive and noxious plant species, implement the FMP through prescribed burning to reduce hazardous fuels and trees, and reestablish the orchards at Elkhorn Tavern and Ford Farm. By not substantially managing or changing the altered landscape, the interpretation value and visitor understanding of the battlefield landscape would continue to deteriorate. The natural and man-made modifications and alterations that have occurred within the battlefield landscape over time have altered it from its 1862 appearance. Because of this, the ability of the park to demonstrate how vegetation influenced the Battle of Pea Ridge would be diminished. The existing interpretation, exhibits, special events, and overall visitor experience would continue under the no action alternative. Because the natural and man-made changes in the park would not be substantially managed or changed, the no action alternative would cause a direct decrease in the quality of the visitor experience by not fully implementing and managing vegetation.

Cumulative Impacts

Past and ongoing NPS management of vegetation has maintained, but not greatly improved, the conditions of the vegetation. The current conditions of vegetation affect visitor enjoyment because the conditions do not accurately represent the battlefield landscape and alter and partially obscure views and interpretation in some areas of the battlefield. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. The relocation of Highway 62 would likely indirectly improve visitor experience by moving the highway away from the park, thereby decreasing noise and visual disturbances. The SWEPCO transmission line would have a local parkwide long-term direct adverse impact on visitor experience by detracting from the feeling of the 1862 setting when viewed from the East Overlook and other points in the park. Present and future residential and commercial development surrounding the park would indirectly adversely affect visitor experience by diminishing the landscape setting of the battle and by increasing demand on natural spaces in the park. When combined with past, present, and reasonably foreseeable future actions, the no action alternative would have both beneficial and adverse cumulative impacts on visitor experience.

Conclusions

The no action alternative would result in parkwide long-term slight adverse impacts on visitor experience because the natural and man-made changes that have altered the park from its 1862 appearance would not be substantially managed or changed. These current and continuing changes would lead to a reduced interpretation value and visitor understanding of the Battle of Pea Ridge. The continued vegetation management actions would maintain, but not greatly improve, the overall landscape setting, and visitor understanding of how vegetation influenced the battle would be diminished. The relocation of Highway 62 would have an indirect beneficial impact on visitor experience by moving the highway away from the park. The construction of the SWEPCO transmission line could adversely affect the visitor experience in the long term when viewed from some points in the park. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have both a parkwide long-term beneficial and parkwide long-term slight adverse cumulative impact on visitor experience. The impacts on visitor experience from the no action alternative would not likely be significant because the impacts would not appreciably alter the overall visitor experience at the park. The fundamental characteristics of the visitor experience at the park would stay the same under the no action alternative.

Alternative B – Reestablish the Functional Agrarian Landscape

Impacts

Under Alternative B, vegetation would be modified and managed to reflect a literal translation of the historic landscape of 1862, based on the historic documentation of Bearss (1962) and other documentation described in *Chapter 1: Purpose and Need*. Alternative B would reestablish the historic spaces with the specific crops (179 acres), orchards (6 acres), pastures (284 acres), forests (2,471 acres), and open woodlands (900 acres) that would have existed at the time of the battle. The vegetation obscuring the views of the battlefields would be thinned or removed and the vegetation along the battlefield routes would be thinned. These actions would increase the interpretation value and visitor understanding of the Battle of Pea Ridge and of the era in which it took place because visitors would have a literal view of the 1862 landscape, which would allow for a better understanding of the battle routes and how vegetation influenced the battle. Reestablishing the battlefields with the species present during the battle would enhance visitor immersion in the actual battlefield, resulting in a direct beneficial impact on visitor experience. Forests would be thinned to a greater degree under Alternative B (50 to 99 percent canopy), which would result in a much more open feel. Removal of eastern red cedar (759 acres) within the woodlands and reestablishment of the natural forest diversity and structure from 1862 would reduce the natural and man-made influences on vegetation that have occurred in the park over the years. This would provide visitors with a view and understanding of the historical character of the park because these natural and man-made changes would be reduced.

Under Alternative B, vegetation along the Tour Road and hiking trail routes would be maintained more consistently when compared with the no action alternative. This would increase visitor enjoyment because views would be less obscured and trail conditions would be improved. Short-term direct adverse impacts on visitor experience could occur during implementation activities for removal and replacement of vegetation within the park. Under Alternative B, the proposed vegetation management techniques would enhance interpretive programs at the park because the modern human influences would be reduced and the landscape would better represent the 1862

landscape. The existing interpretation, exhibits, special events, and visitor program along the Tour Road would not be impacted by Alternative B. Overall, the visitor experience would be enhanced under Alternative B because it would recreate the historical landscape that would have existed in 1862.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on visitor experience. Past management activities have maintained, but not greatly improved, the visitor experience. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees, which would improve visitor experience by increasing the visitor's interpretation of the battle. The relocation of Highway 62 would likely indirectly improve the visitor experience by moving the highway away from the park, thereby decreasing noise and visual disturbances. The SWEPCO transmission line would have a local parkwide long-term direct adverse impact on visitor experience by detracting from the feeling of the 1862 setting when viewed from the East Overlook and other points in the park. Present and future residential and commercial development surrounding the park would indirectly adversely affect visitor experience by diminishing the landscape setting of the battle and by increasing demand on natural spaces in the park. When combined with Alternative B, the impacts on visitor experience would result in an overall beneficial cumulative impact.

Conclusions

Alternative B would result in both long-term beneficial and long-term and short-term adverse impacts on visitor experience. The reestablishment of historic spaces and vegetation patterns that would have been present in 1862 would have a direct beneficial impact on visitor experience by increasing the visitor's immersion in the battlefields, removing obscured views, increasing visitor enjoyment, and providing opportunities for interpretive programs. Implementation activities would result in a local short-term direct slight adverse impact on visitor experience by temporarily closing portions of the park. The construction of the SWEPCO transmission line could also adversely affect the visitor experience in the long term when viewed from some points in the park. As discussed under the no action alternative, the surrounding development would have a local indirect slight adverse impact on visitor experience by diminishing the landscape setting of the battle and by increasing demand on natural spaces in the park. Although increases in surrounding development and the temporary implementation activities would have a parkwide short-term slight adverse impact on visitor experience, the impacts would not substantially detract from the visitor experience over the long term. The parkwide short-term slight adverse impacts on visitor experience would not likely be significant because the temporary impacts would occur within small sections of the park and the surrounding development would not directly affect the battlefields in the park or the interpretation of the battle. The proposed modifications to the vegetation under Alternative B would increase interpretation value and visitor understanding of the park and the Battle of Pea Ridge, allowing for an overall beneficial impact on visitor experience.

Alternative C – Establish a Visual Agrarian Landscape

Impacts

Under Alternative C, vegetation would be modified and managed to present an agrarian and natural landscape that visually represents what would have existed in 1862. This alternative differs from Alternative B by incorporating vegetation that is a literal translation of what was present in 1862 with native grasses and other species, rather than using the specific species that would have been present in 1862. The fields would remain in fescue grasses (168 acres) or be converted to native grasses (284 acres) that visually represent the historical character of 1862, rather than the crops or pasture that are proposed in Alternative B. The remainder of the fields would be used to enhance the interpretive program within the park by planting agricultural crops (11 acres) or by incorporating other interpretive features (0.63 acre). The vegetation obscuring the views of the battlefields would be thinned or removed and the vegetation along the battle routes would be thinned. Alternative C would also reestablish the historic and natural woodland and forest by reducing the eastern red cedar population (from 759 acres to 4 to 10 acres), promoting existing desired species, and planting in-kind species (on a limited basis) that depict the form, function, and aesthetics of the historic vegetation, but that are more suited to contemporary conditions. Although the species would not be the same species present in 1862, the reestablishment of the structure and visual aspect historically present would provide a direct beneficial impact on visitor experience because it would still provide visitors with an understanding of the Battle of Pea Ridge and how vegetation may have influenced the battle. The vegetation visually representing the historical character of the era would increase interpretation value by reducing the natural and man-made changes that have occurred in the park. Visitor enjoyment would increase from current conditions through the proposed maintenance of trails and the Tour Road, the additional interpretive program opportunities, and the increased health of the vegetation within the park. The existing interpretation, exhibits, special events, and visitor program along the Tour Road would not be impacted by Alternative C. Local short-term direct adverse impacts on the visitor experience would occur from implementation activities because of area closures and landscape modifications.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on visitor experience. Past management activities have maintained, but not greatly improved, the visitor experience. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. The relocation of Highway 62 would likely indirectly improve the visitor experience by moving the highway away from the park, thereby decreasing noise and visual disturbances. The SWEPCO transmission line would have a local parkwide long-term direct adverse impact on visitor experience by detracting from the feeling of the 1862 setting when viewed from the East Overlook and other points in the park. Present and future residential and commercial development surrounding the park would indirectly adversely affect visitor experience by diminishing the landscape setting of the battle and by increasing demand on natural spaces in the park. When combined with Alternative C, the impacts on visitor experience would result in an overall beneficial cumulative impact.

Conclusions

Alternative C would result in both long-term beneficial and long-term and short-term adverse impacts on visitor experience. The reestablishment of the historic spaces through species structurally and visually similar to what would have existed in 1862 would provide direct beneficial impacts on visitor experience by increasing interpretation value, visitor understanding, and visitor enjoyment and providing additional opportunities for interpretive programs. Local short-term direct adverse impacts from area closures and landscape modifications would occur during implementation activities. When combined with Alternative C, present implementation activities would result in a local short-term direct adverse impact by temporarily closing areas of the park. The construction of the SWEPCO transmission line could also adversely affect the visitor experience in the long term when viewed from some points in the park. Increased development around the park would have a parkwide long-term indirect adverse cumulative impact on visitor experience. The impacts on visitor experience from implementation activities would not likely be significant because the adverse impacts would be local and short-term, affecting only small sections of the park, and would not appreciably alter the visitor experience. The adverse effects from the surrounding development would not directly affect the battlefields in the park or the interpretation of the battle and, therefore, would not be significant. Overall, Alternative C would have a long-term direct beneficial impact on visitor experience by increasing the interpretation value and visitor understanding of the park and the Battle of Pea Ridge.

Alternative D – Establish a Natural Agrarian Landscape

Impacts

Activities under Alternative D would differ from Alternatives B and C by planting native species that visually represent the openness of the fields and surrounding woodlands that would have been present in 1862. The fields would all be planted with prairie and/or native grass (463 acres) as opposed to crops or fescue. Although the species would not be the same species present in 1862, the reestablishment of the structure and visual aspect historically present would provide a beneficial impact on visitor experience because the natural and man-made changes that have occurred in the park would be reduced and the vegetation would visually represent the 1862 Battle of Pea Ridge. Forests and woodlands would be thinned for native species to 100 percent canopy for the health of the forests and woodlands, but not to the same degree as Alternative B (50 to 99 percent canopy). The reestablishment of historic spaces with native vegetation would increase interpretation value and visitor understanding of the Battle of Pea Ridge and the era in which it took place and how vegetation may have influenced the battle. Visitor enjoyment would increase from the more consistent treatment of trails and the Tour Road (when compared with the no action alternative), the additional interpretive program opportunities, and the increased health of the vegetation within the park. The existing interpretation, exhibits, special events, and visitor program along the Tour Road would not be impacted by Alternative D. Local short-term direct adverse impacts would occur from implementation activities because of local area closures and landscape modifications.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have both a beneficial and adverse impact on visitor experience. Past management

activities have maintained, but not greatly improved, the visitor experience. Reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. The relocation of Highway 62 would likely indirectly improve the visitor experience by moving the highway away from the park, thereby decreasing noise and visual disturbances. The SWEPCO transmission line would have a local parkwide long-term direct adverse impact on visitor experience by detracting from the feeling of the 1862 setting when viewed from the East Overlook and other points in the park. Present and future residential and commercial development surrounding the park would indirectly adversely affect visitor experience by diminishing the landscape setting of the battle and by increasing demand on natural spaces in the park. When combined with Alternative D, the impacts on visitor experience would result in an overall beneficial cumulative impact.

Conclusions

Alternative D would result in both long-term beneficial and long-term and short-term adverse impacts on visitor experience. The construction of the SWEPCO transmission line could adversely affect the visitor experience in the long term when viewed from some points in the park. The reestablishment of the historic spaces through native species would provide beneficial impacts on visitor experience by increasing interpretation value, visitor understanding, and visitor enjoyment and providing additional opportunities for interpretive programs; although the benefits would not be as great as those under Alternatives B and C. Local short-term direct adverse impacts would also occur during implementation activities from area closures and landscape modifications. When combined with Alternative D, present implementation activities would result in a local short-term direct adverse cumulative impact by temporarily closing areas of the park, and increased development around the park would have a parkwide long-term indirect adverse cumulative impact on visitor experience. The impacts on visitor experience from implementation activities would not likely be significant because the adverse impacts would be local and short-term, affecting only small sections of the park. The adverse effects from the surrounding development would not directly affect the battlefields in the park or the interpretation of the battle and, therefore, would not be significant. Overall, Alternative D would have a long-term beneficial impact on visitor experience by increasing the interpretation value and visitor understanding of the park and the Battle of Pea Ridge.

PARK OPERATIONS

Methodology

Impact analyses are based on the current description of park operations presented in *Chapter 3: Affected Environment*. Park operations include the infrastructure, staff, and maintenance activities used in the operation of the park to adequately protect and preserve vital resources and provide for an effective and safe employee and visitor experience. This includes interpretation and education, protection, planning and resource management, business services, and facility management. Short-term impacts on park operations were considered to be those impacts that would last only during implementation activities, while long-term impacts would extend beyond implementation activities. Resource-specific context for assessing impacts of the alternatives on park operations includes:

- Parks must operate within the constraints of the unit-specific budget and number of staff positions that have been allocated by Congress and the NPS Director's Office.
- Park staff is not only responsible for activities within the park, but must also provide for an effective and safe experience and protect resources within the entire park.
- Vegetation management requirements must not affect the ability of park staff to complete maintenance activities and ensure a safe environment.

Alternative A – No Action Alternative

Impacts

Under the no action alternative, there would be no change in current site operations or infrastructure. The park would continue the present level of operations and maintenance of the vegetation in the park, as funding allows. As described in *Chapter 2: Alternatives*, the park would continue to thin open woodlands, plant trees in areas that were historically forested but are currently open fields, mow existing grassland areas, maintain the WUI interface, continue to develop and implement the EPMP, and reestablish the orchards at Elkhorn Tavern and Ford Farm. The estimated number of labor hours required for continuing current management activities would remain the same under the no action alternative; therefore, the no action alternative would not impact the park budget. The removal of the eastern red cedars and thinning of the woodlands and forests would occur over an extended period, likely allowing for continued regrowth of the eastern red cedars and other trees. This continuous regrowth would cause continuous maintenance of the vegetation within the park; however, this is not anticipated to impact the park budget, number of staff required, or ability to provide a safe experience and protect natural resources.

Under the no action alternative, the natural and man-made changes that have altered the landscape from its 1862 appearance would not be reduced and the health of the vegetation would continue to deteriorate. This would affect the interpretive staff's ability to effectively demonstrate how vegetation influenced the Battle of Pea Ridge. The no action alternative would have a parkwide long-term indirect slight adverse impact on park operations because the ability of the interpretive staff to demonstrate how vegetation influenced the Battle of Pea Ridge would be diminished. The long-term approach to removal of trees would also cause continuous maintenance of the vegetation.

Cumulative Impacts

Past actions and reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. These actions would have no new impacts on park operations. The relocation of Highway 62 would impact park operations by closing sections of the park during construction and increasing costs for maintenance. When combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a long-term slight adverse cumulative impact on park operations.

Conclusions

Current maintenance and operation activities would continue under the no action alternative. The continued vegetation management actions would result in the continued deterioration in vegetation, interpretation, and education value of the park, which would result in an indirect adverse impact on park operations by preventing park staff from being able to adequately convey the Battle of Pea Ridge. The relocation of Highway 62 would have a direct adverse impact on park operations by the increased costs incurred by the park to maintain this section of road. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide long-term slight adverse impact on park operations because of the deterioration of the vegetation, ability of the interpretive staff to effectively convey the Battle of Pea Ridge, and the long-term continuous maintenance that would be required of park staff. The impacts on park operations from the no action alternative would not likely be significant because the effects would not inhibit the park from providing an effective and safe experience. In addition, the impacts would not significantly affect the park's ability to protect natural resources nor would they affect the park's budget.

Alternative B – Reestablish the Functional Agrarian Landscape

Impacts

Alternative B would reestablish the historic spaces with the specific crops, orchards, pastures, and open woods that would have existed at the time of the battle, with approximately 463 acres of croplands/pasturelands to be reestablished in the fields and 6 acres of orchards to be established. The proposed conditions under Alternative B would provide increased interpretation and education value, increasing the park staff's ability to relay the information to visitors. Planting of agricultural crops (463 acres) and orchards (6 acres, including the planting of 1,500 peach trees) would require additional hours for implementation and maintenance activities because maintaining the crops, orchards, and pastures that would have existed in 1862 would be more labor intensive than what current management actions require, potentially impacting the park budget. Leasing croplands and pasturelands to independent farmers or businesses would reduce some of the labor required for implementation and management under Alternative B. Reducing the eastern red cedar populations (from 759 acres to 4 to 10 acres) and thinning the surrounding woodlands (900 acres) and forests (2,471) in a short amount of time would require more hours for implementation, but in the long term would require less maintenance activities because regrowth would not occur as quickly as it would under the no action alternative. Implementation of Alternative B would require more labor hours in the short term, which may be supplemented by outside contractors, if necessary. In the long term, Alternative B would provide additional direction and guidance to park staff on vegetation management actions.

Cumulative Impacts

As described under the no action alternative, past and continuing vegetation management techniques such as mowing, haying, and planting seedlings would have no new impacts on park operations. The relocation of Highway 62 would have a direct impact on park operations by closing sections of the park during construction and increasing costs for maintenance. When combined with Alternative B, the impacts on park operations would result in both a beneficial and adverse cumulative impact as implementation of the plan/EA would provide more direction and

guidance to park staff while requiring additional hours for implementation and maintenance activities for the proposed crops and orchards.

Conclusions

Under Alternative B, both long-term beneficial and long-term and short-term adverse impacts on park operations would occur. The implementation of the plan/EA would provide park staff with more guidance on vegetation management activities and increased interpretation and education value, while also requiring additional hours for both the implementation and maintenance of the proposed historic crops, orchards, and pastures, potentially impacting the park budget. However, leasing croplands and pasturelands to independent farmers, businesses, or partnerships would reduce some of the labor required under Alternative B. As discussed under the no action alternative, the relocation of Highway 62 would result in a direct adverse impact on park operations by closing sections of the park during construction and increasing costs incurred by the park to maintain this section of road. The parkwide long-term slight adverse impact would not be significant because the impacts would not require hiring additional staff and would not affect the park's ability to provide an effective and safe experience or to protect natural resources.

Alternative C – Establish a Visual Agrarian Landscape

Impacts

Under Alternative C, vegetation would be modified and managed to present an agrarian and natural landscape that visually represents what would have existed in 1862. This alternative differs from Alternative B by incorporating vegetation that is a literal translation of what was present in 1862 with native grasses and other species, rather than using the specific species that would have been present in 1862. The majority of the fields would remain in fescue grasses (168 acres) or be converted to native grasses (284 acres) that visually represent the historical character of 1862 rather than crops or pasture that are proposed in Alternative B. The remainder of the fields would be used to enhance the interpretive program within the park by planting agricultural crops (11 acres) or by incorporating other interpretive features (0.63 acre). Alternative C would be similar to Alternative B by providing direction and guidance to park staff on vegetation management and potentially resulting in additional hours required by park staff for implementation and maintenance activities; however, long-term maintenance activities would be less than Alternative B because more acres of fescue and native grasses would be established than crops and orchards. The reestablishment of the structure and visual aspect historically present would provide increased interpretation and education value, while reducing the continual maintenance that could be required in Alternative B by allowing for variation in the species planted. As stated under Alternative B, leasing haying and/or crops to independent farmers or businesses would reduce the operation needs of park staff. Reducing the eastern red cedar populations and thinning the surrounding woodlands and forests in a short amount of time would require more labor hours for implementation in the short term, which may be supplemented by outside contractors, if necessary. Over the long term, maintenance activities would be lessened because regrowth would not occur as quickly as it would under the no action alternative.

Cumulative Impacts

As described under the no action alternative, a majority of past, present, and reasonably foreseeable future actions such as haying, mowing, and planting seedlings would have no new impact on park operations. The relocation of Highway 62 would have a direct adverse impact on park operations. When combined with Alternative C, the impacts on park operations would result in both a beneficial and adverse cumulative impact as implementation of the plan/EA would provide more direction and guidance to park staff and increase interpretation and education value, while requiring additional maintenance activities to maintain the planted crops and orchards.

Conclusions

Alternative C would result in both parkwide long-term beneficial and long-term slight adverse impacts on park operations. Implementation of the plan/EA would provide park staff with more guidance on vegetation management activities and increase interpretation and education value, while also requiring additional labor hours for both the implementation and maintenance of the proposed historic crops, orchards, pastures, and open woods, potentially impacting the park budget. Maintenance activities would not be as intense as Alternative B because only 11 acres of crops and orchards would be planted, compared with 463 acres proposed in Alternative B. As discussed under the no action alternative, the relocation of Highway 62 would result in a direct adverse impact on park operations by closing sections of the park during construction and increasing costs incurred by the park to maintain this section of road. The parkwide long-term slight adverse impacts from Alternative C would not be significant because the impacts would not require hiring additional staff and would not otherwise appreciably affect park operations.

Alternative D – Establish a Natural Agrarian Landscape

Impacts

Alternative D differs from Alternatives B and C by planting native species that visually represent the openness of the fields and surrounding woodlands that would have been present in 1862. The fields would all be planted with prairie and/or native grass (463 acres) as opposed to crops or fescue. This would have the same beneficial impact as Alternatives B and C by providing park staff with direction and guidance on vegetation management actions and increasing interpretation and education. Alternative D would also require some additional hours from park staff for implementation of the plan/EA; however, there would be lower maintenance requirements over the long term under Alternative D when compared with Alternatives B and C because the species planted would be more adaptable to conditions within the park. Reducing the eastern red cedar populations and thinning the surrounding woodlands and forests in a short amount of time would require more hours for implementation, but in the long term would require less maintenance activities because regrowth would not occur as quickly as it would under the no action alternative.

Cumulative Impacts

As described under the no action alternative, past, present, and reasonably foreseeable future actions would have no new impacts on park operations. The relocation of Highway 62 would

have a direct adverse impact on park operations. When combined with Alternative D, the impacts on park operations would result in both beneficial and adverse impacts. Implementation of the plan/EA would provide more direction and guidance to park staff and increase interpretation and education value, while requiring additional hours from park staff and/or outside contractors to implement the plan/EA.

Conclusions

Alternative D would result in both long-term beneficial and long-term adverse impacts on park operations. Implementation of the plan/EA would have a beneficial impact on park operations because it would provide park staff with more guidance on vegetation management activities and increase interpretation and education value. Alternative D would have a parkwide short-term direct slight adverse impact on park operations because it would require additional labor hours to convert the fields from their current state to prairie and/or native grasses, potentially impacting the park budget. Future maintenance activities would not be as intense as Alternative B or C because native species would be used under Alternative D. As discussed under the no action alternative, the relocation of Highway 62 would result a direct adverse impact on park operations by closing sections of the park during construction and increasing costs incurred by the park to maintain this section of road. The parkwide short-term slight adverse impacts from Alternative D would not be significant because the impacts would not require hiring additional staff or otherwise appreciably affect park operations.

SOCIOECONOMICS

Methodology

Impact analyses are based on the current description of socioeconomics presented in *Chapter 3: Affected Environment*. Socioeconomics includes how economic processes affect the local or regional economy. The economy is made up of local and regional businesses and industries, mean and median income and employment rates of the local and regional population, and other social factors such as population numbers and racial makeup. Short-term impacts on socioeconomics were considered to be those impacts that would last less than three years, while long-term impacts would last longer than three years. The resource-specific context for assessing impacts of the alternatives on socioeconomics includes the economic contribution of the park to the local economies in the gateway communities and the potential effects associated with vegetation management.

Alternative A – No Action Alternative

Impacts

Under the no action alternative, there would be no change in the socioeconomic condition of the park or local/regional economy. The park would continue the present level of operations and maintenance of the vegetation in the park, as funding allows. As described in *Chapter 2: Alternatives*, the park would continue to thin open woodlands, plant trees in areas that were historically forested but are currently open fields, mow existing grassland areas, maintain the WUI interface, continue to develop and implement the EPMP, and reestablish the orchards at Elkhorn Tavern and Ford Farm. The estimated number of labor hours required for continuing

current management activities would remain the same under the no action alternative; thus, no hiring of additional park staff or outside contractors would be necessary. No change in visitation, and therefore potential spending in gateway communities, is anticipated under the no action alternative, although it is possible there would be a negligible decrease in visitation in the long term as vegetation conditions continue to deteriorate.

Cumulative Impacts

Past actions and reasonably foreseeable future actions include continuing vegetation management techniques such as mowing, haying, planting seedlings, implementing the EPMP to control invasive and noxious plant species, and implementing the FMP through prescribed burning to reduce hazardous fuels and trees. These actions would have no new impacts on socioeconomic conditions. The relocation of Highway 62 is not anticipated to impact socioeconomics because the park would be responsible for maintaining the road within the park. When impacts from the no action alternative are combined with other past, present, and reasonably foreseeable future actions, an adverse cumulative impact would occur to socioeconomics.

Conclusions

Current maintenance and operation activities would continue under the no action alternative. This could lead to a long-term indirect slight adverse impact on socioeconomics if the deterioration of the vegetation causes a decrease in visitation. Overall, when combined with past, present, and reasonably foreseeable future actions, the no action alternative would have a parkwide long-term indirect slight adverse impact on socioeconomic conditions because of the deterioration of the vegetation. The impacts on socioeconomics from the no action alternative would not likely be significant because impacts on the local and regional economies would not be appreciable.

Alternative B – Reestablish the Functional Agrarian Landscape

Impacts

Alternative B would reestablish the historic spaces with the specific crops, orchards, pastures, and open woods that would have existed at the time of the battle, with approximately 463 acres of croplands/pasturelands to be reestablished in the fields and 6 acres of orchards to be reestablished. Planting agricultural crops (463 acres) and orchards (6 acres, including the planting of 1,500 peach trees) may require leasing to local or regional farming operations to maintain the crops and pastures. This would result in a slight benefit to the local and/or regional economy based on the types of crops farmed. Leasing croplands and pasturelands to independent farmers or businesses may reduce some of the labor required for implementation and management under Alternative B. Reducing the eastern red cedar populations (from 759 acres to 4 to 10 acres) and thinning the surrounding woodlands (900 acres) and forests (2,471) in a short period of time may require the use of outside contractors, which would result in a beneficial impact on the local economy.

Visitation is not anticipated to decrease during implementation of vegetation management activities; however, a slight increase in visitation may occur over the long term upon completion

because of the enhanced vegetation conditions within the park that better portray the historic conditions, resulting in increased spending in gateway communities.

Cumulative Impacts

As described under the no action alternative, past and continuing vegetation management techniques such as mowing, haying, and planting seedlings would have no new impacts on socioeconomic conditions. When combined with Alternative B, the impacts on socioeconomics would result in a beneficial cumulative impact, as implementation of the vegetation management plan may provide crop revenue for local/regional farming operations and contract work for local/regional businesses for the implementation activities.

Conclusions

Under Alternative B, a beneficial impact on socioeconomics would occur. Vegetation management may require outside leasing agreements for both the implementation and maintenance of the proposed historic crops, orchards, and pastures, providing a direct benefit to the park and local/regional farming operations. Forest and woodlands thinning may require outside contractors to complete the activities, providing a direct slight benefit to the local/regional economy. As discussed under the no action alternative, the relocation of Highway 62 is not anticipated to impact socioeconomics because the park would be responsible for maintaining the road within the park.

Alternative C – Establish a Visual Agrarian Landscape

Impacts

Under Alternative C, vegetation would be modified and managed to present an agrarian and natural landscape that visually represents what would have existed in 1862. This alternative differs from Alternative B by incorporating vegetation that is a literal translation of what was present in 1862 with native grasses and other species, rather than using the specific species that would have been present in 1862. The fields would remain in fescue grasses (168 acres) or be converted to native grasses (284 acres) that visually represent the historical character of 1862, rather than crops or pasture that are proposed in Alternative B. The remainder of the fields would be used to enhance the interpretive program within the park by planting agricultural crops (11 acres) or for other interpretive purposes (less than 1 acre). Although all of the agricultural crops would not be reestablished under Alternative C, haying of the grasslands would be necessary, which may require leasing to local or regional farming operations. Based on 2013 local land values, at an average yield of 8 bales per acre, this is anticipated to bring (on average) \$6.00 to \$10.00 per bale, or \$22,224 to \$37,040 over 463 acres, to the park on an annual basis. This would result in a direct slight benefit to the park and the local and/or regional economy. Contracting the haying operations to independent farmers or businesses would reduce some of the labor required for maintenance under Alternative C and provide income for the park and local/regional economy. Reducing the eastern red cedar populations (from 759 acres to 4 to 10 acres) and thinning the surrounding woodlands (900 acres) and forests (2,471) in a short amount of time may require the use of outside contractors, which would also provide a direct benefit to the local economy.

Visitation is not anticipated to decrease during implementation of vegetation management activities; however, a slight increase in visitation may occur over the long term upon completion because of the enhanced conditions within the park that better portray the historic conditions and provide better interpretive values for visitors, indirectly resulting in increased spending in gateway communities.

Cumulative Impacts

As described under the no action alternative, a majority of past, present, and reasonably foreseeable future actions such as haying (by park staff) and mowing would have no new impacts on socioeconomics. When combined with Alternative C, the impacts on socioeconomics would result in a long-term beneficial impact on the park and local economy.

Conclusions

Alternative C would result in a beneficial impact on socioeconomics. Outside leasing agreements may be required for haying grasslands, benefitting the park and local/regional farming operations. Forest and woodlands thinning may require outside contractors to complete the activities, providing a slight benefit to the local/regional economy. The enhancement of the vegetation may increase visitation by providing better interpretive values for visitors, indirectly resulting in increased spending in gateway communities. Overall, when combined with cumulative impacts, Alternative C would have a long-term beneficial impact on socioeconomics.

Alternative D – Establish a Natural Agrarian Landscape

Impacts

Alternative D differs from Alternatives B and C by planting only native species that visually represent the openness of the fields and surrounding woodlands that would have been present in 1862. The fields would all be converted to prairie and/or native grass (463 acres), as opposed to crops or fescue. In addition to the field conversions, reducing the eastern red cedar populations (from 759 acres to 4 to 10 acres) and thinning the surrounding woodlands (900 acres) and forests (2,471 acres) in a short amount of time may require the use of outside contractors, which would result in a benefit to the local economy. Maintenance activities such as haying may also require the use of outside farming operations, also benefitting the local economy.

Visitation is not anticipated to decrease during implementation of vegetation management activities, resulting in less spending in gateway communities; however, a slight increase in visitation may occur over the long term upon completion because of the enhanced conditions within the park that better portray the historic conditions for visitors, resulting in increased spending in gateway communities (although not to the same extent as Alternatives B and C).

Cumulative Impacts

As described under the no action alternative, a majority of past, present, and reasonably foreseeable future actions such as haying (by park staff) and mowing would have no new impact

on socioeconomics. When combined with Alternative D, the impacts on socioeconomics would result in a long-term beneficial impact on the park and local economy.

Conclusions

Alternative D would result in a beneficial impact on socioeconomics. Outside leasing agreements may be required for haying of grasslands, providing a benefit to the park and local/regional farming operations. Forest and woodlands thinning may require outside contractors to complete the activities, providing a slight benefit to the local/regional economy. The enhancement of the vegetation may increase visitation by providing better interpretive values for visitors, indirectly resulting in increased spending in gateway communities. Overall, when combined with cumulative impacts, Alternative D would have a long-term beneficial impact on socioeconomics.

CONSULTATION AND COORDINATION

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 CONSULTATION

Agencies that have direct or indirect jurisdiction over historic properties are required by section 106 of the NHPA, to take into account the effect of any undertaking on properties listed in, or eligible for listing in, the National Register. The NPS has documented compliance with the requirements of both NEPA and Section 106 of the NHPA pursuant to 36 CFR Part 800.8(c) within this plan/EA.

Agency scoping for the plan/EA began with a scoping letter sent on August 13, 2012 to the Arkansas SHPO to solicit input on issues of concern (see Appendix C). The SHPO also received a copy of the draft plan/EA for review and comment, and the park will coordinate with the SHPO in the development of mitigation measures for historic and archeological resources, if necessary. No response was received from the SHPO by the end of the January 14, 2013 scoping period. A similar letter was sent to the ACHP on October 22, 2013.

Consultation with American Indian Tribes

The park initiated consultation with American Indian tribes and organizations on September 18, 2012, informing them of the proposed project and soliciting comments (see Appendix C). Information from the tribes also was requested to determine if any ethnographic resources are in the project area and if the tribes wanted to be involved in the environmental compliance process. American Indian tribes traditionally associated with the lands of the park were also given an opportunity to review and comment on this plan/EA. The NPS will continue to consult with the tribes throughout implementation of this project.

The following federally recognized American Indian tribes and tribal governments that are traditionally associated with the area now containing the park received a copy of the scoping notice and received a copy of the draft plan/EA:

- Absentee Shawnee Tribe
- Cherokee Nation of Oklahoma
- Choctaw Nation of Oklahoma
- The Osage Nation
- Shawnee Tribe of Oklahoma
- Quapaw Tribe of Oklahoma
- United Keetoowah Band of Cherokee Indians
- The Chickasaw Nation
- Muscogee (Creek) Nation of Oklahoma

The park received three responses from area tribes following the scoping notice. The United Keetoowah Band of Cherokee Indians in Oklahoma responded to the scoping letter in an email dated October 17, 2012, indicating they have no objection or comments on the project; however, they would need to be contacted if any human remains or funerary items are inadvertently discovered during the project.

CONSULTATION AND COORDINATION

The Choctaw Nation of Oklahoma responded to the scoping letter in a letter dated December 3, 2012, indicating the project is outside of the Choctaw Nation of Oklahoma historic area of interest and deferred to the other tribes that were contacted.

The Tribal Historic Preservation Officer (THPO) of The Osage Nation responded to the scoping letter in a letter dated December 14, 2012, requesting a copy of the Environmental Impact Statement [sic] to review and provide comments.

Responses from the tribes are in Appendix C. No response was received from other tribes by the end of the January 14, 2013 scoping period.

Further consultation with the THPO of the United Keetoowah Band of Cherokee Indians under NEPA and NHPA occurred on May 6, 2013. No ethnographic resources or traditional cultural properties within the park were identified at that meeting. Although not specifically in response to this project, the THPO requested that the park prepare a Native American Graves Protection and Repatriation Act plan of action to address the possible discovery of human remains or funerary or ceremonial objects during all park planning activities.

U.S. FISH AND WILDLIFE SERVICE, SECTION 7 CONSULTATION

In accordance with Section 7 of the Endangered Species Act, the park initiated consultation with the USFWS on August 15, 2012. A response dated September 5, 2012 was received from the USFWS that included a list of threatened and endangered species in Benton County and concurred with the park's determination that the proposed plan/EA would have no effect on listed species. The USFWS response is in Appendix C.

The park also forwarded this plan/EA to the USFWS for review and comment. The USFWS, in coordination with the NPS, will determine the level of consultation needed for potential effects on threatened and endangered species for the proposed project. The USFWS will review this plan/EA to determine if they concur with the park's findings of effect, and whether additional conservation measures are needed to protect listed species.

ENVIRONMENTAL ASSESSMENT REVIEW AND LIST OF RECIPIENTS

The plan/EA will be released for a 30-day public comment period. To inform the public of the availability of the plan/EA, the NPS will publish and distribute a letter to the park's general mailing list; area tribes; and federal, state, and local agencies. The park will provide a press release to the area media. In addition, the park will provide hard copies of the plan/EA to area libraries. Interested individuals may obtain a copy of the plan/EA upon request. The plan/EA will also be available for review at the park's visitor center and on the Internet at <http://parkplanning.nps.gov/peri>. Comments can be submitted through this website or provided in writing to: Superintendent, Attn: Pea Ridge National Military Park, Vegetation Management Plan and EA, 15930 Hwy 62, Garfield, AR 72732.

COMPLIANCE WITH FEDERAL AND STATE REGULATIONS

The NPS would comply with all applicable federal and state regulations when implementing the preferred alternative. Permitting and regulatory requirements for the preferred alternative are listed in Table 9.

TABLE 9. ENVIRONMENTAL COMPLIANCE REQUIREMENTS

Agency	Statute, Regulation, or Order	Purpose	Project Application
Federal			
National Park Service	National Environmental Policy Act	Applies to federal actions that may significantly affect the quality of the environment.	Environmental review of proposed action and decision to prepare a FONSI or EIS.
	National Historic Preservation Act, Section 106	Protection of historic and cultural resources.	The park is consulting with the SHPO to address anticipated effects and mitigation for cultural resources.
	EO 11990, "Protection of Wetlands" and NPS 77-1: <i>Wetland Protection</i>	Requires avoidance of adverse wetland impacts where practicable and mitigation, if necessary.	The preferred alternative would have no effects on wetlands as these areas would be avoided and would not include the discharge of fill material into wetlands.
	EO 11988, "Floodplain Management"	Requires avoidance of adverse floodplain impacts, where practicable, and mitigation, if necessary.	The preferred alternative would have no effect on floodplains.
	NPS 77-2: <i>Floodplain Management</i>	Protection of natural resources and floodplains.	The preferred alternative would have no effect on floodplains.
U.S. Army Corps of Engineers	Clean Water Act – Section 404 Permit to discharge dredge and fill material	Authorizes placement of fill or dredge material in waters of the U.S. including wetlands.	The preferred alternative would not discharge fill material into wetlands.
U.S. Fish and Wildlife Service	Endangered Species Act	Protection of federally listed threatened or endangered species.	The park is consulting with the USFWS as part of the NEPA process.

LIST OF PREPARERS AND CONTRIBUTORS

NATIONAL PARK SERVICE, PEA RIDGE NATIONAL MILITARY PARK

John Scott, Park Superintendent
Kevin Eads, Chief of Resources Management
R. Sheri Nodine, Facilities Manager
Nolan Moore, Biological Science Technician
Curtis Tilghman, Maintenance Worker
Troy Banzhaf, Chief of Interpretation
Matt Fry, U.S. Park Ranger – 2E
Judy Bachler, Administrative Officer
Aaron Artripe, Laborer
Fenn Wimberly, Fire Management Officer, Arkansas Parks Fire Management Group
Dean Pippin, Maintenance Worker
Kris Bolin, Biological Science Technician

NATIONAL PARK SERVICE, MIDWEST REGIONAL OFFICE

Nicholas Chevance, Regional Environmental Coordinator
Bill Harlow, Chief of Historic Architecture and Landscapes

NATIONAL PARK SERVICE, ENVIRONMENTAL QUALITY DIVISION

Lucy Bambrey, Project Manager

NATIONAL PARK SERVICE, HEARTLAND INVENTORY AND MONITORING NETWORK

David Peitz, Wildlife Ecologist
Kevin James, Plant Ecologist

ERO RESOURCES CORPORATION

Nicole Bauman, Project Manager
Moneka Worah, Natural Resources Specialist
Denise Larson, Botanist
Sean Larmore, Principal, Archeologist
David Hesker, GIS/Graphics Specialist
Kay Wall, Technical Editor

MUNDUS BISHOP LANDSCAPE ARCHITECTS

Tina Bishop, Principal
Shelby Scharen, Landscape Designer

REFERENCES

- Anderson, M. D. 2013. *Juniperus virginiana*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <http://www.fs.fed.us/database/feis/>. Last updated: May 31, 2013.
- Bearss, E.C. 1962. Documented Narrative to Support Historical Features and Vegetative Cover Shown on the Pea Ridge Historical Base Map. Part of the Master Plan, Pea Ridge National Military Park. Rogers, Arkansas. February 1957 Edition. First Revision, March 1962.
- Bearss, E.C. 1965. Leetown, Elkhorn Tavern Grounds, Federal Earthworks, and Tanyard as of March, 1862. Prepared for Pea Ridge NMP.
- Benton County. n.d. Benton County Fun Facts. Available at: <http://www.co.benton.ar.us/FunFacts.aspx>. Last accessed: March 19, 2013.
- Bowles, D. 2013. Aquatic Program Leader, National Park Service through Missouri State University, Department of Biology, email communication to Gregory Eads, National Park Service regarding salamanders that occur in Winton, Pratt, and Lee Creeks. March 29.
- Branan, C. 2011. A Cultural Resources Survey of Proposed Arkansas Highway and Transportation Department Jobs 090065 – Avoca to North Garfield (Highway 62) and 090096 – North Garfield to Gateway (Highway 62), Benton County. May 2011
- Briggler, J. and M. Pilgrim. 2001. Final Report: Amphibian and Reptile Survey for Pea Ridge National Military Park. March 9.
- Bureau of Labor Statistics. 2013. Current Unemployment Rates for States and Historical Highs/Lows. Available at: <http://www.bls.gov/web/laus/lausthl.htm>. Last updated: March 18, 2013.
- Carey, J.H. 1992. *Quercus marilandica*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <http://www.fs.fed.us/database/feis/>.
- Carlson-Drexler, C.G., D.D. Scott, and H. Rocker. 2008. "The Battle Raged...with Terrible Fury:" Battlefield Archeology of Pea Ridge Military Park. Technical Report No. 112. Midwest Archeological Center, Lincoln, NE.
- Center for Plant Conservation (CPC). 2010a. *Aster furcatus* plant profile. Available at: http://www.centerforplantconservation.org/Collection/CPC_ViewProfile.asp?CPCNum=338. Last updated: September 28, 2010.
- Center for Plant Conservation (CPC). 2010b. *Silene regia* plant profile. Available at: http://www.centerforplantconservation.org/Collection/CPC_ViewProfile.asp?CPCNum=4005. Last updated: March 4, 2010.
- Christopherson, J. n.d. Natural Resource Management Specialist. Forest Thinning and Defensible Space – An Incline Village/Crystal Bay Defensible Space Program Fact Sheet 92-55. University of Nevada Cooperative Extension. Coleman, R. E. 1988. Archeological Investigations of a Proposed Trail Corridor from the Tour Road to Two Stone Monuments, Pea Ridge National Military Park, Benton County, Arkansas. Ms. on file Southwest Regional Office, Santa Fe, NM.

REFERENCES

- Cribbs, J.T. and D.G. Peitz. 2008. White-tailed Deer Monitoring at Pea Ridge National Military Park, Arkansas: 2008 Status Report. Natural Resource Technical Report NPS/HTLN/NRTR—2008/104. National Park Service, Fort Collins, CO.
- Cutter, B. E. and R.P. Guyette. 1994. Fire Frequency on an Oak-Hickory Ridgetop in the Missouri Ozarks. University of Notre Dame, American Midland Naturalist, Vol. 132, No. 2. October.
- Dale, E., Jr. 1983. Plant Communities and Rare or Endangered Plant Species of Pea Ridge National Military Park, Benton County, Arkansas. Department of Botany & Microbiology, University of Arkansas. March 30.
- Diamond, D., L. Elliott. M. DeBacker, K. James, and D. Pursell. 2013. Vegetation Classification and Mapping of Pea Ridge National Military Park – Project Report. NPS/PERI/NRR-2013/649. National Park Service, Fort Collins, CO. April.
- Dodd, H.R., J.A. Hinsey, and S.K. Mueller. 2011. Fish community monitoring at Pea Ridge National Military Park: 2009 report. Natural Resource Data Series NPS/HTLN/NRDS—2011/217. National Park Service, Fort Collins, CO.
- Eads, K. 2013. Consultation Meeting, On-going Environmental Assessments. Notes from consultation meeting between K. Eads, N. Moore (Pea Ridge NMP) and L. LaRue-Baker (United Keetoowah Band of Cherokee Indians, Historic Preservation Officer). May 6.
- U.S. Department of Agriculture (USDA) and U.S. Department of the Interior (USDOI). 2000. Managing the Impacts of Wildfire on Communities and the Environment: A Report to the President In Response to the Wildfires of 2000, (“National Fire Plan”). August.
- Foti, T.L. 2004. Upland Hardwood Forests and Related Communities of the Arkansas Ozarks in the Early 19th Century. Arkansas Natural Heritage Commission.
- Foti, T.L. and G.A. Bukenhofer. 1998. A Description of the Sections and Subsections of the Interior Highlands of Arkansas and Oklahoma. Journal of the Arkansas Academy of Science, Vol. 52.
- Foti, T.L. and S.M. Glenn. 1991. The Ouachita Mountain landscape at the time of settlement. Pages 49-66 in D. Henderson and L.D. Hedrick, eds. Restoration of old growth forests in the Interior Highlands of Arkansas and Oklahoma. Morrilton, AR: Winrock International Institute for Agricultural Development. 190 pp.
- Grabner, K., M. Struckhoff, and D. Buhl. 2005. Evaluating the Impacts of White-Tailed Deer (*Odocoileus virginianus*) on Vegetation within Pea Ridge National Military Park. U.S. Geological Survey, Northern Prairie Wildlife Research Center. April.
- Harcourt, J.P. 1993. A Cultural Resources Inventory of the Proposed Location of an Equipment Storage Facility, Pea Ridge National Park, Benton County, Arkansas. Project #878. Arkansas Archeological Survey, Fayetteville.
- Hinterthuer, W. 2003. Inventory of Vascular Plants of Pea Ridge National Military Park. Prepared for Heartland Network.
- Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007, Fourth Assessment Report (AR4). Working Group I: The Physical Science Basis.
- James, K. 2008. Forest Community Monitoring Baseline Report, Pea Ridge National Military Park. Natural Resource Technical Report NPS/HTLN/NRTR-2008/082. National Park Service. Fort Collins, CO.

- Johnsey, P. and M. Malinen. 1970. Final Report on Population Densities of Small Mammals in Relation to the Specific Habitat in Pea Ridge National Military Park, Benton County, AR.
- Jurney, D.H. and D.W. Stahle. 2004. Old-Growth Wooded Pasture in the Ozarks.
- Kay, M. and J. Herrmann. 2005. Archaeological Predictive Modeling of Land Use at Pea Ridge National Military Park, Arkansas and Wilson's Creek Historic Battlefield, Missouri. Department of Anthropology, University of Arkansas, Fayetteville, Arkansas. Submitted to the Midwest Archeological Center, Lincoln, NE under Cooperative Agreement CA No. H6115040033.
- Kvamme, K. L. 2002. Geomagnetic Investigations at the Leetown Battlefield in Pea Ridge National Military Park, Arkansas. Ms. on file, Midwest Archeological Center, Lincoln, NE.
- Lawson, E. 2013. *Juniperus virginiana* L. Eastern Redcedar. Available at: http://www.na.fs.fed.us/pubs/silvics_manual/Volume_1/juniperus/virginiana.htm.
- Michigan Department of Natural Resources. 2013. Epizootic Hemorrhagic Disease (EHD) in White-Tailed Deer. Available at: http://www.michigan.gov/dnr/0,1607,7-153-10370_12150-26647--,00.html. Last accessed: March 22, 2013.
- National Parks Conservation Association (NPCA). 2009. State of the Parks – Civil War National Parks: The Battles for Missouri. June.
- National Park Service (NPS). 1963. Pea Ridge National Military Park Master Plan.
- National Park Service (NPS). 2002. Director's Order #28: Cultural Resource Management. June 11.
- National Park Service (NPS). 2004. Director's Order #28A: Archeology. October 12. National Park Service (NPS). 2005. Pea Ridge National Military Park Fire Management Plan. April.
- National Park Service (NPS). 2006. Pea Ridge National Military Park – Final General Management Plan/Environmental Impact Statement. 409/06-28 FES. August 4.
- National Park Service (NPS). 2007. Pea Ridge National Military Park Geologic Scoping Summary. April 25. National Park Service (NPS). 2008. Paleontological Resource Inventory and Monitoring. Heartland Network. Natural Resource Technical Report NPS/NRPC/NRTR – 2008/132. Fort Collins, CO. October.
- National Park Service (NPS). 2011a. Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-Making (update and replacement for 2001 edition). October 5.
- National Park Service (NPS). 2011b. Pea Ridge National Military Park - Long-Range Interpretive Plan. December.
- National Park Service (NPS). 2011c. Economic Benefits to Local Communities from National Park Visitation, 2011. Natural Resource Report NPS/NRSS/ARD/NRR–2013/632.
- National Park Service (NPS). 2012a. Trail of Tears – 2012 Official Map - Historic Trail Map. http://www.nps.gov/trte/planyourvisit/maps.htm#CP_JUMP_645527. Last accessed: July 29, 2013.
- National Park Service (NPS). 2012b. National Park Service Visitor Use Statistics - Annual Park Visitation (All Years) Report for Pea Ridge National Military Park. Available at: [https://irma.nps.gov/Stats/SSRSReports/Park Specific Reports/Annual Park Visitation \(All Years\)?Park=PERI](https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Annual%20Park%20Visitation%20(All%20Years)?Park=PERI).

REFERENCES

- National Register of Historic Places (NRHP). 1966. National Register of Historic Places Inventory – Nomination Form Pea Ridge Battlefield.
- National Register of Historic Places (NRHP). 2013. Cherokee Trail of Tears National Historic Trail and Springfield – Fayetteville Road – Elkhorn Tavern Segment. Available at: <http://nrhp.focus.nps.gov/natregsearchresult.do?fullresult=true&recordid=97>. Access July 29, 2013.
- Natural Resources Conservation Service (NRCS). 2012. Plant Guide – Eastern Red Cedar (*Juniperus virginiana*). Plant Materials available at: <http://plant-materials.nrcs.usda.gov/>; Plant Fact Sheet/Guide Coordination Page available at: <http://plant-materials.nrcs.usda.gov/intranet/pfs.html>; and National Plant Data Center available at: <http://npdc.usda.gov>.
- NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, VA. Available at: <http://www.natureserve.org/explorer>. Last accessed: April 2, 2013.
- Nelson, John C. 1997. Presettlement Vegetation Patterns along the 5th Principal Meridian, Missouri Territory, 1815. University of Notre Dame, American Midland Naturalist, Vol. 137, No. 1.
- Peitz, D.G. 2005. White-tailed Deer Monitoring at Pea Ridge National Military Park, Arkansas: 2005-2006 Status Report. Natural Resource Technical Report NPS/MWR/HTLN/NRTR—2006/XXX. National Park Service, Omaha, NE.
- Peitz, D.G. 2009. Bird monitoring at Pea Ridge National Military Park, Arkansas 2008 Status Report. Natural Resource Technical Report NPS/HTLN/NRTR—2009/194. National Park Service, Fort Collins, CO.
- Proebsting, E. 2004. A Survey of the Methods Used to Study Historic Changes in Land Cover with a GLO Pilot Project at Pea Ridge Park. May 3.
- Shea, W.I. and E.J. Hess. 1992. Pea Ridge, Civil War Campaign in the West.
- Sley, M., C. Bitting, and J.D. Wilhide. 2004. A Bat Inventory of Buffalo National River, Pea Ridge National Military Park, and Wilson's Creek National Battlefield. February.
- South Dakota Department of Agriculture. n.d. Thinning Benefits. Resource Conservation and Forestry Division.
- Spetich, M.A., ed. 2004. Upland oak ecology symposium: history, current conditions, and sustainability. Gen. Tech. Rep. SRS-73. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 311 pp.
- Stahle, D.W. 1996-1997. Tree Rings and Ancient Forest Relics. University of Arkansas.
- Stephenson, S. 2012. Inventory Glades and Develop a Management Plan at Pea Ridge National Military Park – Progress Report. University of Arkansas, Department of Biological Sciences. Fayetteville, AR.
- Tirmenstein, D.A. 1991a. *Quercus alba*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Available at: <http://www.fs.fed.us/database/feis/>.
- Tirmenstein, D.A. 1991b. *Quercus rubra*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <http://www.fs.fed.us/database/feis/>.

- U.S. Census Bureau (Census). 2010a. Bentonville, Arkansas, 2010 Census Data.
- U.S. Census Bureau (Census). 2010b. Census Viewer, Rogers, Arkansas. Available at: <http://censusviewer.com/city/AR/Rogers>.
- U.S. Census Bureau (Census). 2013. Benton County Quick Facts. Available at: <http://quickfacts.census.gov/qfd/states/05/05007.html>. Last revised: March 11.
- U.S. Fish and Wildlife Service (USFWS). 2012. Letter to Mr. Kevin Eads, Pea Ridge National Military Park. September 5.
- U.S. Forest Service. 1999. Ozark-Ouachita Highlands Assessment: Terrestrial Vegetation and Wildlife. Report 5 of 5. Chapter 2.
- Weih, R. 2006. Director – Historic Land Cover/Use Classification of Pea Ridge National Military Park. November 22.
- Williams, M.H. 2009. An evaluation of biological inventory data collected at Pea Ridge National Military Park: Vertebrate and vascular plant inventories. Natural Resource Technical Report NPS/HTLN/NRTR—2009/261. National Park Service, Fort Collins, CO.
- Wilson, R.L. 1965. Archeological Investigations in Pea Ridge National Military Park. Ms. on file, Midwest Archeological Center, Lincoln, NE.

