
PRESCRIBED FIRE PROGRAM

ENVIRONMENTAL ASSESSMENT

**Wayne National Forest
Athens Ranger District
Athens and Hocking Counties, Ohio**

January 2003



**U.S. Department Of Agriculture,
Forest Service**





United States
Department of
Agriculture

Forest
Service

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Athens Ranger District

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Date: January 31, 2003

Interested Parties

Dear Recipient,

The Wayne National Forest has released the Environmental Assessment (EA) for its prescribed fire program for public comment. This is the formal 30-day Notice and Comment period required under 36 CFR 215.5. The comment period will start on or around February 3, 2003, the date the Public Notice is expected to be printed in the Athens Messenger, the newspaper of record for project. The comment period will end 30 days from the date of publication.

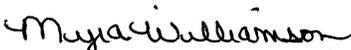
The Forest previously released a "Draft" of the EA for review by those interested parties on the Vegetation Management mailing list.

The EA is available in the Reading Room on the Wayne National Forest website at <http://www.fs.fed.us/r9/wayne/>. If you wish make a comment please send the comment to Kevan Moore at the following address: Wayne National Forest, 13700 U.S. Route 33, Nelsonville, OH 45764.

If you wish to receive a hardcopy of the EA, please call (740) 753-0101 to request a copy, and it will be sent to the address you provide.

Thank you for your interest in the project.

Sincerely,


MYRA L. WILLIAMSON
Athens District Ranger

cc: Steve Marchi, Carleen Yocum, Kevan Moore



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Chapter 1 - Purpose and Need

1.1 INTRODUCTION

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts of management alternatives for the Prescribed Fire Program in the Athens District of the Wayne National Forest.

This EA has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the human environment;
- Council of Environmental Quality (CEQ) Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;
- U.S. Dept of Agriculture NEPA Policies and Procedures at 7 CFR Part 1b; Forest Service Manual 1950; Forest Service NEPA Handbook 1909.15.

The Purpose of an Environmental Assessment (EA)

An EA study is performed by a Federal agency, such as the Forest Service, to determine if an action they are proposing to implement would significantly affect any portion of the environment.

The intent is to provide project planners and Federal decision-makers with relevant information on a Proposed Action's potential impacts to the environment.

If the study finds no significant impacts, then the agency can publish a Finding of No Significant Impact (FONSI) and can proceed with the action. If the study finds there would be significant impacts, then the agency must prepare and publish a detailed Environmental Impact Statement to help determine how to proceed with the action.

Key objectives of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies, and the documents recording their results, such as this EA, focus on providing input to the particular decisions faced by the relevant officials. In this case, the Athens District Ranger of the Wayne National Forest is faced with a decision to implement a prescribed fire program under the Fire Management Plan as described below. This decision will be made within the overall management framework already established in the Wayne National Forest Land and Resource Management Plan and the Forest's Fire Management Plan. The alternative courses of action to be considered at this time are, unless otherwise noted, crafted to be consistent with the concepts established in the both plans identified above, and the National Fire Plan.

1.2 PURPOSE AND NEED

The 1996 Federal Wildland Fire Policy identifies fire as the most aggressive natural resource management tool employed by the Forest Service. The guideline further states that all wildland fires are classified as either wildfires or prescribed fires. Prescribed fires, including wildland fire use (natural ignition), may be authorized by an approved wildland fire management plan and contribute to resource management objectives. Human-caused wildfires are unplanned events and may not be used to achieve resource management objectives.

The purpose of this action is to develop and implement a prescribed fire program that utilizes fire to achieve the desired fuel model, change the horizontal continuity of the fuels, and reduce the amount of available fuel on the identified portions of the Athens Ranger District. Past fire suppression activities have resulted in the accumulation of hazardous fuels. This project will directly reduce hazards to private land from uncontrolled wildfires. These private lands contain numerous private dwellings, utilities, and transportation assets for Dover and Starr Township residents. The National Fire Plan lists Dover and Starr Townships as “Communities in the vicinity of federal lands at risk of wildfire in Ohio.” In addition the burns will have a secondary benefit to promote oak-hickory regeneration, to improve remnant prairie and grassland habitat on the Wayne National Forest.

The Wayne National Forest Athens Ranger District is proposing to conduct burns on five geographically separate units in Athens and Hocking Counties. The burn areas contain 2,035 acres and are located within Kern Prairie, Peabody Tract, Big Bailey, Middle Bailey, and Utah Ridge. Figure 2.1 *Prescribed Fire Treatment Areas and Their Prescriptions*, illustrates the vicinity of the proposed action to Athens. The distance to burn areas from Athens is approximately 14.5 air miles northwest for Kern Prairie and Peabody and seven miles north for Middle Bailey, Big Bailey, and Utah Ridge. All lands to be prescribed burned are national forest lands that are considered suitable for timber production and fuel reduction activities in the Forest Plan. The treatment areas are located within Management Areas 3.1 and 3.3

The Forest Plan provides direction to minimize damage to resources from wildfire or insect damage. Currently Kern Prairie has a fuel model 6 (Intermediate Shrub), Peabody has a fuel model 3 (Tall grass), and Big Bailey, Middle Bailey, and Utah Ridge has a mix of fuel model 9 (Eastern Hardwood Litter) and fuel model 6. These conditions make it extremely difficult to control and contain wildfires because of the horizontal continuity of the fuels and the availability of fuels. Horizontal continuity influences whether a fire will spread or not and how steady the rate of spread will be.



Figure 1-1 (Peabody Tract) Tallgrass fuels with no break in the horizontal continuity



Figure 1-2 (Peabody Tract) Tallgrass fuels with a break in horizontal continuity



Figure 1-3 (Example for Big Bailey, Middle Bailey, and Utah Ridge) Area needing fuel reduction



Figure 1-4 (Example for Big Bailey, Middle Bailey, and Utah Ridge) Area where fuels have been reduced with 1 year of leaf fall

1.3 DESIRED CONDITION

The desired fuel models for these areas are Kern prairie fuel model 3, Peabody fuel model 3 with less horizontal continuity, and, and Big Bailey, Middle Bailey, and Utah Ridge a continued mix of fuel models 9 and 6 with a change in the horizontal continuity and a reduction in the amount of available fuels. This includes the small woody component, 100-hour fuels and above that won't build up annually but over a much longer period of time¹. If wildfire were introduced

¹ Explanation of timelag fuels:

Size, diameter inch	Timelag hours
< ¼	1
¼ to 1	10
1 to 3	100
>3	1,000

before these areas were prescribed burned, they would burn with a higher intensity than it would if it was introduced after the burn.

Descriptions of the current and desired fuels types and fire behavior for each of the fuel classes associated with the prescribed fire treatment areas are included below.

Kern Prairie:

Current Condition: Fuel model 6 Intermediate Shrub

Desired Condition: Fuel model 3 Tall Grass

- Fire behavior in fuel model 6 - Fires carry through the shrub layer with moderate winds greater than 8 mi/h at midflame height. Fire will drop to the ground at low wind speeds of at openings in the stand
- Fire behavior in fuel model 3 - This model is the most intense of the grass group and displays a high rate of spread under the influence of wind. Wind can drive fire into the upper heights of the grass and across standing water. Stands are tall, averaging about 3 feet, but considerable variation may occur.

Peabody:

Current Condition: Fuel model 3 Tall Grass

Desired Condition: Fuel model 3 with frequent burn intervals

Big Bailey, Middle Bailey, and Utah Ridge:

Current Condition: Fuel model 9 Eastern Hardwood Litter & Fuel model 6 Intermediate Shrub

Desired Condition: A mix of fuel models 9 & 6

Areas of fuel model 9 need to burn to knock back the red maple understory so the oak –hickory community can continue to thrive. Areas of fuel model 6 need to burn to keep the shrub component for wildlife purposes

- Fire behavior in fuel model 9 – Fires are usually surface fires with long flame heights. Both long needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Fall fires in hardwoods are representative, but high winds will cause higher rates of spread than predicted because of spotting caused by rolling and blowing leaves.
- Fire behavior in fuel model 6- Fires carry through the shrub layer with moderate winds greater than 8 mi/h at midflame height. Fire will drop to the ground at low wind speeds of at openings in the stand.

1.4 BACKGROUND

The proclamation boundary for the Wayne National Forest encompasses 833,990 acres in 12 Ohio counties, where 233,070 acres of that area are National Forest Service lands that are managed by the Forest Service. The Forest has 2 Ranger Districts: the Athens Ranger District, comprised of the Athens and Marietta Units, and the Ironton Ranger District, comprised of the Ironton Unit. The Athens District encompasses 109,778 acres (see Figure 1-5).

Approximately 95 percent of the lands managed by the Forest Service in the Wayne National Forest are forested. Many of these forest stands have been previously cut, typically by harvest, and followed by cultivation or grazing. A majority of those areas that were harvested in the past have been reforested through tree plantings or through natural regeneration. The other 5 percent is in lowland and upland brush, open fields and water resources. Other areas in the Forest, particularly in the Athens Ranger District, have been subjected to strip mining activities. Over 1,200 acres of these lands have been reclaimed, with another 1,160 acres in need of reclamation. The 575-acre Kern Prairie/Peabody Tract in the Athens Ranger district is one example of National Forest lands that have been reclaimed after a history of strip mining activities. The Kern Prairie/Peabody Tract has not been manually re-vegetated.

Hazardous fuel levels have accumulated in the Wayne National Forest after over 100 years of fire suppression efforts. The presence of private residences and structures adjacent to and near National Forest lands places even greater emphasis on the need to re-introduce fire for hazardous fuels removal in portions of the Athens Ranger District. This condition where wildland forests meet urban developments, or where forest fuels meet urban fuels (such as houses), is referred to as a wildland urban interface (WUI). With treatment, a wildland urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend structures and/or communities.

Kern Prairie/Peabody is adjacent to approximately 36 private homes and structures, Big Bailey, Middle Bailey, and Utah Ridge is adjacent to approximately 19 private homes and structures. These privately owned resources are at high risk of damage if a wildfire is introduced into this area. Over the past five years, the Athens Ranger District has had approximately 5 fires for a total of 78 acres. There have been historical fires that occurred in the District that were initially attacked by local volunteer fire departments and not reported to the Wayne National Forest.

Another consequence of fire suppression has been a decline in the health and viability of fire-adapted plant and animal species that rely on periodic wildfire to promote and sustain the vegetation communities in which they reside. Both the prairie and oak/hickory vegetation communities have been adversely affected in the absence of fire.

Table 1-1 shows a breakdown of the habitat components within the prescribed fire treatment areas under consideration for prescribed fire in this EA:

Table 1-1. Habitat Components Within the Prescribed Fire Treatment Areas

Habitat Component	Estimated Acres In Forest Land Base *	Acres Estimated in Burn Area**
Conifers	16,315	91
Mature hardwoods	147,776	1,730
Close-canopied, mature/over mature hardwoods	147,776	1,730
Early hardwoods	49,877	247
Late succession	6,181	59
Middle Succession	2,007	9
Early Succession	7,406	42

* These acres are estimated from April 1999 Data extrapolated (Forest at 210,877 acres) to current forest acreage of 233,070.

**Acres from CDS Data base for compartments 120,125,126 and 128 (scaled to 2035 acre burn area.)

1.5 FOREST MANAGEMENT GOALS AND OBJECTIVES

The following forest management goals and objectives that are related to the proposed prescribed fire program were derived from the Wayne National Forest Land and Resource Management Plan.

Goals:

1. Vegetation Diversity

- Schedule vegetation treatments for the greatest number of recreation, wildlife, range, water, and timber goals;

2. Wildlife and Fish

- Improve fish habitats and maintain wildlife habitats to maintain viable populations of native and desired nonnative species and to maintain and improve habitat of management indicator species;
- Protect and enhance riparian habitat for wildlife;
- Promote the diversity of plant and animal communities by providing a variety of vegetative communities;
- Improve habitat effectiveness and minimize disturbance to wildlife consistent with management area goals;

3. Protection

- Minimize the risk of damage from flood, wind, wildfire and erosion;
- Suppress all wildfire by taking action commensurate with values at risk, and management area goals and agreed upon standards found in cooperative fire agreement with State of Ohio for interspersed private land;
- Ensure forest management activities are compatible with federal and state laws protecting air quality; and
- Direct a fire prevention effort that promotes a land ethic approach with area residents to reduce the number of arson fires.

1.6 DECISIONS TO BE MADE

Based on the analysis documented in this EA, including public comments in response to scoping, the Athens District Ranger, Wayne National Forest will decide whether to implement the proposed action as described above, to meet the purpose and need within the proposed treatment units through an alternative combination of treatments, or to defer any action at this time.

1.7 SCOPING ISSUES AND IMPACT TOPICS

In November 2001, the Forest Service published a description of the proposed action and requested public involvement in the Wayne Quarterly. On May 30, 2002, a scoping notice describing the Proposed Action was sent to a mailing list of 198 individuals, organizations, and media outlets. In June 2002, television and radio coverages on the proposed action were aired on WOUB and the local Public Broadcasting Station. The Forest Service received comments from 5 interested parties regarding the proposed project. Prior to and during public scoping, the Forest Service also conducted internal scoping meetings to discuss the proposed action and issues of concern.

The major issues and concerns that came from public and internal input (e.g., email, written correspondence) were evaluated and sorted. Issues determined to be significant were those related to the effects of the proposed action, and those not already adequately addressed by laws, regulations, and policies. Issues were not considered significant if they were outside the scope of the environmental assessment, based on conjecture rather than scientific evidence, irrelevant to the proposed action, and/or already adequately addressed by laws, regulations, and policies. Significant issues were considered in developing and evaluating the alternatives to the Proposed Action discussed in this EA.

1.7.1 *Significant Issues*

- Issue: Large prairies (>100 acres) should be placed under a rotational system of management in which sections (25%-30%) are burned annually. Smaller prairies (<100 acres) should be managed as a single unit and burned in their entirety every 2-3 years. This issue was used to create an alternative to the proposed action (Alternative 3) and was addressed through the fire return interval for prescribed fires (e.g., prescribed fire every 2-3 years)
- Issue: Ground nesting forest interior neotropical migrants, such as the worm-eating warbler, ovenbird, and hooded warbler, suffer from prescribed burning. This issue was addressed in the environmental consequences analysis in Chapter 3 through scientific literature reviews.
- Issue: Prescribed fires (broadcast burns) for restoration purposes are premature and should not be conducted since the Forest Service has failed to inventory and monitor native species, particularly management indicator species within the Wayne National Forest. Impacts to Management Indicator Species were quantitatively addressed in the

environmental consequences analysis in Chapter 3 through acres of habitat impacted by proposed treatments.

- Issue: Eliminating or controlling woody encroachment is vital to maintenance of prairie ecosystems. The Forest Service recognizes the need to stop the encroachment of woody tree and shrub species and has incorporated selective tree removal and prescribed fire into its proposed action to address this issue.
- Issue: Prescribed burning during the nesting and brooding-rearing periods when eggs, nestlings, and young animals cannot escape the fire will harm wildlife. Prescribed fires should be conducted prior to April 1 and after September 1. The Forest Service's proposed action calls for prescribed fire activities to be concentrated prior to April 15 and after September 15. This prescribed fire window takes into consideration the protection of the migratory bird nesting season, generally May 15 through August 15.
- Issue: Prescribed fire will promote the health and regeneration of oak-hickory forest communities by reducing the extent of red maple, sugar maple, blackgum, and other late-successional, mixed-mesophytic species. The Forest Service recognizes the need to promote the health of oak/hickory forests by reducing the extent of the tree species referenced above. The proposed action calls for a prescribed fire program which will help in this endeavor.

1.7.2 Other Issues Not Considered in Detail

- Issue: Prescribed fires that burn away hazardous fuels will not prevent future wildfires. This issue was dismissed from further consideration because it is irrelevant to the proposed action and associated purpose and need. The Forest Service recognizes that hazardous fuels treatments will not prevent future wildfires. The purpose for reducing hazardous fuels on the Forest, however, is to reduce the fire hazard that the areas pose to the natural resources on the Forest and the private residences and structures adjacent to and nearby it (wildland urban interface). Hazardous fuels reduction can help prevent future wildfires from becoming high-severity, catastrophic wildfires that can threaten human health and safety.
- Issue: While prescribed fires may benefit the prairies, they are too small to justify the burning of the hundreds of forested acres surrounding them. This issue was dismissed from further consideration because it is irrelevant to the proposed action and associated purpose and need. The Forest Service does not seek to justify a prescribed fire program for forested areas with the benefits that will be obtained from prescribed fire treatments in prairies. The Forest Service proposes to reduce hazardous fuels in and promote restoration of both the prairie and the oak/hickory communities as a result of separate issues. Prescribed fire and selective tree removal in Kern Prairie would halt and/or reverse the encroachment of woody tree species and promote the growth of fire-adapted plant species. Prescribed fire in the oak/hickory forests would reduce the extent of faster growing tree species such as red and sugar maple in the forest understory. Both

communities are in need of prescribed fire for restoration purposes; however, the reasons (need) for the treatments are separate issues.

- Issue: Pocket prairies, which have been in the area since the glacial retreat 12,000 to 14,000 years ago, are not vanishing because wildfires are no longer keeping them clear. This issue was dismissed from further consideration because it is based on conjecture rather than scientific evidence. Wildfire is an integral part of prairie ecosystems. Among the benefits that accrue from fire, such as soil enrichment and development and the promotion of native grasses and forbs, is the removal of woody shrub and tree species that encroach upon the prairies. In the absence of wildfire, encroachment of woody tree species and shrubs can reduce the extent of prairie habitat as well as the habitat and biological diversity of the prairies. Wildfire suppression is not the only factor that is causing a decline in the acreage and health of short and tall grass prairies; however, it is one of several factors (e.g., urban development, agriculture, noxious weeds).
- Issue: Wildfire may not be as great an influence on southern Ohio forest ecosystems as popular belief would indicate. Research in Dysart Woods suggests that fire was a “negligible” ecological factor prior to significant European settlement. This issue was dismissed from further consideration because it is based on conjecture rather than scientific evidence. Prescribed fire is an important tool that the Forest Service can employ to promote and protect remnant prairie and mixed-oak forest communities. Without fire, these vegetative communities have experienced a decline in habitat diversity and species diversity. Without fire, existing prairies will eventually become overrun with woody tree species and shrubs, and mixed-oak forests will transition into mesic forests where maples and poplar species are predominant. Current scientific research today suggests that prescribed fire is an invaluable tool in managing for the prairie and mixed-oak forest communities on the Wayne National Forest. Recent studies (Cooper et al., 1999; van Lear and Brose, 1999; USDA, 2002b) have demonstrated that prescribed fire treatments are an important component in managing for oak regeneration.

1.7.3 Impact Topics Evaluated in this Environmental Assessment

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. The following topics, however, do merit consideration in this EA:

Soils: Soils can potentially be adversely affected by intense fires as well as by suppression activities, therefore, impacts to soils are analyzed in this EA.

Water Resources: Both prescribed fires and fire suppression efforts can indirectly affect water resources by exposing soils, which lead to erosion during storm events and subsequent suspended solids and turbidity in downstream surface waters. Therefore, impacts to water resources are analyzed in this EA.

Vegetation: Since plant communities will be affected by prescribed fire, this EA considers the impacts of the proposed FMP alternatives on vegetation.

Wildlife: The Wayne National Forest supports resident populations of various species of reptiles, amphibians, birds, mammals, and invertebrates as well as several federally-listed threatened and endangered species and Regional Forester Sensitive Species. Therefore, impacts of the FMP alternatives on wildlife are evaluated in this EA.

Air Quality: The Federal 1970 Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect air quality from adverse air pollution impacts. All types of fires generate smoke and particulate matter, which can impact air quality within National Forest lands and surrounding region. All of these considerations warrant the inclusion of impacts to air quality in this analysis.

Human Health and Safety: Fires can be extremely hazardous, even life-threatening, to humans, and current federal fire management policies emphasize that firefighter and public safety is the first priority; all FMP's must reflect this commitment (NIFC, 1998). Therefore, impacts to human health and safety are addressed in this EA.

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966 provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. Therefore, potential impacts to cultural resources are addressed in this EA.

1.7.4 Impact Topics Considered but not Evaluated in this Environmental Assessment

NEPA and the CEQ Regulations direct agencies to “avoid useless bulk...and concentrate effort and attention on important issues” (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of proposed actions or projects have been judged to not be substantively affected by any of the FMP alternatives considered in this EA. These topics are listed and briefly described below, and the rationale provided for considering them, but dropping them from further analysis.

Noise: Noise is defined as unwanted sound. Fuels reduction, prescribed fires and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws, trucks, helicopters, and airplanes. Each of these devices, in particular helicopters and chain saws at close range, are quite loud (in excess of 100 decibels). The use of machines, such as chainsaws, would be infrequent in light of the limited tree removal activities proposed. The use of mechanical equipment, such as chainsaws, is not frequent enough to substantially interfere with human activities in the area or with wildlife behavior. Therefore, this impact topic is eliminated from further analysis in this EA.

Transportation: None of the FMP alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around National Forest lands. One exception to this general rule would be the temporary closure of nearby roads during fire suppression activities or from heavy smoke emanating from prescribed fires. Project level roads analysis revealed that no construction or reconstruct of any Forest Development Roads is needed, unclassified roads, special use roads, temporary roads, may be used in under the proposed action as fire breaks and

temp access for personnel during the burn. Use of existing roads as fire lines and fire breaks will not adversely effect the transportation system in the areas. Therefore, this topic is dismissed from any further analysis.

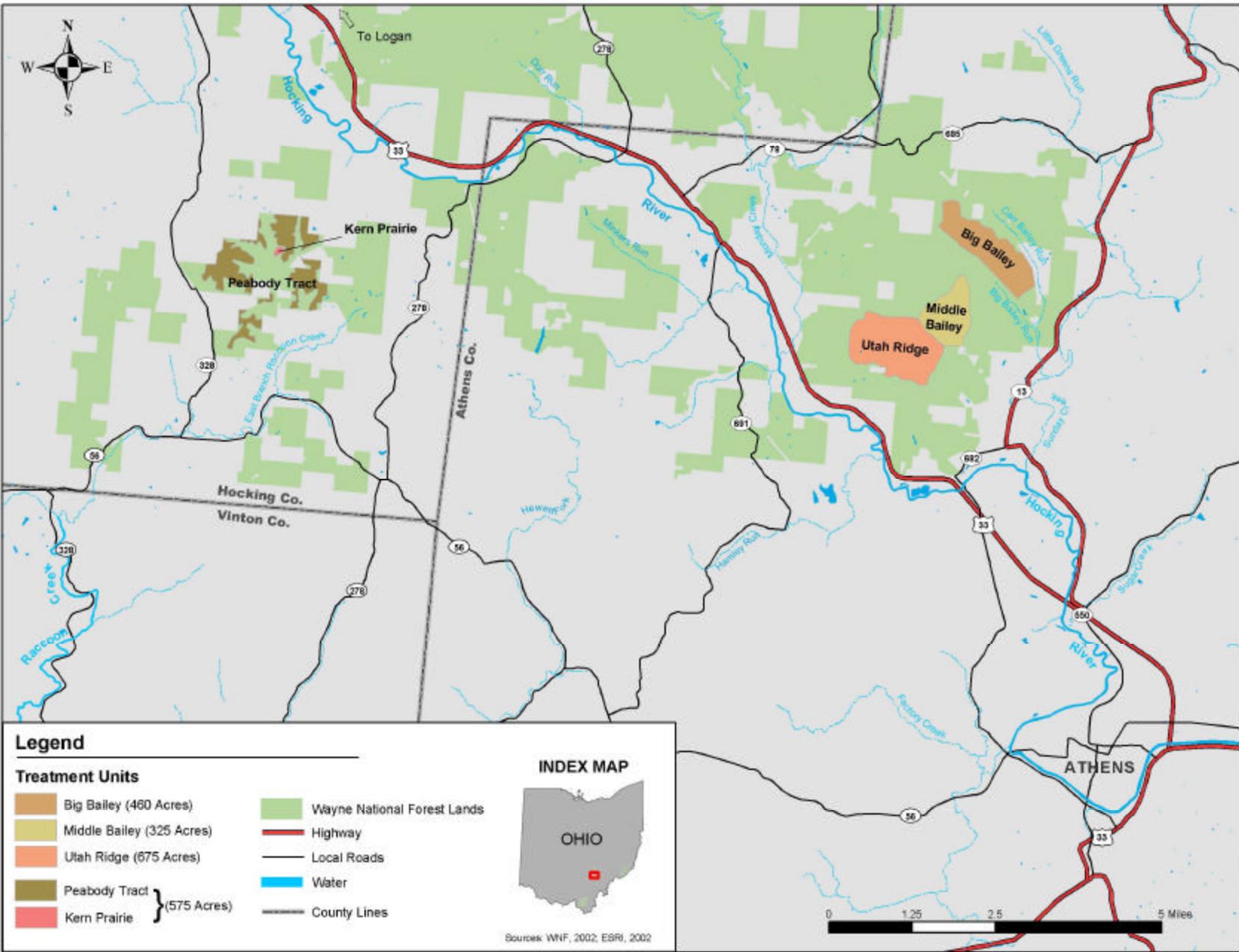
Land Use: Prescribed fire activities would not affect land uses within the National Forest lands or in private lands adjacent to it. The use of prescribed fire in the Kern Prairie/Peabody Tract, located in Management Area 3.3, and in the Utah Ridge, Big Bailey, and Middle Bailey units, located in Management Area 3.1, would not conflict with the purposes of and management prescriptions for these management areas as outlined in the Forest's Land and Resource Management Plan. The Scenic Integrity Objectives (SIOs) for the project areas would not be affected by implementation of the Proposed Action or alternatives; the Proposed Action and its alternatives would be in compliance with the "LOW" SIO for each of the project areas. In addition, all activities under the Proposed Action and its alternatives would be consistent with riparian area standards and guidelines as presented in the Forest Plan. Therefore, this impact topic is not included for further analysis in this EA.

Recreation: The project areas currently provide dispersed recreation opportunities, such as hunting, berry picking, and wildlife viewing. The proposed fire management activities would have only temporary effects (during the proposed fires) on these uses of the project areas, and would not affect the ability of the project areas to support these recreation opportunities in the future. In addition, there are many additional acres on the Wayne National Forest that support the same recreational uses and that would not be affected at all by implementation of the project. These areas could be used by recreationists while the proposed project is being implemented. Therefore, this impact topic is not included for further analysis in this EA.

Socio-economics: Fire management activities would not result in a significant impact on local and regional economies and would not have a highly disproportionate and adverse impact on minority or impoverished communities. Therefore, this impact topic is not included for further analysis in this EA.

Prime and Unique Agricultural Lands: Prime farmland has the best combination of physical and chemical characteristics for producing food, fed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. National Forest lands to be treated under this proposed project do not meet these definitions. This impact topic is not evaluated further in this EA.

Wilderness: Since there is no wilderness in or adjacent to the project area, this impact topic is not evaluated further in this EA.



1-12

Figure 1-5 Wayne National Forest Prescribed Fire Program Vicinity Map

Chapter 2 - Alternatives

This Chapter describes the range of alternatives, including the Proposed Action and No Action Alternatives, formulated to address the purpose of and need for the proposed project. These alternatives were developed through evaluation of the comments provided by individuals, organizations, governmental agencies, and the Interdisciplinary Team.

2.1 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER IN THIS ENVIRONMENTAL ASSESSMENT

2.1.1 *Hazardous Fuels Reduction through Manual and Mechanical Removal Only*

Under this alternative, the Forest Service would reduce hazardous fuels in the prairie and oak/hickory communities by manually and mechanically removing surface and ladder fuels in the project area. This approach would involve the use of hauling trucks and heavy equipment (e.g., bulldozers) to transport the fuels out of treatment areas. Existing roads may need to be improved to provide access for the heavy equipment. The Forest Service did not consider this alternative in detail because the costs associated with this type of removal would be cost-prohibitive due to the fact that these fuels are non-merchantable. In addition, mechanical fuels removal alone would not restore and maintain the health of the prairie ecosystems. This alternative responds to public comments that prescribed fire should not be employed to reduce hazardous fuels or restore prairie, grassland, and oak/hickory communities.

2.1.2 *Hazardous Fuels Removal through Prescribed Fire and Mechanical Thinning*

Under this alternative, the Forest Service would employ a combination of prescribed fire and mechanical thinning to reduce hazardous fuels and restore prairie and oak/hickory communities. Mechanical thinning would be implemented through commercial contracts. This approach would involve the use of hauling trucks and heavy equipment (e.g., bulldozers) to transport the fuels out of treatment areas, and may involve the construction of skid trails. Existing roads may need to be improved to provide access for the heavy equipment. The Forest Service did not consider this alternative in detail because the costs associated with this type of removal would be cost-prohibitive due to the fact that these fuels are non-merchantable. This alternative responds to public comments that prescribed fire should not be employed to reduce hazardous fuels or restore prairie, grassland, and oak/hickory communities.

2.2 ALTERNATIVES CONSIDERED AND ANALYZED IN THIS ENVIRONMENTAL ASSESSMENT

2.2.1 *Alternative 1 (No Action Alternative) – No Hazardous Fuels Reduction*

Under this alternative, there would not be any prescribed fires or other activities, such as tree removal, in the project area to reduce hazardous fuels. All wildfires would continue to be suppressed. Wildfires from unplanned natural ignitions (e.g., lightning) may be managed as a

prescribed fire if the area of the fire has an approved prescribed fire plan and if the fire fits the burning prescription.

2.2.2 Alternative 2 (Proposed Action) – Hazardous Fuel Reduction with Prescribed Fire

Under this alternative, prescribed fire would be employed on 2,035 acres in the Athens Ranger District of the Wayne National Forest. Treatment units would include Utah Ridge (675 acres), Big Bailey (460 acres), Middle Bailey (325 acres), and the Kern Prairie/Peabody Tract (575 acres). Descriptions of each of these units and the proposed treatments can be found in Table 2-1 below. Figures 2-1 and 2-2 depict the treatment units. While the cost of this alternative will depend on site-specific terrain, necessary containment lines and containment forces, Wildland Urban Interface, and complexity, the project is estimated to cost between \$100/acre to \$700/acre.

There would be limited and selective removal of woody shrub (sumac) and tree species (pine) (saplings and non-merchantable trees) in the Kern Prairie/Peabody Tract. In addition, some selective tree removal to remove encroaching trees would occur in the forest openings within the Middle Bailey and Utah Ridge units. No trees greater than 6" Diameter at Breast Height (DBH) would be removed. There would not be any tree removal to reduce hazardous fuels in the oak/hickory forests under this alternative; however, hazardous trees may be removed for human health and safety reasons. In special cases, fuels would be removed from the bases of important snags (i.e., known bat roost trees) to protect them from prescribed fire, or the fire line would be relocated to avoid snags. Overall snag retention would be consistent with the guidance outlined in the Forest's Land and Resource Management Plan. No new roads would be constructed.

General activities to be undertaken in preparing for and executing prescribed fires would include fire line construction, hazard tree mitigation, prescribed fire ignition, and mop-up. All of these activities would not necessarily occur prior to each individual prescribed fire; however, some combination of them is likely. Fire line construction would involve the removal of vegetation to bare mineral soil (for all of the project areas) using hand tools (e.g., pulaskis, shovels, rakes, McCleods), power tools (e.g., chainsaws, weed eaters, leaf blowers, brush cutters, etc.), and mowers and/or brush hogs. Vegetation, including downed fuels, would be brushed away from and adjacent to the fire lines to ensure clear, adequate breaks. Fuels that provide a path to the crowns of trees (ladder fuels) would also be removed. In addition, existing roads and trails would also be used as existing fire lines. Fire lines would typically be 3-4 feet in width. Approximately 2.1 miles/year of fire lines would be needed for implementation of the Proposed Action, the majority of which are natural and/or existing fire lines. Fire lines would be offset from private land boundaries to protect private lands. The approximate amount of shared boundary for each unit is: Peabody Tract/Kern Prairie – 4.1 miles (encompassing the entire unit); Utah Ridge – 600 feet; Big Bailey – 1 mile; and Middle Bailey – 600 feet. Rehabilitation measures for fire lines would be determined by Forest Service specialists following post-burn site analyses.

Hazard tree mitigation would involve the removal of hazardous trees on the fire line or directly adjacent to it. Prescribed fire ignition would involve the lighting of fires with the intent of burning an area behind the fire lines. Drip torches that contained a mix of gasoline and diesel fuel would be the most common source of ignition. However, fusees (magnesium), "ping pong balls" (potassium permanganate and glycol injected into plastic balls), or other ignition devices may be used, as needed.

Finally, mop-up would involve hand and power tools and/or water to ensure prescribed fires are out and a source of ignition is not left behind to start an unwanted fire after activities are complete. ATVs would be used for access to areas within treatment units prior to and during prescribed fires.

Prior to each prescribed fire, a prescribed fire plan would be developed that takes into consideration such factors as weather conditions and humidity, fuel loadings, and fuel burn rates at a given moisture content. All the burn prescriptions must be met before a particular prescribed fire could be ignited. If a prescribed fire burned out of prescription or weather conditions changed during the fire, the Forest Service would implement a contingency plan, which may include total suppression.

The spring fire season for the Forest is between February and May and the fall fire season is between September and December. Prescribed fires in the Kern Prairie/Peabody Tract would primarily be conducted in February and March while fires in Utah Ridge, Big Bailey, and Middle Bailey would primarily be conducted in March and April. These months are generally the driest and coldest months and, as such, present the most favorable weather conditions for prescribed fire. The Forest may also conduct prescribed fires during the fall fire season, between September and December. The Forest intends to complete an initial prescribed fire treatment for the entirety of the four units within 6-7 years. Wildfires from unplanned natural ignitions (e.g., lightning) may be managed as a prescribed fire if the area of the fire has an approved prescribed fire plan and if the fire fits the burning prescription.

In order to comply with the *Biological Opinion on the Land and Resources Management Plan* prepared by the U.S. Fish and Wildlife Service, prescribed fires on the Wayne National Forest are limited to 2,500 acres during the five-year period of the *Biological Opinion*, which runs from September 2001 to September 2006. Implementation of the Proposed Action will result in the incidental take of up to 1,462 forested acres of potential Indiana bat habitat.

Table 2-1 Wayne National Forest Prescribed Fire Units

Prescribed Fire Unit	Treatment(s)	Description
Utah Ridge	The unit would be burned in whole or in parts depending on fire conditions. Logical breaks in the treatment unit would be existing roads and trails. Prescribed fire would most likely be conducted between March and April and would be mosaic in nature. The forested areas of this treatment unit would be burned on a 6-8 year rotation. The forest opening in this treatment unit would be burned on a 3-8 year rotation.	Utah Ridge primarily consists of oak/hickory forests with some forest openings. The purposes of the project in this unit are to reduce hazardous fuels, promote rare species, and promote oak regeneration through prescribed fire. Rattlesnake master (<i>Eryngium yuccifolium</i>), a State Potentially threatened species, can be found in this unit and may benefit from opening effects of burning.
Big Bailey	The unit would be burned in whole or in parts depending on fire conditions. Logical breaks in the treatment unit would be existing roads and trails. Prescribed fire would most likely be conducted between March and April and would be mosaic in nature. This treatment unit would be burned on a 6-8 year rotation.	Big Bailey consists of an oak/hickory forest community. The purposes of the project in this unit are to reduce hazardous fuels, promote post-oak regeneration, and promote habitat for the Lawrence's warbler.

Prescribed Fire Unit	Treatment(s)	Description
Middle Bailey	The unit would be burned in whole or in parts depending on fire conditions. Logical breaks in the treatment unit would be existing roads and trails. Prescribed fire would most likely be conducted between March and April and would be mosaic in nature. This treatment unit would be burned on a 6-8 year rotation. Forest openings would be burned on a 3-8 year rotation.	Middle Bailey consists of an oak/hickory forest community. The purposes of the project in this unit are to maintain two forest openings and reduce hazardous fuels.
Kern Prairie/ Peabody Tract	Prescribed fire would be conducted sequentially on the 7 units of the Peabody Tract to protect against habitat loss of the Henslow's sparrow (<i>Ammodramus henslowii</i>). In addition, the units would be burned in a mosaic pattern with each prescribed fire. Prescribed fires within the Peabody Tract and the Kern Prairie would be conducted on a 3-8 year burn rotation to maintain the prairie and grassland/reclaimed strip mine vegetation and suppress encroaching woody vegetation. Prescribed fire would most likely be conducted in February and March. The Forest Service would selectively remove woody shrub and tree species within and on the edge of the units.	Kern Prairie is in the easternmost remnant of the prairie peninsula, and contains prairie-indicator species like big and little bluestem (<i>Andropogon gerardii</i> and <i>Schizachyrium scoparium</i> , respectively). The Peabody reclaimed strip mine region across the road contains open fields/grasslands that provide habitat for Henslow's sparrow, a Regional Forester Sensitive Species. This treatment unit is subdivided into 7 distinct units. The purposes of the project in these units are to restore and maintain prairie and grassland/reclaimed strip mine habitat, promote threatened and endangered species establishment through prescribed fire and selective removal of woody shrub and tree species, and reduce hazardous fuels.

2.2.3 Alternative 3 – Hazardous Fuels Reduction with More Frequent Prescribed Fire

This alternative responds to public comments that suggest a more frequent burn rotation would better restore prairie habitats. The proposed actions described under Alternative 2 (Proposed Action) would be the same for this alternative with the exception that the Forest Service would conduct prescribed fires in the Kern Prairie every 2-3 years. While the cost of this alternative will depend on site-specific terrain, necessary containment lines and containment forces, Wildland Urban Interface, and complexity, the project is estimated to cost between \$75/acre to \$675/acre.

2.3 IMPACT DEFINITIONS

Table 2-2 depicts the impact definitions used in this Environmental Assessment. Significant impact thresholds for the various key resources were determined in light of compliance with existing state and federal laws, and compliance with existing Forest planning documents.

Table 2-2 Impact Definitions

Key Resources	“Minor” Impact	“Major” or “Significant” Impact
Soils	Minor damage to or loss of the litter/humus layers that causes minor localized increases in soil loss from erosion; fire severe enough to cause minor harm to soil community; minor, temporary surface sterilization of soils that does not cause long term loss of soil productivity that would alter or destroy vegetation community; short-term and localized compaction of soils that does not prohibit re-vegetation	Damage to or loss of the litter/ humus layers that would increase soil loss from erosion on a substantial portion of the burn area; fire severe enough to damage soil community; substantial surface sterilization of soils that may cause long term loss of soil productivity and that may alter or destroy a portion of the vegetation community; long-term and widespread soil compaction that affects a large number of acres and prohibits re-vegetation
Water Resources	Minor damage to or loss of the litter/humus layers that increases sedimentation on no more than 0.1% of a subwatershed; localized and indirect riparian impact that does not substantively increase stream temperatures or affect stream habitats; no alteration of natural hydrology of wetlands	Damage to or loss of the litter/ humus layers that increases sedimentation on greater than 0.1% of a subwatershed; localized and indirect riparian impact that may substantively increase stream temperatures or affect stream habitats; alteration of natural hydrology of wetlands
Vegetation	Short-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; removal of small diameter understory trees	Violation of the Endangered Species Act of 1973
Wildlife	Temporary displacement of localized individuals or groups of animals; mortality of individuals of species not afforded special protection by federal law	Violation of the Endangered Species Act of 1973; mortality of species that jeopardize the resident population
Air Quality	Minimal to negligible air emissions and temporary smoke accumulation; temporary and limited smoke exposure to sensitive resources	Violation of state and federal air quality standards; violation of Class II air quality standards; prolonged smoke exposure to sensitive receptors
Human Health & Safety	Minor injuries to any worker or member of the public; limited exposure to hazardous compounds or smoke particulates at concentrations below health-based levels	Serious injury (life threatening) to any worker or member of the public; exposure to hazardous compounds or smoke particulates at concentrations above health-based levels.
Cultural Resources	Temporary, non-adverse effects to registered heritage sites, eligible heritage sites, sites with an undetermined eligibility, and traditional cultural properties	Temporary or long-term adverse impacts to registered heritage sites, eligible heritage sites, sites with an undetermined eligibility, and traditional cultural properties

2.4 MONITORING AND MITIGATION MEASURES

2.4.1 *Monitoring*

Minimum monitoring and evaluation requirements are found in the Wayne National Forest Land and Resource Management Plan. Monitoring and evaluation of the fire program can include, but are not limited to, the following:

1. The changes in fire activity (fire occurrence and acres burned by size and intensity) and comparison with the predictions derived for that area where fuel conditions have been altered by management practices;
2. A comparison of the prevention program projections for person-caused fires, with trends evidenced by the fire occurrence statistics;
3. An evaluation of the adequacy of the fire management organization to meet the expected fire frequency and size distribution at the expected cost and net value change levels as projected for the selected fire program;
4. A determination of the adequacy of the values change analysis by comparing the reported annual value change from the individual fire reports with the projected analysis; and
5. Assessment of implementation of National, Regional, and local safety direction.

Fuel plots will be established prior to burning and those will be monitored according to current standards. This will determine the amount of fuel on the ground in tons/acre.

Monitoring will occur after each prescribed fire for signs of erosion. If monitoring reveals that erosion is taking place, seeding and mulching bare slopes and isolation from over land waterflow with dips and/or erosion blankets or other actions will be taken, as appropriate, to remedy erosion problems.

Two permanent transects, which have been sampled at least two times a year since 2000, have been established at the Kern Prairie area. These plots should continue to be sampled post-burn to assess the effectiveness of the prescribed burning regime on restoration of the prairie community. While no permanent plots have been established in the other burn areas, annual (at least for the first several years) post-burn monitoring is necessary to determine the effectiveness of burning on fuel reduction and habitat restoration. Monitoring is also necessary to track the spread of non-native invasive species within all areas, as well as the illegal use of ORVs along fire lines in all areas (especially Big and Middle Bailey and Utah Ridge).

Yearly avian surveys will be conducted within the burned and unburned area of the Peabody tract in order to monitor in particular the status of the Henslow Sparrow population and usage of the area

2.4.2 *Mitigation Measures*

Mitigation measures are prescribed to prevent and/or mitigate adverse environmental impacts that may occur from fire management activities. Mitigation measures are common to all alternatives.

2.4.2.1 *Mitigation for Fire Management Activities*

- Whenever consistent with safe, effective suppression techniques, the use of natural barriers will be used as extensively as possible;
- Fire retardant agents must be on an approved list for use by the Forest Service;
- Earth moving equipment such as tractors, graders, bulldozers or other tracked vehicles will generally not be used for fire suppression unless there was a threat of loss of human life and/or property;
- When handline construction is required, construction standards will be issued requiring the handlines to be built with minimum impact. Erosion control methods will be used on slopes exceeding 10% where handline construction took place; and
- All sites where improvements are made or obstructions removed will be rehabilitated to pre-fire conditions, to the extent practicable.

2.4.2.2 *Mitigation for Soil and Water Resources*

- Creek crossings will be limited to set and existing locations;
- Fire line construction will not be permitted in wetlands;
- Construction of fire lines will not be conducted on slopes greater than 30%;
- Fire retardant/foam applications will be prohibited within 100 feet of surface water resources or sensitive areas;
- Prescribed fire activities will be prohibited within 100 feet of surface water resources; and
- Monitoring will occur after each prescribed fire for signs of erosion, and actions will be taken as described in Section 2.4.1 above, to remedy erosion problems.

2.4.2.3 *Mitigation for Vegetation and Wildlife*

Indiana Bat and Evening Bat:

- (For the Indiana bat *only*). Coordination with the District Wildlife Biologist will be conducted prior to commencement of any burn to develop smoke management guidelines to ensure that known or suspected hibernacula will not be jeopardized. Burns within the Utah Ridge unit should be planned when winds are from the west or northwest. If these burn patterns are rare during preferred burning times, prescribed fires in this unit should be planned so that convection would lift the smoke relatively straight up.
- In accordance with the *Biological Opinion*, all standing dead trees greater than nine inches DBH, all shagbark and shellbark hickory trees over six inches DBH, and all trees over six inches DBH with large areas of loose bark that are hollow, have major splits, or have broken tops will be retained in all project areas (unless they pose a safety hazard, and only after coordination with the District Wildlife Biologist). In addition, proposed fire lines should be moved to avoid damage or removal of these trees, and fuels should be removed from the bases of any known roost trees to avoid accidental fire effects.
- To avoid or minimize adverse effects from human disturbance, heat, and smoke, prescribed fire should be conducted before April 15 and after September 15.

Cerulean Warbler:

- Prescribed fires should be conducted before April 15 within the Big Bailey, Middle Bailey, or Utah Ridge burn units.

Henslow's Sparrow:

- To protect nest sites and young Henslow's sparrows, the USFS should not conduct prescribed fires in the Peabody Tract between 15 April and 15 September.
- To prevent negative effects on Henslow's sparrow due to crowding in already occupied habitat, prescribed fires within the Peabody Tract should be planned so that there are many acres of contiguous Henslow's sparrow habitat available post-burn. If large, contiguous grassland units cannot be provided, a complex of smaller units located close to each other should be provided to facilitate colonization from adjacent territories during prescribed fire implementation. The District Wildlife Biologist should be consulted on the prescribed burn plans for the Peabody Tract due to the intricate nature of annual rotations and percentage of habitat that should be burned for managing the Henslow's sparrow.

Timber Rattlesnake:

- To avoid adverse effects on the timber rattlesnake, the USFS should not conduct prescribed fires in the Big Bailey, Middle Bailey, and Utah Ridge units between April 15 and October 15. However, the USFS may conduct prescribed fires in these units prior to October 15 if the areas are first surveyed for the timber rattlesnake and the species is 1) determined to be absent from the project area, or 2) determined to be present, and site-specific mitigation/avoidance measures can be developed and implemented to protect the species.

Regal Fritillary:

- Prescribed fires during the fall fire season should not be conducted in the Kern Prairie/Peabody Tract prior to 15 September to prevent disturbance of the species during its flight period. The spring fire season on the Wayne National Forest does not overlap the flight period of this species.

2.4.2.4 Mitigation for Air Quality and Human Health & Safety

- Smoke and prescribed fire warning signs will be posted on any paved roads in the vicinity of the burn unit;
- During burns, smoke will be monitored visually. Unacceptable smoke effects will be addressed by altering firing tactics, actively directing traffic, or terminating the burn;
- Temporary ATV access points and trails would be rendered inconspicuous by raking leaf litter over exposed ground, and/or piling debris at entry points, so as to discourage prolonged, illegal ATV use post project completion;

- Nearby and adjacent residents will be notified prior to implementation of any prescribed fires; and
- Prior to each prescribed fire, any oil and gas companies will be contacted to turn off any active lines within the project areas. Measures will be taken to protect any above-ground lines and structures, including, but not limited to:
 - Applying Class C Foam (non-phosphorous, biodegradable) to all fire lines and around oil and gas structures;
 - Removing leaf litter, debris, and other fuels around oil and gas structures; and
 - Implementing burn outs away from the structures.

2.5 COMPARISON OF ALTERNATIVES

Table 2-3 briefly summarizes the environmental effects of the various alternatives. It provides a quick comparison of how well the alternatives respond to the project need, objectives, significant issues, and impact topics. Chapter 3 discusses the environmental consequences of the proposed alternatives in detail.

Table 2-3 Comparison of Alternatives' Responses to Impact Topics

	Alternative 1 - No Hazardous Fuels Reduction (No Action Alternative)	Alternative 2 - Hazardous Fuels Reduction with Prescribed Fire (Proposed Action)	Alternative 3 – Hazardous Fuels Reduction with More Frequent Prescribed Fire
Project Need			
Hazardous Fuels Reduction/Project Cost	No hazardous fuels reduction would occur under this alternative. The cost of this alternative would be \$0.	Hazardous fuels reduction would occur on approximately 2,035 acres. The approximate cost of this alternative would be \$100 - \$700 per acre.	Hazardous fuels reduction would occur on approximately 2,035 acres. The approximate cost of this alternative would be \$75- \$675 per acre.
Restore Prairie and Oak/Hickory Communities; Maintain Grassland Communities	The restoration of the prairie and oak/hickory forest communities and maintenance of the grassland community would not occur under this alternative	Restoration of prairie and oak/hickory communities and the maintenance of the grassland community would be promoted under this alternative	Restoration of prairie and oak/hickory communities and the maintenance of the grassland community would be promoted under this alternative
Impact Topics			
Soils	No soil impacts	Minor short-term soil erosion and compaction impacts resulting from prescribed fire and wildfire suppression activities; benefits to soil development and soil nutrification from prescribed fire.	Similar effects as described under Alternative 2
Water Resources	No water resources impacts	Minor short-term impacts to water resources from sediment delivery and turbidity resulting from prescribed fire and wildfire suppression activities; wetland hydrology unaffected	Similar effects as described under Alternative 2
Vegetation	No immediate impacts to vegetation; greater potential for moderate to high-intensity wildfire in the absence of hazardous fuel treatments; in the long-term, prairie and grassland habitat degraded as woody shrub and tree species encroach upon them	Fuel loadings reduced on approx. 2,035 acres; fire-adapted plant species and habitat benefited; increase in oak/hickory tree regeneration with decrease in maple and poplar regeneration; current prairie habitat preserved and former prairie restored	Fuel loadings reduced on approx. 2,035 acres; fire-adapted plant species and habitat benefited; increase in oak/hickory tree regeneration with decrease in maple and poplar regeneration; encroaching woody trees/debris in prairie habitat would be eliminated quicker and increased fire intervals would simulate and promote the growth of fire-adapted and other prairie species

Table 2-3 Comparison of Alternatives' Responses to Impact Topics

	Alternative 1 - No Hazardous Fuels Reduction (No Action Alternative)	Alternative 2 - Hazardous Fuels Reduction with Prescribed Fire (Proposed Action)	Alternative 3 – Hazardous Fuels Reduction with More Frequent Prescribed Fire
Impact Topics			
Wildlife	No short-term and direct impacts to wildlife; long-term and indirect impacts to wildlife with the degradation of grassland and prairie habitat from woody shrub and tree species encroachment	Prescribed fire activities would temporary displace some wildlife species; individual mortality of some wildlife species likely; minor adverse impact on some ground-nesting migratory birds; minor impacts to federally-listed T&E and Regional Forester Sensitive species; wildlife habitat improved in the long-term	Prescribed fire activities would temporary displace some wildlife species; individual mortality of some wildlife species likely; minor adverse impact on some ground-nesting migratory birds; minor impacts to federally-listed T&E and Regional Forester Sensitive species; wildlife habitat improved in the long-term
Air Quality	No impacts to air quality	Minor air quality impacts (air emissions and visibility) from prescribed fires	Similar effects as described under Alternative 2
Human Health & Safety	No immediate impacts to human health and safety; greater fire danger to adjacent communities in the absence of hazardous fuels reduction	Human health and safety improved by reducing fire danger to National Forest lands and adjacent communities; potential for injury from prescribed fire and wildfire suppression activities; minor exposure to smoke by workers and the public during prescribed fire	Similar effects as described under Alternative 2
Cultural Resources	No impact to known cultural resources	No impact to known cultural resources	No impact to known cultural resources

Chapter 3 – Environmental Analysis

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the action and No-Action alternatives. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided.

3.1 SOILS

3.1.1 *Affected Environment*

There are three predominant soil series in the Kern Prairie/Peabody Tract (Bethesda, Westmoreland, and Guernsey) and five predominant soil series within Big Bailey, Middle Bailey and Utah Ridge (Westmoreland, Guernsey, Upshur, Chagrin, Dekalb).

The Bethesda soil series consists of deep, well-drained soils (shaly silty clay loam) with moderately slow permeability formed in acid regolith from surface mine operations. The regolith is a mixture of partially weathered fine earth and fragments of bedrock. They are typically located on nearly level ridgetops and benches to very steep side slopes. The Westmoreland soil series consists of deep and very deep well-drained soils (silt loam) formed in residuum and colluvium from siltstone, sandstone, and limestone. They are typically located on hillsides, nose slopes and head slopes on dissected uplands, and are associated with woodlands, chiefly mixed hardwoods (oak and maple). The Guernsey soil series consists of deep, moderately well-drained soils (silt loam) formed in colluvium and residuum from interbedded siltstone, shale, and limestone. They are typically located on benches and side slopes on dissected uplands, and are associated with hardwood forests. The Upshur soil series consists of deep and very deep, well-drained, slowly permeable soils (silty clay) formed in residuum derived from clay shale and in places interbedded with thin layers of siltstone. They are typically located on ridgetops, benches, and hillsides, and are associated with mixed hardwoods (mainly oaks, hickory, and yellow poplar). The Chagrin soil series consists of deep, well-drained moderately permeable soils (silt loam) that formed in alluvium on flood plains. They are typically located on flood plains receiving alluvium from upland areas of sandstone, siltstone, shale, limestone, and low-lime glacial drift, and are associated with hardwood forests (mainly beech, hickory, sugar maple, ash, and sycamore). The Dekalb soil series consists of moderately deep, excessively drained soils (cobly sandy loam) formed in material weathered from gray and brown acid sandstone. They are typically located on nearly level to very steep uplands and ridges, and are associated with forests of mixed hardwoods, such as oaks, maples, and some white pine and hemlock (USDA, 2002a).

Much of the Peabody Tract contains reclaimed stripmines and the soils in some of these areas have already been impacted by compaction and heavily influenced by past mining operations and the reclamation process.

3.1.2 *Environmental Consequences*

Soil impacts were qualitatively assessed using soil characteristics, literature reviews, and mitigation measures.

3.1.2.1 Alternative 1 – No Action

Under the No Action Alternative, there would not be any impacts to soils.

3.1.2.2 Alternative 2 – Proposed Action

Proposed activities with the potential to impact soils include building fire lines during wildfire suppression activities and prescribed fire.

Minor and localized soil compaction would occur from prescribed fire activities (use of a bush hog). Heavy equipment (bush hog) would be prohibited within 100 feet of surface water resources, which would minimize the potential for soil disturbance and erosion in riparian areas. Since fire line construction would only be to the mineral soil and the soil structure will not be damaged, erosion potential is low.

Prescribed fire would release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrition for vegetation in the prairie. In addition to increasing nitrification of the soils and increasing minerals and salt concentrations in the soil, the ash and charcoal residue resulting from incomplete combustion aids in soil buildup and soil enrichment by being added as organic matter to the soil profile. The added material works in combination with dead and dying root systems to make the soil more porous, better able to retain water, and less compact while increasing needed sites and surface areas for essential microorganisms, mycorrhizae, and roots (Vogl, 1979; Wright and Bailey, 1980).

Prescribed fire in central hardwood forests are typically of low-severity and primarily consume the unconsolidated leaf litter. When the fires are able to move across the open forest floor, soil temperatures have been shown to not increase enough to cause significant heating-induced mortality of organisms dwelling in the mineral soil. Recolonization of the redeveloping post-fire forest floor has been found to be rapid. While microbial abundances are typically reduced by fire, rapid recolonization by these groups is likely. Soil sterilization can occur at site-specific locations when prescribed fire leads to smoldering of downed woody debris (Boerner, No date).

Bethesda soils are well-drained and exhibit moderately slow permeability, thus surface runoff is slow to very rapid depending on terrain. The potential for surface runoff in Westmoreland soils is negligible to high depending on terrain, and permeability is moderate. Guernsey soils are moderately well-drained and exhibit moderately slow or slow permeability, thus surface runoff is medium to very rapid depending on terrain. Upshur soils are well-drained and have slow permeability, thus surface runoff is medium to rapid depending on terrain. Surface runoff in Chagrin soils is slow since they are well-drained and exhibit moderate permeability. The potential for surface runoff in Dekalb soils is negligible to high depending on terrain, and permeability is rapid (USDA, 2002a).

Prescribed fire and wildfire suppression activities are anticipated to result in very minor soil erosion in light of the low-severity nature of the fires in central hardwood forests and prairie habitats, soil characteristics, and in light of the following mitigation measures and monitoring:

- When handline construction is required, construction standards will be issued requiring the handlines to be built with minimum impact. Erosion control methods will be used on slopes exceeding 10% where handline construction took place;
- Construction of fire lines will not be conducted on slopes greater than 30%; and
- Monitoring will occur after each prescribed fire for signs of erosion. If monitoring reveals that erosion is taking place, seeding and mulching bare slopes and isolation from over land waterflow with dips and/or erosion blankets or other actions will be taken, as appropriate.

3.1.2.3 Alternative 3

General soil impacts would be similar to those described under Alternative 2, except the benefits accruing to soils from prescribed fire would occur more rapidly with more frequent prescribed fires in the Kern Prairie.

3.2 WATER RESOURCES (INCLUDING WETLANDS)

3.2.1 *Affected Environment*

The Kern Prairie/Peabody Tract is located within the Raccoon-Symmes watershed and the Big Bailey, Middle Bailey, and Utah Ridge tracts are located in the Hocking watershed. Runoff from the Kern Prairie/Peabody Tract enters the East Branch of Raccoon Creek. Raccoon Creek is an impaired waterbody per the Environmental Protection Agency (EPA) (303d listed waterbody). Impairment of Raccoon Creek is attributed to low pH levels from acid mine drainage and the waterbody is listed as moderately impaired (EPA, 2002a). Within and immediately adjacent to the Kern Prairie/Peabody Tract, there are several streams (perennial and intermittent), strip ponds and other small open bodies of water with poor water quality (low pH) as a result of surface and underground mining and mining runoff. In the northern portion of the Peabody Tract, there is a shallow marsh with emergent vegetation surrounding one of the open bodies of water.

Runoff from Big Bailey, Middle Bailey and the northern half of Utah Ridge drains into West Bailey Run, Middle Bailey Run, Big Bailey Run and Carr Bailey Run (streams), which then drain into Sunday Creek and the Hocking River. The southern portion of Utah Ridge drains into Monday Creek, which also feeds into the Hocking River. The stretch of Hocking River between Monday Creek and the town of Athens is listed by the EPA as an impaired waterbody (303d listing). Impairment of this stretch of the Hocking River is attributed to elevated metals concentrations and siltation from mining/mining runoff and stream bank modification and destabilization. The EPA lists this segment of the Hocking River as minimally impaired (EPA 2002b). Both Bailey Run and North Branch have suitable water quality to support aquatic species. North Branch also has several associated wetlands. Big Bailey has two wetlands

adjacent to it. One is a man-made and the other is beaver influenced. There is a small pond located within the Utah Ridge unit.

Despite their proximity to former mine sites, Big Bailey Run and Middle Bailey Run both retain suitable aquatic habitats and water quality to support wildlife.

3.2.2 *Environmental Consequences*

Water resource impacts were qualitatively assessed using presence/absence of surface water resources, literature reviews and mitigation measures.

3.2.2.1 Alternative 1 – No Action

Under the No Action Alternative, there would not be any impacts to surface water resources. In the absence of hazardous fuels removal, future wildfires have a greater potential to become moderate or high-severity wildfires. Such wildfires can result in severe soil erosion and subsequent sediment delivery to nearby water resources.

3.2.2.2 Alternative 2 – Proposed Action

Fire line construction and prescribed fire activities (low-severity in nature) would result in a temporary and minor increases in soil erosion, especially in steeply sloped areas. Increased erosion would result in very minor and temporary sediment delivery and turbidity of adjacent surface water resources until treated areas re-vegetated. There would be very minor impacts to surface water resources from suppression and prescribed fire activities in light of the following mitigation measures:

- Creek crossings will be limited to set and existing locations;
- Fire line construction will not be permitted in wetlands;
- In the event riparian areas have been completely burned, they may be seeded with native plant species depending on the intensity of the burn and the composition of the vegetation prior to the burn (exotic vs. native);
- Fire lines will be located outside of highly erosive areas, steep slopes (greater than 30%), and other sensitive areas; and
- Prescribed fire activities and fire retardant/foam applications will be prohibited within 100 feet of surface water resources.

The use of fire retardants or foams could potentially cause short and long-term impacts to water resources if misapplied or mishandled. Retardants contain ammonia and phosphate or sulfate ions, which can change the chemistry of a water body, thus making it lethal to fish and other aquatic organisms. Foams contain detergents that can interfere with the ability of fish gills to absorb oxygen. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river. For example, if a 800-gallon drop is made into a fast flowing river, it is likely that the lethal effects to aquatic resources will be short-lived as dilution below the toxic level is quickly achieved. On the other hand, a 3,000-gallon drop in a stagnant pond would likely cause toxic

levels to persist for some time (USDA, 2001). Potential water quality impacts from fire retardant use would be minimized and/or eliminated by prohibiting its use within 100 feet of surface water resources.

By prohibiting the construction of fire lines within wetlands, and in light of the minimal amount of soil erosion anticipated from prescribed fire activities, there would be no change in the hydrology of streams and wetlands on National Forest lands. Increased sediment delivery as a result of low-severity prescribed fires would not be sufficient to change the degree of impairment for either Raccoon Creek or the Hocking River.

3.2.2.3 Alternative 3

General water resources impacts under Alternative 3 would be similar to those described under Alternative 2.

3.3 VEGETATION

3.3.1 *Affected Environment*

The proposed prescribed fire treatment areas in the Wayne National Forest consist of two predominant vegetation communities: prairie and mixed-oak forest. The prairie habitats are dominated by big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium*), with only scattered forbs intermixed, such as Queen Anne's lace (*Daucus carota*) and early goldenrod (*Solidago juncea*). Woody species are overtaking former prairie areas such as Kern Prairie and encroaching upon the grasslands in the Peabody Tract. The primary woody invaders are sassafras (*Sassafras albidum*), hawthorns (*Crataegus* spp.), and red maple (*Acer rubrum*) (Andrews, McCormac, and Whan, 2000).

The mixed-oak forest stands consist of canopy trees including white oak (*Quercus alba*), scarlet oak (*Q. coccinea*), chestnut oak (*Q. prinus*), northern red oak (*Q. rubra*), black oak (*Q. velutina*), pignut hickory (*Carya glabra*), and shagbark hickory (*Carya ovata*). Many of the forest stands have high densities of red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), and yellow poplar (*Liriodendron tulipifera*). In the understory of the mixed-oak forests, herbaceous vegetation types include plant species such as blueberries (*Vaccinium* spp.), spotted wintergreen (*Chimaphila maculata*), Solomon's seal species (*Polygonatum* sp.), smooth false foxglove (*Aureolaria flava*), Canada lily (*Lilium canadense*), sedges (*Carex* spp.), and whorled loosestrife (*Lysimachia quadrifolia*) (USDA, No date).

There are several federal threatened and endangered species and Regional Forester Sensitive Species (RFSS) that occur in or have potential habitat in the project area (see Table 3-1). Full descriptions of all the federally-listed and RFSS wildlife species and their habitat requirements can be found in the Biological Evaluation for this proposed Prescribed Fire Program.

Table 3-1 Federal Threatened and Endangered Species & Regional Forester Sensitive Species

Common Name	Scientific Name	Status
FEDERALLY LISTED SPECIES		
Northern wild monkshood	<i>Aconitum noveboracense</i>	T
Small whorled pogonia	<i>Isotria medeoloides</i>	T
Running buffalo clover	<i>Trifolium stoloniferum</i>	E
REGIONAL FORESTER SENSITIVE SPECIES (RFSS)		
Juniper sedge	<i>Carex juniperorum</i>	RFSS
Bicknell's panicgrass	<i>Dicanthelium (=Panicum) bicknelli</i>	RFSS
Yellow gentian	<i>Gentiana alba (G. flavida)</i>	RFSS
Butternut	<i>Juglans cinerea</i>	RFSS
Umbrella magnolia	<i>Magnolia tripetala</i>	RFSS
Yellow-fringed orchid	<i>Platanthera ciliaris</i>	RFSS
Rock skullcap	<i>Scutellaria saxatilis</i>	RFSS
Pigeon grape	<i>Vitis cinerea</i>	RFSS

Between June 7 and August 8, 2002, plant surveys for small whorled pogonia and northern wild monkshood were conducted in the Big Bailey, Middle Bailey, and Utah Ridge treatment areas. The surveys did not record the presence of small whorled pogonia or northern wild monkshood. The treatment areas did not contain appropriate habitat for monkshood (creviced outcrops).

Table 3-2 identifies those invasive plants that are most likely to occur within the treatment areas, and that are causing the greatest problems Forest-wide (Larson, 2002). During the plant surveys for small whorled pogonia and northern wild monkshood, it was noted that the forest cover was relatively free of multiflora rose and other invasives; however, there were scattered occurrences.

Table 3-2 Invasive Plants in the Prescribed Fire Treatment Areas on the Wayne National Forest

Common Name	Scientific Name	Status*	Habitat
Tree of heaven	<i>Ailanthus altissima</i>	1	disturbed soils – all habitats except wetlands
Garlic mustard	<i>Alliaria petiolata</i>	1	semi-shade (forests, savannas, yards, roadsides)
Japanese barberry	<i>Berberis thunbergii</i>	1	roadsides/thickets
Asian bittersweet	<i>Celastrus orbiculatus</i>	1	open woods/thickets
Crown-vetch	<i>Coronilla varia</i>	1	roadsides and waste lands
Russian olive	<i>Elaeagnus angustifolia</i>	1	pastures, fields, grasslands, sparse woodlands
Autumn olive	<i>Elaeagnus umbellata</i>	1	pastures, fields, grasslands, sparse woodlands
Gill-over-the-ground	<i>Glechoma hederacea</i>	3	moist woods; disturbed area
Japanese honeysuckle	<i>Lonicera japonica</i>	1	fields, forest edges and openings, disturbed woods, floodplains
Amur honeysuckle	<i>Lonicera maackii</i>	1	understory of woodlands, marsh edges
Morrow (Fly) honeysuckle	<i>Lonicera morrowi</i>	1	understory of woodlands, marsh edges
Tatarian honeysuckle	<i>Lonicera tatarica</i>	1	understory of woodlands, marsh edges
White sweet-clover	<i>Melilotus alba</i>	2	roadsides/waste places (especially calcareous soil)

Common Name	Scientific Name	Status*	Habitat
Yellow sweet-clover	<i>Melilotus officinalis</i>	2	Waste places
Multiflora rose	<i>Rosa multiflora</i>	2	sunny areas w/ well drained soil

* Forest Service Region 9 Category for Invasiveness:

- 1) Category 1 – Highly Invasive: These plants are all non-native, highly invasive plants, which invade natural habitats and replace native species;
- 2) Category 2 – Moderately Invasive: These plants are less invasive than those in Category 1. If these species are significantly replacing native species, then they are doing so only in local areas; and
- 3) Category 3 – Widespread Non-Native Species: These plants are often restricted to disturbed ground, and are not especially invasive in undisturbed natural habitats. Most of these species are found throughout much of the Forest.

3.3.2 Environmental Consequences

Vegetation impacts were qualitatively assessed using literature reviews and quantitatively assessed by acres impacted.

3.3.2.1 Alternative 1 – No Action

There would not be any immediate impacts to vegetation under the No Action Alternative. In the absence of wildfire, the maple species would continue to increase in number at the expense of hickory and oak species. In the early years of development, oak regeneration allocates more photosynthate to root development while other fire-intolerant species, such as maples and yellow poplar, allocate more to shoot development. These differing growth strategies result in oaks being suppressed in the shaded understory while fire-intolerant species move to dominance of the overstory (Cooper et al., 1999).

In prairie habitats, habitat for fire-adapted species such as yellow gentian, rattlesnake master (*Eryngium yuccifolium*), big bluestem, and little bluestem would continue to deteriorate. In other prairie habitats of the National Forest (Buffalo Beats Research Natural Area), the introduction of prescribed fire as a vegetation management tool enhanced the presence of these species and other rarities, such as slender blazing star (*Liatris cylindracea*). Yellow gentian, rattlesnake master, and slender blazing star are known to occur within 0.2 miles of the Big Bailey tract (Larson, 2002).

In the absence of prescribed fire treatments, hazardous fuels in the forested areas of the proposed treatment areas would continue to accumulate. Woody tree and shrub species would continue to encroach upon grassland and prairie habitats in the Kern Prairie/Peabody Tract treatment area, and in the forest openings in the Middle Bailey and Utah Ridge units.

There would be no impacts to any federal threatened and endangered species or Regional Forester Sensitive Species under the No Action Alternative. Tables 3-4 and 3-5 summarize the potential impacts to federally-listed species and Regional Forester Sensitive Species under Alternative 1.

3.3.2.2 Alternative 2 – Proposed Action

Under the proposed action, prescribed fire would be employed on approximately 2,035 acres. Hazardous fuels in the project areas have accumulated with the absence of fire. Prescribed fire treatments and selective tree removal would decrease leaf litter and downed woody debris (hazardous fuels) within the project areas over time.

For the prairie habitats, the introduction of prescribed fire and selective removal of encroaching woody tree species would have several beneficial effects. First, the loss of prairie habitat would be stopped and former prairie restored. In the Kern Prairie, the Forest Service estimates that a combination of prescribed fire and selective tree removal could restore up to 4 acres of remnant prairie (Andrews, McCormac, and Whan, 2000). Second, prescribed fire would promote the establishment of rare and fire-adapted prairie plant species, such as yellow gentian, rattlesnake master, little bluestem, and big bluestem. Third, plant habitat and diversity in the prairie and grasslands would increase under a prescribed fire program.

In the mixed-oak forests, prescribed fire would reduce hazardous fuel levels (surface and ladder fuels), and would promote the growth of fire-adapted and/or fire-tolerant species. Recent studies have demonstrated that prescribed fire treatments are an important component in managing for oak regeneration (Cooper et al., 1999; van Lear and Brose, 1999). These studies, and other ongoing projects such as Elaine Kennedy Sutherland's work to determine the ecological responses of mixed-oak communities in southern Ohio to prescribed fire (USDA, 2002b), show a positive correlation between oak regeneration and prescribed fire treatments. Fire-intolerant species' seeds, such as yellow poplar, have epigeal germination, where the root collar and its accompanying dormant buds are placed above the soil surface. Acorns from oak species are usually buried by animals and have hypogeal germination, where the root collar and its dormant buds are placed below the soil surface. The difference in germination strategy makes yellow poplar more susceptible to lethal temperatures at or above ground levels. By allocating more carbon to development of a large taproot in their early years, oak species have a more favorable root/shoot ratio for vigorous resprouting after being top-killed by fire (Cooper, 1999). Both Cooper and van Lear & Brose found that maples and poplar experienced reduced densities after prescribed fire while oak densities remained largely unaffected. The reduction of fire-intolerant tree species provides a competitive advantage to the oak and hickory species in the understory, and in the long-term, would result in an oak and hickory-dominated canopy.

While fire may help control some non-native plant species, many are disturbance-adapted and fire increases their vigor and encourages their spread. Many of the species listed below either resprout vigorously from rhizomes or root crowns after fires or colonize burned areas through prolific seed production (USDA 2002c). Table 3-3 summarizes the fire effects on several of the more pernicious invasive plants found on the National Forest lands. Unless otherwise noted, fire effects information was collected from the U.S. Forest Service's Fire Effects Information System (USDA, 2002c).

Table 3-3 Effects of Fire on Invasive Plants Common to Prescribed Fire Treatment
Areas on the Wayne National Forest

Common Name	Fire Effects
Tree of heaven	It resprouts after heat-girdling; a prolific seed producer, grows rapidly and can successfully compete with the native vegetation; it produces toxins which prevent the establishment of other species (TNC, 1988)
Garlic mustard	May sprout from root crown after fire; "mid-intensity" burns, with flame lengths up to 3 inches (15 cm), significantly reduce the presence of garlic mustard; adult plant densities were reduced by both spring and fall burns, as well as repeated fires, although single spring burns were most effective in oak dominated, dry mesic upland forest
Japanese barberry	Information unavailable
Asian bittersweet	Information unavailable
Crown-vetch	In fire-adapted communities, prescribed fire in late spring can be an effective control
Russian olive	May sprout from root crown after fire: probably colonizes burned areas via off-site seed sources
Autumn olive	May sprout from root crown after fire: probably colonizes burned areas via off-site seed sources
Gill-over-the-ground	Information unavailable
Japanese honeysuckle	After being top-killed by fire, Japanese honeysuckle sprouts vigorously from the root crown and can reach or exceed pre-fire composition percentage
Amur honeysuckle	Repeated annual prescribed fires during the growing season will top-kill shrubs and inhibit new shoot production; the use of prescribed fire may be effective in some cases where the density of <i>Lonicera</i> spp. is low and sufficient fuels are available; restoration potential is likely to be lowest where <i>Lonicera</i> spp. occur in high densities and there is a high likelihood of continued dispersal of seeds into the restoration area; because exotic bush honeysuckles readily resprout, it may be necessary to re-burn every year or every other year for several years (TNC, 2000)
Morrow honeysuckle (Fly)	Repeated annual prescribed fires during the growing season will top-kill shrubs and inhibit new shoot production; the use of prescribed fire may be effective in some cases where the density of <i>Lonicera</i> spp. is low and sufficient fuels are available; restoration potential is likely to be lowest where <i>Lonicera</i> spp. occur in high densities and there is a high likelihood of continued dispersal of seeds into the restoration area; because exotic bush honeysuckles readily resprout, it may be necessary to re-burn every year or every other year for several years (TNC, 2000)
Tatarian honeysuckle	Repeated annual prescribed fires during the growing season will top-kill shrubs and inhibit new shoot production; the use of prescribed fire may be effective in some cases where the density of <i>Lonicera</i> spp. is low and sufficient fuels are available; restoration potential is likely to be lowest where <i>Lonicera</i> spp. occur in high densities and there is a high likelihood of continued dispersal of seeds into the restoration area; because exotic bush honeysuckles readily resprout, it may be necessary to re-burn every year or every other year for several years (TNC, 2000)

Common Name	Fire Effects
White sweet-clover	Fire stimulates germination of white sweet-clover seed; spring or summer burning in prairies and old fields effectively kills most second-year plants; the use of fire to suppress white sweet-clover is possible, but several successive annual or biennial burns are probably required to exhaust the seed supply
Yellow sweet-clover	Burning aids establishment of yellow sweet-clover on grassland, probably because it aids germination of seeds through scarification and by creating openings in which sweet-clover can establish; fire kill of the crown buds of second year effectively kills the plant; death or injury to branched stems at the base will severely retard new growth
Multiflora rose	May re-sprout from root crown; may invade burned areas via off-site seed sources; one study reported complete elimination of multiflora rose after an unreported-severity prescribed fire

During the 2002 plant survey for northern wild monkshood and small-whorled pogonia, scattered occurrences of multiflora rose were noted. The limited information regarding fire effects on multiflora rose suggests that frequent prescribed fire would help reduce, if not eliminate, the plant within treated areas. Since the supercanopies of the forest areas are being preserved, shade-intolerant, fire-intolerant noxious weeds, such as crown-vetch and Russian and autumn olive, would not likely become established in treatment areas. Other noxious weeds, including the honeysuckles and clovers, may proliferate in areas that are disturbed with selective tree removal and prescribed fire; however, repeated prescribed fires would likely reduce the extent of their propagation. Of all the noxious weed species noted in Table 3-3, Japanese honeysuckle appears to be the most responsive to prescribed fire, and management of the plant may be more problematic under a prescribed fire program.

Prescribed fire activities would not significantly affect any federally-listed threatened or endangered plant species since none are known to occur within the project area. Similarly, prescribed fire activities would not result in significant, adverse effects on any RFSS species. An in-depth environmental analysis for these determinations can be found in the Biological Evaluation for this proposed Prescribed Fire Program. Tables 3-4 and 3-5 summarize the potential impacts to federally listed species and Regional Forester Sensitive Species under Alternative 2.

3.3.2.3 Alternative 3

General vegetation impacts under Alternative 3 would be similar to those described in the Proposed Action. However, more frequent prescribed fires in the prairies would remove middle and late successional vegetative habitats. Encroaching woody debris in the prairie would be eliminated quicker under this alternative, and more frequent fires would stimulate and promote the growth of fire-adapted and other prairie species. In addition, most of the noxious weeds (e.g., honeysuckles and clovers) would respond negatively to repeated prescribed fires. Management of Japanese honeysuckle, if present, would become problematic in the Kern Prairie under a more frequent prescribed fire program. Tables 3-4 and 3-5 summarize the potential impacts to federally listed species and Regional Forester Sensitive Species under Alternative 3.

Table 3-4 Determination of Effect to Federally Listed Species

Species	Alternatives Not Likely to Adversely Impact	Alternatives With No Impact
Northern wild monkshood		1, 2, 3
Small whorled pogonia	2, 3	1
Running buffalo clover	1, 2, 3	

Table 3-5 Determination of Effect to Regional Forester Sensitive Species

Species	May Impact Individuals or Habitat but Not Likely to Cause a Trend to Federal Listing or Loss of Viability	May Cause a Loss of Viability Within Project Area	Alternatives With No Impact
Juniper sedge	1, 2, 3		
Bicknell's panicgrass	1, 2, 3		
Yellow gentian	1, 2, 3		
Butternut	2, 3		1
Umbrella magnolia			1, 2, 3
Yellow-fringed orchid	1, 2, 3		
Rock skullcap	2, 3		1
Pigeon grape	2, 3		1

3.4 WILDLIFE

3.4.1 Affected Environment

The mix of openland and mixed-oak forest provides a wide variety of wildlife habitats on the Wayne National Forest. Common mammals include white-tailed deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus*), woodchuck (*Marmota monax*), opossum (*Didelphis virginiana*), and gray squirrel (*Sciurus carolinensis*). Common birds are wild turkey (*Meleagris gallopavo silvestris*), ruffed grouse (*Bonasa umbellus*), pileated woodpecker (*Dryocopus pileatus*) and wood duck (*Aix sponsa*).

There are several federal threatened and endangered species and Regional Forester Sensitive Species (RFSS) that occur in or have potential habitat in the project area (see Table 3-6). Full descriptions of all the federally listed and RFSS wildlife species and their habitat requirements can be found in the Biological Evaluation for this proposed Prescribed Fire Program.

Surveys for potential bat hibernacula and swarming habitat were conducted in the treatment areas and within ¼ mile of them to determine the presence or absence. From the portal survey, one portal was deemed potential habitat as hibernacula and was surveyed in early September 2002 via a swarming survey. No Indiana bats were found during the survey. In addition, surveys for the American burying beetle, conducted in all the treatment areas during late July/early August, did not result in a positive occurrence.

Table 3-6 Federal Endangered and Threatened Species and Regional Forester Sensitive Species

Common Name	Scientific Name	Status
FEDERALLY LISTED SPECIES		
<i>Mammals</i>		
Indiana bat	<i>Myotis sodalis</i>	Endangered
<i>Beetles</i>		
American burying beetle	<i>Nicrophorus americanus</i>	Endangered
REGIONAL FORESTER SENSITIVE SPECIES (RFSS)		
<i>Mammals</i>		
Evening bat	<i>Nycticeius humeralis</i>	RFSS
Black bear	<i>Ursus americanus</i>	RFSS
Bobcat	<i>Felis rufus</i>	RFSS
Allegheny woodrat	<i>Neotoma magister</i>	RFSS
<i>Birds</i>		
Cerulean warbler	<i>Dendroica cerulea</i>	RFSS
Henslow's sparrow	<i>Ammocramus henslowii</i>	RFSS
<i>Reptiles and Amphibians</i>		
Timber rattlesnake	<i>Crotalus horridus</i>	RFSS
Green salamander	<i>Aneides aeneus</i>	RFSS
<i>Butterflies</i>		
Olympia marble	<i>Euchloe olympia</i>	RFSS
Southern grizzled skipper	<i>Pyrgus wyandot</i>	RFSS
Regal fritillary	<i>Speyeria idalia</i>	RFSS

Several animal species identified in the Wayne National Forest Plan and Environmental Impact Statement are referred to as indicator species to represent relative measures of change in the quality and quantity of habitats as part of the overall planning process. Table 3-7 identifies the management indicator species for the Wayne National Forest. The redfin shiner, blackside darter, rainbow darter, golden redhorse, sand shiner, and banded darter do not have habitat and are not known to occur within the project area. Descriptions for the management indicator species were taken from the Wayne National Forest Land and Resource Management Plan.

Table 3-7 Management Indicator Species for the Wayne National Forest

Common Name	Scientific Name	Habitat Component
pine warbler	<i>Dendroica pinus</i>	Conifers
pileated woodpecker	<i>Dryocopus pileatus</i>	Mature hardwoods
cerulean warbler	<i>Dendroica cerulea</i>	Close-canopied, mature/over mature hardwoods
ruffed grouse	<i>Bonasa umbellus</i>	Early hardwoods
white-eyed vireo	<i>Vireo griseus</i>	Late succession
common yellowthroat	<i>Geothlypis trichas</i>	Middle Succession
field sparrow	<i>Spizella pusilla</i>	Early Succession
eastern bluebird	<i>Sialia sialis</i>	Park like
wood duck	<i>Aix sponsa</i>	Beaver ponds, oxbows
Virginia rail	<i>Rallus limicola</i>	Marsh
western chorus frog	<i>Rana sylvatica</i>	Fishless ponds in fields
wood frog	<i>Pseudacris triseriata</i>	Vernal ponds in hardwoods
bluegill	<i>Lepomis macrochirus</i>	Artificial impoundments

Common Name	Scientific Name	Habitat Component
southern redbelly dace	<i>Phoxinus erythrogaster</i>	Small/intermittent streams
redfin shiner	<i>Notropis umbratilis</i>	Medium streams with sand/gravel pools
blackside darter	<i>Percina maculata</i>	Medium streams with silt pools
rainbow darter	<i>Etheostoma caeruleum</i>	Medium streams with riffles
golden redhorse	<i>Moxostoma erythrurum</i>	Large streams with pools
sand shiner	<i>Notropis ludibudus</i>	Large streams with sand pools
banded darter	<i>Etheostoma zonale</i>	Large streams with riffles

Pine warbler: This bird is restricted to woodlands dominated by pines. In Ohio, they prefer mixed woods with a pine canopy and an understory of various deciduous species. They occupy mature forests and second growth woods with scattered large pines, and are equally likely to be found within the interiors and along the edges of these habitats. Breeding bird surveys conducted on the Wayne National Forest from 1992-1994 recorded very few pine warbler occurrences. No pine warblers were detected in the Athens Ranger District.

Pileated woodpecker: This bird prefers extensive tracts of mature forests, but may also be found in scattered woodlots and along riparian corridors. Breeding bird surveys conducted on the Wayne National Forest from 1992-1994 recorded pileated woodpeckers at all thirty transects.

Cerulean warbler: This bird is associated with mature deciduous woodlands. Eastern Ohio is in the core area of this species breeding range. In southeast Ohio, breeding pairs occupy extensive mixed mesophytic forests and floodplain woods. Population trend analysis on state data shows that the Ohio population of the cerulean warbler has not shown a significant overall trend of change and detections have remained even and constant for a thirty year period from 1965 to 1995. Breeding bird surveys conducted on the Wayne National Forest from 1992-1994 recorded cerulean warblers at all thirty transects. Cerulean warblers are known to occur throughout all units on the Wayne National Forest.

Ruffed grouse: This bird prefers second growth deciduous woods where dense understories, shrubs, vines, and other tangles provide suitable cover. They prefer extensive tracts but may also occupy isolated woodlots. Breeding records of the ruffed grouse show that they occur almost exclusively in southeastern and northeastern Ohio. In 1995, a breeding bird inventory was undertaken in 39 stands, ranging in age from 5 to 21 years of age, on all three units of the National Forest. Twenty-four detections of ruffed grouse were made in 11 of these stands. Detections were made on all three units. The ruffed grouse was also detected during interior forest bird surveys in 7 of the thirty transects.

White-eyed vireo: This bird prefers shrub stage successional habitats, especially old fields where woody vegetation is interspersed with herbaceous patches. They may also be found in woodland edges and openings, and along fencerows. Damp and dry habitats are equally suitable, but not swamps. Population trend analysis on state data for the years of 1965 through 1995 show a rise in the average number of individuals detected per route. In 1995, a breeding bird inventory was undertaken in 39 stands, ranging in age from 5 to 21 years of age, on all three units of the National Forest. Eighty-five detections of white-eyed vireos were made in 21 of these stands. The majority of detections were made on the Ironton Unit.

Common yellowthroat: This bird inhabits dense herbaceous vegetation with scattered brushy thickets and small saplings in damp or wet locations. Most breeding pairs inhabit old fields, corridors along fencerows and streams, woodland edges and openings, and the margins of ponds and marshes. During survey efforts within earlier successional habitat, only 5 of 39 sampled areas had common yellowthroats detected, with all but one detection being on the Ironton unit. This low number may be due to the amount of available aquatic habitat located within them.

Field sparrow: This bird occupies a wide variety of brushy successional habitats, such as old fields and cutover hillsides where herbaceous vegetation is interspersed with brushy tangles and scattered small saplings. They inhabit brushy pastures, woodland edges and openings with shrubby undergrowth, and narrow brushy corridors along fencerows, roadsides, railroads, and streams adjacent to open fields. In 1995, a breeding bird survey inventory was undertaken in 39 stands, ranging in age from 5 to 21 years of age, on all three units of the National Forest. Thirty-four detections of field sparrows were made in 9 of these stands. Detections were made on the Ironton unit only.

Eastern bluebird: This bird inhabits open country, such as large grassy pasture fields, and right-of-way along roads bordered by fencerows and woodland edges. They also occupy weedy fallow fields, but avoid woodland interiors. The Eastern bluebird is common and widely distributed in the state and the population levels appear to be stable after a decline in the population due to the severe winters of 1976-1978. The bluebird is a common resident of the Peabody Tract and the Forest maintains several nest boxes in the unit for their use.

Wood duck: This bird prefers mature riparian corridors along streams, quiet backwaters of lakes and ponds bordered by large trees, and secluded wooded swamps. Numerous wood duck nest boxes have been placed in various wetlands and along streams on the Wayne National Forest with great success.

Virginia rail: This bird prefers dense marshy vegetation. They occupy shallow marshes dominated by cattails or other tall emergent vegetation. This species is not known to occur in southeastern Ohio.

Western chorus frog: This frog can be found in a variety of habitats including marshes, meadows, swales, and other open areas. Breeding occurs in early spring in the edges of shallow ponds, flooded swales, ditches, wooded swamps, and flooded fields. They usually remain close to the breeding grounds throughout the year, hiding from predators (and hibernating also) beneath logs, rocks, leaf litter, and in loose soil or animal burrows. This frog has been heard calling from one wetland on the Athens Unit.

Wood frog: This frog is most commonly found in moist woodlands during the summer. They hibernate under stones, stumps and leaf litter in the winter. Breeding occurs in very early spring in woodland ponds. Numerous sites on the Forest have been identified as wood frog breeding habitat areas, in part from the annual frog and toad calling surveys.

Bluegill: The preferred habitat of the bluegill is slow or non-moving clear water containing small amounts of suspended clayey silts, with bottoms made of sand, gravel, or soft muck

containing organic debris with scattered beds of aquatic vegetation. Some examples are lakes, ponds, sloughs, reservoirs, and moderately deep stream pools. The bluegill has been collected from every 5th level watershed in the National Forest.

Southern redbelly dace: The primary habitat of the southern redbelly dace is clear slow moving streams with long pools. These streams generally contain wooded undercut banks and are not subjected to frequent flooding. Undercut banks are desired for the sake of safety and shade. Unlike many other species of minnows, the redbelly will school in the middle of the channel if frightened, especially if the cut banks are not present. The southern redbelly dace has been collected from every 5th level watershed in the Forest.

3.4.2 *Environmental Consequences*

Wildlife impacts were qualitatively assessed using presence/absence determinations of federally listed, Regional Forester Sensitive Species, and Forest Management Indicator species, literature reviews, and mitigation measures.

3.4.2.1 Alternative 1 – No Action

There would be no direct impacts to wildlife under the No Action Alternative. In the absence of prescribed fire, and with continued wildfire suppression, fire-adapted species in the prairie, grassland, and mixed-oak communities would continue to decline. With a continued degradation of grassland habitat from encroaching woody tree and shrub species, wildlife species such as Henslow's sparrow would be adversely affected. In the long-term, the viability of the sparrow population at the Peabody Tract may be at risk due to loss of grassland habitat. Tables 3-8 and 3-9 summarize the potential impacts to federally listed species and Regional Forester Sensitive Species under Alternative 1.

3.4.2.2 Alternative 2 – Proposed Action

Proposed activities with the potential to impact wildlife include fire line construction, fire retardant use, tree removal, and prescribed fire. General impacts to wildlife during these activities would be minor and would include the temporary loss of some habitat and isolated mortality of individuals.

With the implementation of mitigation measures as outlined in section 2.4 of this assessment, it is anticipated that prescribed fire activities would affect, but not adversely affect, the Indiana bat and American burying beetle and their habitat. In addition, prescribed fire activities would not likely cause a trend to federal listing or loss of viability for any RFSS. The in-depth environmental analysis for these determinations can be found in the Biological Evaluation for this proposed Prescribed Fire Program. In some cases, species such as Henslow's sparrow would benefit from prescribed fire and selective tree removal since these activities would stop the encroachment of woody tree species and enhance and protect existing grassland habitat. While maintenance of Henslow's sparrow habitat requires active grassland management, such as burning, haying, or light grazing, or periodic disturbances, in order to create and maintain tall and dense grasses and forbs with sparse woody vegetation and a well-developed litter layer, the

species avoids areas that have been recently disturbed by burning, mowing, or grazing (Johnson and Igl, 2001; Thatcher, 2000; Swanson, 1996), and avoids burned areas the summer following spring and fall burns due to the scarcity of litter and standing dead vegetation (Swanson, 1996; Johnson and Igl, 2001).

Prescribed fire activities would not directly impact nesting migratory birds since the activities would occur prior to the breeding season (generally May 15 through August 15). Prescribed fires would likely impact some migratory bird species in mixed-oak forests as a result of changes in habitat conditions. A recent study found that ground and low-shrub nesting bird species would be adversely affected in the long-term when prescribed fires were employed to restore mixed-oak communities in southern Ohio. Prescribed fires resulted in incremental but temporary reductions in the availability of leaf litter, shrubs, and saplings, but they did not affect trees, snags, or understory vegetation cover. While the study found that some breeding bird species experienced declines in population densities, it also found that prescribed fires improved habitat for ground and aerial-foraging birds. Moreover, there were no changes in the composition of the breeding bird community, and total breeding bird population levels were unaffected by prescribed fires (Artman et al, 2001).

Table 3-8 shows the estimated acreage of habitat for each Management Indicator Species Forest-wide, estimated acreage of habitat for each species within the proposed burn areas, and the percent of the total Forest-wide habitat type acreage that would be affected by implementation of the Proposed Action.

Table 3-8 Management Indicator Species Habitat Affected by the Proposed Action

Common Name	Scientific Name	Habitat Component	Estimated Acres In Forest Land Base *	Acres Estimated in Burn Area**	% Of Forest Type in Burn Area
Pine Warbler	<i>Dendroica pinus</i>	Conifers	16,315	91.3	0.6%
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Mature hardwoods	147,766	1,730.3	1.2%
Cerulean Warbler	<i>Dendroica cerulea</i>	Close-canopied, mature/over mature hardwoods	147,766	1,730.3	1.2%
Ruffed Grouse	<i>Bonasa umbellus</i>	Early hardwoods	49,877	246.5	0.5%
White-Eyed Vireo	<i>Vireo griseus</i>	Late succession	6,181	58.6	0.9%
Common Yellowthroat	<i>Geothlypis trichas</i>	Middle Succession	2,007	9.0	0.6%
Field Sparrow	<i>Spizella pusilla</i>	Early Succession	7,406	41.7	0.5%
Eastern Bluebird	<i>Sialia sialis</i>	Park like	2,386	575	24%
Wood Duck	<i>Aix sponsa</i>	Beaver ponds, oxbows	Not impacted by burn	N/A	N/A
Virginia Rail	<i>Rallus limicola</i>	Marsh	Not impacted by burn	N/A	N/A
Western Chorus Frog	<i>Rana sylvatica</i>	Fishless ponds in fields	Not impacted by burn	N/A	N/A

Wood Frog	<i>Pseudacris triseriata</i>	Vernal ponds in hardwoods	Not impacted by burn	N/A	N/A
Bluegill	<i>Lepomis macrochirus</i>	Artificial impoundments	Not impacted by burn	N/A	N/A
Southern Redbelly Dace	<i>Phoxinus erythrogastres</i>	Small/intermittent streams	Not impacted by burn	N/A	N/A
Redfin Shiner	<i>Notropis umbratilus</i>	Medium streams with sand/gravel pools	Not impacted by burn	N/A	N/A
Blackside Darter	<i>Percina maculata</i>	Medium streams with silt pools	Not impacted by burn	N/A	N/A
Rainbow Darter	<i>Etheostoma caeruleum</i>	Medium streams with riffles	Not impacted by burn	N/A	N/A
Golden Redhorse	<i>Moxostoma erythrurum</i>	Large streams with pools	Not impacted by burn	N/A	N/A
Sand Shiner	<i>Notropis ludibudus</i>	Large streams with sand pools	Not impacted by burn	N/A	N/A
Banded Darter	<i>Etheostoma zonale</i>	Large streams with riffles	Not impacted by burn	N/A	N/A
* These acres are estimated from April 1999 Data extrapolated (Forest at 210,877 acres) to current forest acreage of 233,070.					
**Acres from CDS Data base for compartments 120,125,126 and 128 (scaled to 2035 acre burn area.)					

As shown in Table 3-8, only a minimal amount of habitat for certain Management Indicator Species would be affected by implementation of the Proposed Action. The amount of habitat affected represents only a very small fraction of the total amount of habitat available on the Wayne National Forest. In addition, not all acres would be burned at one time; each burn area would be burned in parts, leaving unaffected habitat available within the project area for species to use.

Prescribed fire activities may temporarily affect field sparrow, common yellowthroat, white-eyed vireo, and eastern bluebird as shrub habitat would be reduced from tree removal and fire. It is not anticipated, however, that these species would experience significant population declines since the treatment units would 1) be burned on a 3-8 year rotation and 2) be burned in parts, thus leaving an adequate shrub component to support nesting and foraging activities. Virginia rail would not likely be affected since the species does not breed on the National Forest. Pine warbler, cerulean warbler, Lawrence's warbler, and pileated woodpecker are not likely to be impacted in the short-term since tree removal activities would concentrate on small diameter trees that are encroaching upon prairies and grasslands, and prescribed fires would remove surface fuels and young saplings. In the long-term, these species may benefit from forest stands with higher percentages of oak and hickory vs. red maple. Wood duck would not be affected since the prescribed fire treatments would not significantly impact water quality or hydrology of ponds and streams within or adjacent to the project area, and since mature trees that may contain nesting cavities would not be cut.

During any wildfire suppression efforts (from an escaped prescribed fire), the construction of fire lines and approved use of fire retardant would have minor effects on wildlife habitat. Mitigation

measures that prohibit fire lines or fire retardant use within riparian areas and within 100 feet of surface water resources, respectively, would minimize and/or eliminate potential impacts to aquatic species, such as the redbelly dace, bluegill, western chorus frog, and wood frog. Prescribed fires in the spring may impact adult wood and western chorus frogs as they migrate to aquatic sources; however, the degree of impact is not expected to be significant. Many of these individuals would be located in the damp/moist leaf litter and previous research suggests that the burning of the moist leaf litter has little effect on populations of amphibian species (USDA, 2000a). Nevertheless, there would likely be some individual mortality of the wood and western chorus frog during prescribed fire events during the spring.

Wildfire suppression activities and hazardous fuel reduction efforts would likely result in the isolated mortality of a few wildlife individuals that are not federally-listed species; however, it is not anticipated that such minor mortality would be great enough to threaten the viability of resident wildlife populations on and adjacent to National Forest lands. Tables 3-8 and 3-9 summarize the potential impacts to federally listed species and Regional Forester Sensitive Species under Alternative 2.

3.4.2.3 Alternative 3

General wildlife impacts under Alternative 3 would be similar to those described under the Proposed Action. Tables 3-9 and 3-10 summarize the potential impacts to federally listed species and Regional Forester Sensitive Species under Alternative 3.

Table 3-9 Determination of Effect to Federally Listed Species

Species	Alternatives Not Likely to Adversely Impact	Alternatives With No Impact
Indiana bat	1, 2, 3	
American burying beetle	1, 2, 3	

Table 3-10 Determination of Effect to Regional Forester Sensitive Species

Species	May Impact Individuals or Habitat but Not Likely to Cause a Trend to Federal Listing or Loss of Viability	May Cause a Loss of Viability Within Project Area	Alternatives With No Impact
Evening bat	1, 2, 3		
Black bear	2, 3		1
Bobcat	1, 2, 3		
Allegheny woodrat	1, 2, 3		
Cerulean warbler	1, 2, 3		
Henslow's sparrow	2, 3	1	
Timber rattlesnake	2, 3		1
Green salamander			1, 2, 3
Southern grizzled skipper	2, 3	1	
Olympia marble	1, 2, 3		
Regal fritillary	2, 3	1	

3.5 AIR QUALITY

3.5.1 *Affected Environment*

Under the terms of the 1990 Clean Air Act amendments, the Wayne National Forest is designated as a Class II quality area. By definition, Class II areas of the country are set aside under the Clean Air Act, but identified for somewhat less stringent protection from air pollution damage than Class I areas. The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides (USDA, 2000b). Morgan and Washington Counties, north and northeast of the Athens Ranger District of the Wayne National Forest, are both maintenance areas for sulfur dioxide.

3.5.2 *Environmental Consequences*

Air quality impacts were qualitatively assessed upon review of the State of Ohio prescribed fire permit requirements, the extent of proposed prescribed fire activities under all the alternatives, and mitigation measures.

3.5.2.1 Alternative 1 – No Action

Under the No Action Alternative, there would not be any air quality impacts.

3.5.2.2 Alternative 2 – Proposed Action

Smoke consists of dispersed airborne solids and liquid particles, called particulates, which could remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion.

For prescribed fires, there are three principle strategies to manage smoke and reduce air quality effects. They include:

1. Avoidance - This strategy relies on monitoring meteorological conditions when scheduling prescribed fires to prevent smoke from drifting into sensitive receptors, or suspending burning until favorable weather (wind) conditions;
2. Dilution – This strategy ensures proper smoke dispersion in smoke-sensitive areas by controlling the rate of smoke emissions or scheduling prescribed fires when weather systems are unstable, not under conditions when a stable high-pressure area is forming with an associated subsidence inversion. An inversion would trap smoke near the ground; and

3. Emission Reduction– This strategy utilizes techniques to minimize the smoke output per unit area treated. Smoke emission is affected by the number of acres burned at one time, pre-burn fuel loadings, fuel consumption, and the emission factor. Reducing the number of acres that are burned at one time would reduce the amount of emissions generated by that burn. Reducing the fuel beforehand, e.g., removing firewood, reduces the amount of fuel available. Conducting prescribed fires when fuel moistures are high can reduce fuel consumption. Emission factors can be reduced by pile burning or by using certain firing techniques such as mass ignition.

A smoke management (amount of particulates released) permit will be obtained from the EPA prior to implementing any prescribed fires. In addition, a burn boss certified by the State of Ohio as a prescribed fire manager will be on-site during all prescribed fires.

If weather conditions changed unexpectedly during a prescribed fire, and there was a potential for violating air quality standards or for adverse smoke impacts on sensitive receptors, the Forest Service would implement a contingency plan, including the option for immediate suppression. Considering the relatively small number of acres that would be affected by prescribed fire under the proposed action over a period of several years and considering the Forest Service would quantify emissions prior to every prescribed fire to ensure the fire's compliance with state and national air quality standards, prescribed fires would not violate daily national or state emission standards. Smoke impacts to sensitive receptors would be minimized by adhering to prescribed fire plans that maximized smoke dispersion and prohibited the ignition of prescribed fires when prevailing winds would carry smoke towards sensitive receptors.

Smoke impacts to residents and the general public would be minimized as a result of education/outreach efforts regarding the prescribed fire program, the temporary closure of potentially affected roads, and adherence to smoke management plans that maximized smoke dispersion.

3.5.2.3 Alternative 3

Under Alternative 3, general air quality impacts would be similar to those described under Alternative 2.

3.6 HUMAN HEALTH AND SAFETY

3.6.1 Affected Environment

In keeping with the Federal Wildland Fire Policy, the Forest Service affirms that firefighter and public safety is the first priority in every fire management activity. All decisions will reflect the Forest Service's commitment to the principle of protecting human life before any other resource. The Forest Service will ensure that all firefighter personnel possess the qualifications, training, and experience necessary to meet or exceed the minimum national standards prior to being assigned fire line duties. In addition, staff would prepare brochures for the public and adjacent landowners that advise them of the time and extent of the proposed prescribed fire. In the event

of potentially hazardous wildfires within the park, the Athens District Ranger would coordinate public notification efforts within and outside the park. The extent of public notice would depend on the specific fire situation.

There exist several oil and gas structures and other utilities within and adjacent to the treatment units. One utility line runs through portions of two of the seven areas of the Peabody Tract. A telephone utility line bisects the Utah Ridge burn unit, and there are two active gas wells located in the western portion of this unit, connected by an above-ground active gas line. Two active gas wells, each with a surface tank battery, are located within or immediately adjacent to the Middle Bailey burn unit. In addition, there is one active oil well located within or immediately adjacent to the Middle Bailey area, and a pipeline runs along the southern boundary of the area. Within the Big Bailey burn unit, utilities include: one inactive (plugged) oil well, three active oil wells (two of which are connected via a pipeline within the burn unit, and the third of which is connected to a surface tank battery via a pipeline in the burn unit), and two active gas wells. A pipeline runs to the south of the Big Bailey burn unit, forming the border of the unit.

There are also numerous private residences and structures nearby and adjacent to the treatment units. The accumulation of hazardous fuels in this wildland urban interface increases the potential that a wildfire may impact neighboring residences and structures.

3.6.2 Environmental Consequences

Human health and safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, literature review of type and extent of injury caused by equipment and conditions, and in light of mitigation measures and best management practices.

3.6.2.1 Alternative 1 – No Action

Under the No Action Alternative, hazardous fuels would continue to accumulate in the treatment units, thus increasing the fire danger to adjacent and nearby private residences and structures in the wildland urban interface.

3.6.2.2 Alternative 2 – Proposed Action

Factors likely to adversely impact firefighter health and safety include activities associated with prescribed fire and, if necessary, wildland fire suppression efforts (accidental spills, injuries from the use of fire-fighting equipment, smoke inhalation, and, in severe cases, injuries from wildland fires). Impacts to the public could include smoke inhalation, and in severe cases, injuries from escaped wildland fires.

Accidental spills of fire retardants and foams can adversely impact human health and safety. Fire retardants used in controlling or extinguishing fires contain about 85 percent water, 10 percent fertilizer, and 5 percent minor ingredients such as corrosion inhibitors and bactericides. Fire suppressant foams are more than 99 percent water. The remaining 1 percent contains surfactants, foaming agents, corrosion inhibitors, and dispersants. These qualified and approved

wildland fire chemicals have been tested and meet specific requirements with regard to mammalian toxicity as determined by acute oral and dermal toxicity testing as well as skin and eye irritation tests (USDA, 2001a). However, they are strong detergents, and can be extremely drying to skin. All currently approved foam concentrates are irritating to the eyes as well. Application of a topical cream or lotion can alleviate the effects of a retardant, and protective goggles can prevent any injury to the eyes when using foams.

Injuries can occur from the use of equipment as well as from traveling overland to targeted areas for firefighting efforts during suppression efforts. While each of the crew is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines would minimize accidents.

Smoke inhalation can also pose a threat to human health and safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM_{2.5}), and total suspended particulate (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000c).

The use of prescribed fire may contribute to additional human health and safety impacts. When using prescribed fire, management actions, such as construction of fire lines, the presence of engines, and strict adherence to prescribed fire plans, would minimize the potential for an out-of-prescription burn or escape. In addition, the Forest Service would notify all nearby and adjacent residents prior to implementation of any prescribed fires. Elements of the prescribed fire plan that relate to ensuring a safe burn include such measures as fuel moisture, wind speed, rate of fire spread, and estimated flame lengths. While the potential for a fire escape will always exist when conducting prescribed fires, that potential is extremely small. Recent statistics summarized by the Boise Interagency Fire Center report that approximately 1 percent of prescribed fires on federal lands required suppression activities of some kind. In most cases these prescribed fires jumped a control line and suppression tactics were successfully used to control them. Out of the 1 percent of prescribed fires that required suppression, 90 percent were controlled without incident. Statistically, this result leaves about 0.1 percent of prescribed fires that required major suppression actions (Stevens, 2000). To reduce and/or eliminate potential human health and safety concerns with hunters during the hunting season and other recreationists, the Forest will post signs on paved roads in the vicinity of the treatment areas.

By reducing hazardous fuel loads and creating defensible space for firefighters, the Forest Service would improve its ability to protect people and structures on National Forest and adjacent lands.

The presence of oil and gas structures in the treatment units could pose a human health and safety concern during prescribed fires, if a fire were to come into contact with such structures.

To protect oil and gas structures from fire during treatments, and to reduce associated human health and safety impacts, the Forest Service would implement the following mitigation measures:

- Prior to each prescribed fire, any oil and gas companies will be contacted to turn off any active lines within the project areas; and
- Measures will be taken to protect any above-ground lines and structures, including, but not limited to:
 - Applying Class C Foam (non-phosphorous, biodegradable) to all fire lines and around oil and gas structures;
 - Removing leaf litter, debris, and other fuels around oil and gas structures; and
 - Implementing burn outs away from the structures.

3.6.2.3 Alternative 3

The general impacts to human health and safety under Alternative 3 would be similar to those under Alternative 2.

3.7 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions.

3.7.1 *Affected Environment*

A visual inspection for above-ground cultural resources in the treatment units was conducted between November 23 and November 27, 2001. No architectural resources or above-ground archeological resources were identified during the course of these investigations. Former cultural surveys in portions of the treatment units (Mills and Markham, 1997; Gundy, 1995; and Skinner, 1986; and Heft, 1944) identified 6 cultural sites. Five of the recorded sites consisted of subsurface deposits and one was an earthen mound. The mound is assumed to date to the Woodland period; however, no formal investigations of this mound were ever performed. The location of the mound, as indicated on the mapping available at the Ohio Historic Preservation Office, could not be confirmed during the 2001 investigations. None of these sites have been deemed eligible for inclusion on the National Register of Historic Places (NRHP), and it appears that none of these sites, with the possible exception of the earthen mound, meet the minimum requirements for inclusion on the NRHP.

Protection measures for heritage sites are keyed to determinations of each site's eligibility for inclusion in the National Register of Historic Places. Officially listed heritage sites and sites determined eligible or with an undetermined eligibility are of concern. Ineligible sites are dropped from management concerns, and determinations of effect on these properties are not addressed in this analysis.

3.7.2 *Environmental Consequences*

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources.

3.7.2.1 Alternative 1 – No Action

There would not be any direct or indirect impacts to cultural resources under the No Action Alternative.

3.7.2.2 Alternative 2 – Proposed Action

Proposed activities with the potential to impact cultural resources include creating fire lines and prescribed fire. There are no above-ground cultural resources located within any of the project areas, and none would be affected by prescribed fire under the Proposed Action. In addition, fire lines would be constructed only down to mineral soil. Therefore, no subsurface cultural resources would have the potential to be affected by project implementation or to be uncovered by the creation of fire lines. Low-intensity burning under the Proposed Action is considered to have no adverse effect on these cultural resource sites.

3.7.2.3 Alternative 3

Impacts to cultural resource sites would be similar to those described under Alternative 2.

3.8 CUMULATIVE EFFECTS

The cumulative effects analysis for the Fire Management Plan environmental assessment considers the past, present, and reasonably foreseeable future actions on land uses that could add to (intensify) or offset (compensate for) the effects on the resources and that may be affected by the Fire Management Plan alternatives. In some instances, activities may result in both negative and positive impacts when considering the short and long-terms. As a result, some resource categories in Table 3-11 show both positive and negative impacts resulting from a particular activity. The information provided in Table 3-11 is the basis for the cumulative effects described in Table 3-12.

Table 3-11 Affected Key Resources and Activities/Land Uses
Contributing to Prescribed Fire Program Implementation Cumulative Effects

DIRECT/INDIRECT EFFECTS KEY: (+) Positive/beneficial; (-) Negative/detrimental; (Blank) Neutral/no effect

	Soils	Water Resources	Vegetation	Wildlife	Air Quality	Human Health & Safety	Cultural Resources
Lightning & human-caused wildfires	+ -		+ -	+ -	-	-	-
Wildfire suppression past, present, future	+ -	+ -	+ -	+ -	+	+	+ -
Past mining operations (construction, operation and residual effects)	-	-	-	-		-	
Strip mine reclamation	+	+	+	+		+	
Timber management	-	-	+ -	+ -			-
Potential off-road vehicle, horse and/or pedestrian trail construction activities and use	-	-	-	-			-
Minor road construction, reconstruction	-	-	-	-		+	-
Urban development	-	-	-	-	-	+	-

Table 3-12 Cumulative Effects

Resource	Past and Present Actions	No Action	Proposed Actions	Future Actions	Cumulative Effects
Soils	Adverse soil impacts (soil erosion or loss, contamination) from timber management, road construction, past wildland fires and suppression efforts, and from mining operations (acid mine drainage); Beneficial soil impacts from past wildland fires (nutrification of soils); acid mine reclamation reduced the extent of contaminants leaching into soils.	No soil impacts.	Prescribed fire activities would have temporary and minor adverse effects on soils (soil erosion), but beneficial effects as well over the short and long-terms (soil development and soil nutrification).	Future prescribed fire activities would have temporary and minor adverse effects on soils (soil erosion), but beneficial effects as well over the short and long-terms (soil development and soil nutrification); future development of recreational trails and road construction and/or reconstruction will have minor, short-term soil impacts (soil erosion and compaction).	<u>Proposed Action and Alternative 3:</u> Soils would improve over time with soil development and nutrification from prescribed fires. The Prescribed Fire Program would contribute to impacts on soils, but would not result in significant cumulative impacts. <u>No Action Alternative:</u> Alternative would not contribute to cumulative impacts, since no impacts on soils would occur.
Water Resources	Degradation of water quality from residential and commercial development; short-term degradation of water quality from past wildfires; acid mine drainage significantly impacts water resources.	No water resources impacts.	Prescribed fires may have very minor and temporary water resource impacts (sediment delivery and turbidity); no alteration of current hydrology from prescribed fire activities.	Future prescribed fires may have very minor and temporary water resource impacts (sediment delivery and turbidity); no alteration of current hydrology from activities; future acid mine reclamation improves water quality of ponds, streams, and rivers.	<u>Proposed Action and Alternative 3:</u> Water resources would remain relatively unaffected. The Prescribed Fire Program would contribute a minor amount to cumulative impacts on water resources, but would not result in significant cumulative impacts. <u>No Action Alternative:</u> Alternative would not contribute to cumulative impacts, since no impacts on water resources would occur.
Vegetation	Past timber management reduced tree densities and old growth; wildfire suppression promoted the growth of red maple and other plant species at the expense of oak, other fire-adapted plant species; acid mine	No immediate impacts to vegetation; greater potential for moderate to high-intensity wildfire in the absence of hazardous fuel treatments; in the	Prescribed fire would decrease hazardous fuel loadings; fire-adapted plants would increase in abundance; oak trees would be favored at the expense of red maple and other fire-intolerant plant species.	Future prescribed fire would decrease hazardous fuel loadings; minor vegetation loss from future trail construction.	<u>Proposed Action and Alternative 3:</u> Fuel loadings would be reduced, prairie habitat and diversity would benefit, oak in mixed-oak forest stands would benefit. The Prescribed Fire Program would contribute to cumulative impacts on vegetation, but would not result in significant cumulative impacts.

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Table 3-12 Cumulative Effects

Resource	Past and Present Actions	No Action	Proposed Actions	Future Actions	Cumulative Effects
	drainage alters soil composition and adversely affects plant habitat.	long-term, prairie and grassland habitat degraded as woody shrub and tree species encroach upon them.			<p><u>No Action Alternative:</u> Continued growth promotion of red maple and other plant species at the expense of oak, other fire-adapted plant species. Continued degradation of grassland and prairie habitat would occur. Eventual succession of surrounding forest into grassland and prairie habitat, resulting in the loss of that habitat. Cumulative impacts would not be significant.</p>
Wildlife	Timber management, wildfire suppression, mining operations, urban development, and road construction degraded wildlife habitat and diversity.	No short-term or direct impacts to wildlife; long-term and indirect impacts to wildlife with the degradation of grassland and prairie habitat from woody shrub and tree species encroachment.	Prescribed fire would result in minor, short-term disturbance and displacement with minimal loss of individuals; improved habitat and increased wildlife diversity with prescribed fire.	Future prescribed fire and acid mine reclamation would continue to improve wildlife habitat and diversity.	<p><u>Proposed Action and Alternative 3:</u> Wildlife habitat and diversity would increase. The Prescribed Fire Program would contribute towards beneficial cumulative impacts on wildlife, but would not result in significant cumulative impacts. <u>No Action Alternative:</u> Decrease in wildlife species dependent on grassland and prairie habitat in the project area over the long-term and increase in species in those areas that prefer forested habitat. Decrease in habitat and species diversity would occur. Cumulative impacts would not be significant.</p>

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Table 3-12 Cumulative Effects

Resource	Past and Present Actions	No Action	Proposed Actions	Future Actions	Cumulative Effects
Air Quality	Urban development, past wildland and prescribed fires contribute to some temporary deterioration in air quality and visibility.	No impacts to air quality.	Prescribed fire emissions would result in very minor, short-term air quality and visibility impacts.	Future development around the Forest would continue to result in increased air emissions (wood stoves, automobiles, etc.).	<p><u>Proposed Action and Alternative 3:</u> Class II air quality standards would not be violated. The Prescribed Fire Program would contribute to cumulative impacts on air quality, but would not result in significant cumulative impacts.</p> <p><u>No Action Alternative:</u> Alternative would not contribute to cumulative impacts, since no impacts on air quality would occur.</p>
Human Health & Safety	Past wildfire suppression efforts protected adjacent communities; acid mine reclamation indirectly benefits human health and safety.	No immediate impacts to human health and safety; greater fire danger to adjacent communities in the absence of hazardous fuels reduction.	Prescribed fire activities might result in very minor impacts; long-term improvement in human health and safety with reduction in fuels.	Similar effects as described in Past and Present Actions.	<p><u>Proposed Action and Alternative 3:</u> Human health and safety would improve over time with prescribed fire activities due to a decrease in the potential for future catastrophic wildfires. The Prescribed Fire Program would contribute to beneficial cumulative impacts on human health and safety, but would not result in significant cumulative impacts.</p> <p><u>No Action Alternative:</u> Increased potential for future catastrophic wildfires to occur, which could adversely affect human health and safety. Cumulative impacts would not be significant.</p>
Cultural Resources	Past suppression efforts and development may have impacted un-recorded cultural sites.	No impacts to cultural resources	No impacts to cultural resources.	No impacts to cultural resources since they would be avoided.	<p><u>Proposed Action and Alternative 3:</u> Alternatives would not contribute to cumulative impacts, since no impacts on cultural resources would occur.</p> <p><u>No Action Alternative:</u> Alternative would not contribute to cumulative impacts, since no impacts on cultural resources would occur.</p>

Consultation and Coordination

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Scoping

Details of the scoping process and the issues that arose from it are described in Chapter 1, Section 1.7 – *Scoping Issues and Impact Topics*.

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Appendix A: Response to Comments on the EA

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Comment	Response
 <p>6375 Riverside Drive, Suite 50 Dublin, Ohio 43017</p> <p>TEL 614 717-2770 FAX 614 717-2777</p> <p>Worldwide Office Arlington, Virginia TEL 703 841-3300</p> <p>nature.org</p> <p>October 23, 2002</p> <p>Mr. Kevan Moore Forest Fire Management Officer Wayne National Forest 13700 US Hwy 33 Nelsonville, Ohio 45764</p> <p>Re: Wayne National Prescribed Fire Program Draft Environmental Assessment</p> <p>Dear Mr. Moore:</p> <p>On behalf of the Ohio Chapter of The Nature Conservancy, I am writing to state that we concur with the conclusions in the Prescribed Fire Program Draft Environmental Assessment for the Wayne National Forest, and support the proposed action in Alternative 2.</p> <p>The draft environmental assessment thoroughly addresses many issues of concern and provides a convincing analysis that impacts from implementation of the preferred alternative to the soils, water resources, vegetation, wildlife, air quality, human health and safety, and cultural resources will be minimal. At the same time these impacts will be offset to a great extent by the benefits to the forest resource. We believe Alternative 2 would allow the Forest Service to meet its management goals in the Wayne National Forest to promote vegetation diversity, protect and enhance fish and wildlife habitat, and protect the forest resource from wildfire and other natural weather events.</p> <p>Research of historical documents by Conservancy staff indicates that prior to European contact fire played a major role in shaping the landscape throughout most of Ohio. Based on a number of factors including Native American populations, climate, and topography, these effects were probably greatest in the western and southern halves of the state, where the Wayne National Forest is located. Anthropogenic fire resulted in the development of extensive grassland, savannas and oak woodlands, and oak dominated forests. With this in mind, and considering the natural communities proposed to be managed with prescribed fire in the Wayne National Forest, it is certainly appropriate to implement the prescribed fire program as described in the draft environmental assessment.</p> <p>As an additional reference of support, I've included a copy of the letter dated 6/20/2002 that The Nature Conservancy sent in support of the Wayne National Forest's prescribed fire program. The statements in that letter also apply to the environmental assessment and I include it for additional emphasis.</p>	<p>Comment noted.</p> <p>Comment noted.</p> <p>Comment noted. As stated in Section 1.2 of this EA, the purpose of this action is to develop and implement a prescribed fire program that utilizes the benefits of fire to achieve desired natural resource conditions while minimizing the fire danger to adjacent lands from hazardous fuel accumulations. Prescribed fire is proposed to be used in a manner that promotes the health and rejuvenation of prairie, grassland, and hickory/oak communities.</p>

Comment	Response
<p>Kevan Moore Wayne National Prescribed Fire Environmental Assessment 10/25/02 Page Two</p> <p>Thank you for the opportunity to comment on the draft environmental assessment. If I can be of additional assistance, please contact me at (614)717-2770 ext.18.</p> <p>Sincerely,</p> <p><i>Marleen Kromer</i> Marleen Kromer Director of Inter-Agency Program Development</p> <p>cc: Myra L. Williamson, Athens District Ranger Mary O. Reddan, Forest Supervisor</p>	