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Environmental Assessment

HOLLOW BROWN PROJECT

**Forest Service
Ozark-St. Francis National Forest
Boston Mountain Ranger District
Washington County Arkansas,
Main Division**

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1.0 Introduction

1.1 Document Structure

The Forest Service, represented by an interdisciplinary team including the district wildlife biologist, the timber management assistant, the recreation specialist, an archaeologist, a Geographical Information Systems (GIS) specialist and others, has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

Introduction: Includes the purpose of and need for the project and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's proposed action as well as alternatives to the proposed action. These alternatives were developed based on issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Environmental Consequences: This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area.

Agencies and Persons Consulted: This section provides a list of preparers and agencies

consulted during the development of the environmental assessment.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the District Office in Ozark, Arkansas

1.2 Purpose and Need

The Boston Mountain Ranger District proposes road, timber harvesting, silvicultural, and wildlife/fisheries habitat management treatments on National Forest land north of the Millers Chapel area in the Upper Jones Fork Watershed in Washington County, Arkansas.

Restoration of native ecological systems and improvement of wildlife and fisheries habitats are the highest priorities in managing our natural resource base in order to have a lasting effect on future conditions of the forest. Habitat diversity for animals and plants, including threatened, endangered, and/or sensitive species would be maintained or improved by the timber, wildlife, and recreation management activities proposed.

Competition resulting from over-stocked stands has slowed the growth and vigor of trees within the stands of this project area. If this condition were to continue, growth will stagnate, the trees will become stressed and become vulnerable to insect and disease attacks, and eventually mortality would take place among the trees in the stands. We propose thinning to promote the overall health and vigor of these stands. This would increase growth by individual trees, help the trees defend against attacks from insect and

disease pathogens, and the stand would be more efficient in carbon sequestration.

The management actions proposed in this project such as the rehabilitation of wildlife openings, development of wildlife ponds, and eradication non-native invasive species will contribute to healthy forest conditions within the project area.

Part of the need for this project is to improve watershed conditions in the Jones Fork Watershed northeast of Winslow in Washington County. This watershed is contained in the larger Upper Frog Bayou Watershed, the source of a municipal water supply. The actions proposed take into account the protection and restoration of forest ecosystems. When trying to achieve far-reaching goals like the restoration of landscape-scale ecological systems, it may take

decades for some of these broad aspirations to be accomplished. However, with the adaptive approach that is inherent in this proposed project, we will periodically reassess progress and can make adjustments if monitoring results indicate desired conditions are not achievable. In some cases, our desired condition matches the current condition, so our goal is to maintain what we have. But in other cases, we need to work toward meeting the desired conditions, and success in achieving them can only be measured over the long term.

1.2.1 Overview of the Proposed Action

The project area includes compartments 512 and 513. The legal description is Township 13 North Range 29 West sections 10 – 12, 14, and 15. Figure 1.2.1 shows the general location of the project area in Washington County.

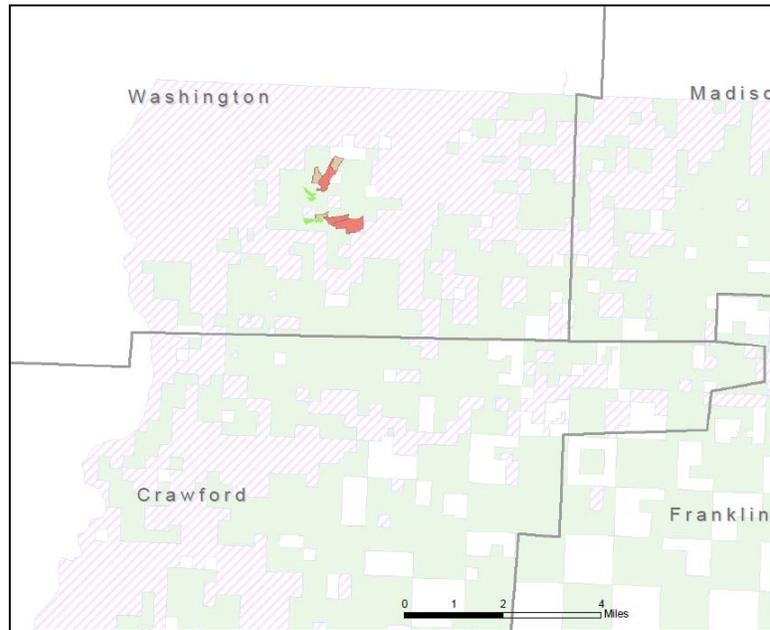


Figure 1.2.1. Project area location in Washington County, Arkansas

Following is a brief review of the proposed actions to meet this purpose and need (all

measures are approximations).

VEGETATION MANAGEMENT

Thinning would remove less vigorous trees to reduce competition between remaining trees. This would increase growth and vigor of the remaining trees and increase their resistance to disease and insects. Vigorous growth also aids in carbon sequestration which occurs at a higher rate if trees are allowed to grow unhindered by competition. Thinning these

stands would also increase the amount of sunlight reaching the forest floor and improve conditions for ground level plants such as bluestem grasses and various forbs. Small rodents, birds, deer and turkey would benefit from these treatments. Table 1.2.1 shows the proposed treatments by stand and compartment.

Table 1.2.1. Proposed silvicultural treatments

Comp/Stand	Acres	Method of Cut	Silvicultural Treatments
512/05	83	Thin	N/A
512/10	33	Thin	N/A
512/18	13	Shelterwood And SH Removal	<u>Chemical site prep (alternative 1) or mechanical site prep (alternative 2) and site prep burn.</u> Chemical release of desirable tree species as needed (alternative 1). After 5 years remove shelterwood trees if sufficient stocking. Planting of desired tree species as needed.
512/20	21	N/A	Pre-commercial Thin
513/06	26	Shelterwood And SH Removal	<u>Chemical site prep (alternative 1) or mechanical site prep (alternative 2) and site prep burn.</u>
513/11	57	Thin	N/A
513/22	28	Shelterwood And SH Removal	<u>Chemical site prep (alternative 1) or mechanical site prep (alternative 2) and site prep burn.</u>
513/23	21	N/A	Pre-commercial Thin
Total Acres	282		

ROADS MANAGEMENT

Install gate at intersection of FS Roads 3WA0918 & 95513C.

WILDLIFE / FISHERIES HABITAT MANAGEMENT

Table 1.2.2 summarizes treatments by stand and compartment.

Wildlife Openings: Construct or reconstruct, maintain or improve 7 wildlife openings

Ponds: Construct or reconstruct, maintain or improve 5 ponds for a total of approximately 4 acres.

Stream Habitat: Actions may include placement of medium and large wood into parts of the stream in Brown Hollow and an unnamed tributary of the Jones Fork above the confluence with the stream draining Brown Hollow to augment fish habitat, cover and shading.

Table 1.2.2 Proposed wildlife/fisheries treatments

Comp/Stand	Acres	Wildlife/Fisheries Treatments
512/10	2	<u>Wildlife opening construction.</u> Mechanical and subsequent mechanical(alternative 1)/and/or chemical (alternative 2) maintenance. Plant in approved wildlife forages or native grass species.
512/10	0.5	<u>Pond construction.</u> Mechanical and subsequent mechanical(alternative 1)/and/or chemical(alternative 2) maintenance.
512/11	2	<u>Wildlife opening construction.</u>
512/11	0.5	<u>Pond construction</u>
512/13	2	<u>Reconstruction of existing wildlife opening.</u> Mechanical(alternative 1)/and/or chemical (alternative 2) maintenance. Plant in approved wildlife forages or native grass species.
512/13	0.5	<u>Reconstruction of existing pond.</u> Mechanical(alternative 1)/and/or chemical (alternative 2) maintenance.
513/08	4	<u>Reconstruction of 2 existing wildlife openings.</u>
513/08	0.5	Reconstruction of existing pond. Mechanical/and/or removal of trees from dam. Mechanical(alternative 1)/and/or chemical (alternative 2) maintenance.
513/19	2	<u>Wildlife opening construction</u>
513/19	0.5	<u>Pond construction.</u>
513/23	1	<u>Wildlife opening construction</u>
513/23	0.5	<u>Pond construction.</u>

1.3 Other Environmental Documents Relevant to This Analysis

Tiering: The Revised Land and Resources Management Plan (RLRMP 2005) set the overall guidance for managing the land and resources of the Ozark-St. Francis National Forests. This document is available on the web at: http://www.fs.fed.us/oonf/ozark/projects/planrevision/revised_forest_plan.html

The project area is in management area 3E - High Quality Forest Products (RLRMP 2005). Forest and watershed health, scenery management, and habitat improvement activities for wildlife are strongly emphasized. The proposed treatments seek to accomplish improvements in these goals for this area.

The Final Environmental Impact Statement (FEIS) for the RLRMP describes the alternatives and their consequences for revising the LRMP. This document is available on the web at: <http://www.fs.fed.us/oonf/ozark/projects/planrevision/eis.html>.

This EA is tiered to these documents. For more information on the plants and animals in the project area see the Biological Evaluation (BE) (2008) for this project. This document is available at the district office.

1.3.1 Relationship to Other Laws and Regulations

The Multiple-Use Sustained Yield Act of 1960 (MUSYA) directs the forest to produce and maintain a sustainable supply of timber in perpetuity.

Under the National Forest Management Act (NFMA) regulations, selection of management indicator species (MIS) during development of forest plans is required. MIS are selected because their population changes are believed to indicate the effects of management activities. They are used during planning to help compare effects of

alternatives and as a focus for monitoring. Where appropriate, MIS represent the following groups of species (36 CFR 219.19 [a][1]):

- Threatened and endangered species on state and federal lists
- Species with special habitat needs
- Species commonly hunted, fished or trapped
- Non-game species of special interest
- Species selected to indicate effects on other species of selected major biological communities.

1.4 Decision to be Made

This document will provide the District Ranger with a basis on which to make an informed decision. No other agency will be involved.

Following a review of this document, the District Ranger will decide to do one or more of the following:

1. Approve specific management activities within the planning area as presented in one of the alternatives or a combination of alternatives analyzed in this document.
2. Defer all or specific management activities for implementation at a later time.
3. Determine whether projects or certain individual activities analyzed in this document may cause significant impacts (as defined in 40 CFR 1508.27) that will require the development and approval of an environmental impact statement prior to implementation.

1.4.1 Appeal Opportunities

Only those persons who responded during the comment period for this project have legal

standing to appeal the decision pursuant to 36 CFR 215.11.

Appeal opportunities are described in detail in the decision notice. The appeal period will last for 45 days beginning the day after the legal notice of the decision is published in the *Times Record*.

1.5 Comments and Issues

1.5.1 Public Involvement

Scoping for this project began with the mailing of a scoping package containing a description of the proposed action, a map depicting the proposed action, and a comment form. This was mailed to adjacent landowners and interested citizens on July 15, 2009. The mailing list also included letters to Native American Tribes and the Arkansas Game and Fish Commission. A total of 140 letters were mailed. The notice of the availability of these documents was posted in the *Times Record* on July 15, 2009. A copy of the proposed action letter was posted that same week on the Ozark-St. Francis National Forests website at

<http://www.fs.fed.us/oonf/ozark/projects/planning/bostonmtnproject.html>.

Issues developed from scoping responses and internal comments throughout development of the project were considered by the interdisciplinary team.

Only one (positive) response was received within the comment period of July 16 through August 14 2009

2.0 Alternatives and Comparisons

This chapter explains the alternatives in detail and provides a summary of the environmental effects for all alternatives.

Alternative 1 includes the proposed actions described in the scoping letter with herbicide treatments in the timber treatments and no herbicide in the wildlife treatments.

Alternative 2 includes the proposed actions described in the scoping letter. However, herbicides would be used in the wildlife treatments and no herbicides would be used in the timber treatments.

Alternative 3 (no action) does not require any standards.

2.1 – Detailed description of Alternatives 1 and 2:

VEGETATION MANAGEMENT

See Table 1.2.1 for an overview of treatments.

Pre-commercial Thin -42 acres

Thin the stand by removing lower quality trees and leaving the residual stand on 12x12 spacing, approximately 300 trees per acre.

Commercial Thin - 173 Acres: Thins the stand by removal of lower quality trees leaving the residual stand at approximately 70 sq ft of basal area.

Shelterwood Harvest -67 acres

Method of regenerating an even-aged stand in which a new age class develops beneath the residual trees. The initial harvest prepares the seedbed and creates a new age class where natural regeneration is preferred. In the first phase, 70 percent of the overstory is removed. Site preparation will be accomplished utilizing chemical (for alternative 1) or mechanical (alternative 2) means and controlled burning

methods. Periodic chemical releases (alternative 1) will often be necessary to promote desirable tree species. With adequate regeneration, the second phase removes the remaining overstory.

Full planting with site prep on 67 acres: Site preparation would be accomplished with herbicides in alternative 1 or by mechanical means in alternative 2 followed by prescribed burning to prepare these sites for planting. Planting will be accomplished by either mechanical means or by hand. This treatment would only occur in the event that acceptable stocking levels are not met by natural regeneration means.

ROADS MANAGEMENT

Install gate at intersection of FS Roads 3WA0918 & 95513C.

Forest Development Roads (FDR) 95512A, 95513A, 95513C and 95513D are all single lane, native material surfaced roads under Forest Service jurisdiction. Some maintenance was performed during the previous timber sale on roads 95512A, 95513A and 95513C. Maintenance has been performed on these roads in the past, although light brushing, grading and additional spot aggregate placement will be needed on these roads to support additional timber sale activities.

WILDLIFE HABITAT MANAGEMENT

See Table 1.2.2 for an overview of treatments.

Wildlife Openings: Construct or reconstruct, maintain or improve 7 wildlife openings. Activities will include one or a combination of the following treatments:

Wildlife Opening Maintenance/Improvement:

Maintain and improve wildlife openings annually or every 2-3 years through brush

hogging, mowing, (alternative 1) or chemical (alternative 2) treatments (glyphosate, triclopyr, and/or imazapyr) over a ten year period. Other activities include hay-cutting, liming, seeding, disking, planting with approved wildlife forages or warm season native grasses. Wildlife openings that are planted in native grasses will brush hogged or cut for hay each year after the third year of grass establishment.

Wildlife Opening Roads: The roads that lead directly to the wildlife openings may receive overhead and side limbing and brush hogging every 2-3 years to allow for tractors to access the wildlife openings in order to maintain and improve them.

Ponds: Construct or reconstruct, maintain or improve 6 ponds for a total of approximately 4 acres. Activities will include one or a combination of the following treatments:

Pond Construction: Ponds would be constructed in areas where water availability is inadequate for wildlife. Bentonite may be added to the newly constructed ponds to assist with water holding capabilities. Ponds may have small brush structures, gravel spawning beds and some large boulders or hollow trees placed in them for fish habitat. Future activities for these ponds may include fish stocking as needed. Some ponds would not be stocked with fish in order to provide habitat for amphibians.

Pond Maintenance/Improvement: Activities may include: Fertilizing ponds as needed (determined by water quality tests); bank stabilization/erosion control through native grass, herbaceous plant and/or shrub plantings; annual fish stocking in ponds that are designated for fish habitat; addition of brush structures, gravel spawning beds, boulders/logs for fish and amphibian habitat and cover as needed over the life of the project. Other

activities could include mechanical (alternative 1) or chemical (alternative 2) (glyphosate, triclopyr, and/or imazapyr) removal of trees from dams.

Stream Habitat

Actions may include placement of medium and large wood into parts of the stream in Brown Hollow and an unnamed tributary of the Jones Fork above the confluence with the stream draining Brown Hollow to augment fish habitat, cover and shading. The wood need of the creeks would be determined through aquatic habitat surveys and would occur throughout the life of the project. The trees would be hinged cut, with a small section of wood still attached to the base of the tree. The trees would not be anchored and will be scattered along the creeks.

2.2 – Design Standards and Monitoring

DESIGN STANDARDS

For Alternatives 1 and 2, applicable standards and guidelines in the Revised Ozark-St. Francis Land and Resources Management Plan (RLRMP), the mitigation measures and management requirements of the Trails Management Handbook (FSH 2309.18), and the Best Management Practices (BMP) Guidelines for Water Quality Protection (Arkansas Forestry Commission 2002) would be applied as appropriate for this project.

Some of the more important of these standards and guidelines are summarized below. This list is not all-inclusive. The above documents should be referenced for a complete list.

General

A biological evaluation (USFS BAE 2009) has been conducted on all areas proposed for management activities. The list of the species considered is in the project file. Any threatened, endangered or sensitive species (TES) that are found will be protected (FSM 2670.31).

Soil productivity will be protected by discing, seeding, and fertilizing roads, firelines, and temporary roads.

Water quality will be protected by retaining filter strips of vegetation along all perennial streams and springs. This zone will be 100-125 feet on either side of the channel; at least 50 square feet of basal area will be retained within this zone.

Wildlife den trees will be retained as well as six standing dead snags per acre when available.

Heritage Resources

Heritage resources consideration has been given to all acres where site-disturbing activities are proposed. Findings are discussed in the Heritage Resources Section of this EA. Any other sites found during implementation of this project will be examined and necessary mitigation measures prescribed by the Forest Archaeologist (RLRMP, pp. 4-6).

Prescribed Burning

The following mitigation measures are found in the Final Environmental Impact Statement (FEIS) for the RLRMP, pages 3-50 to 3-69:

- a. Prescribed burns will follow an approved burning plan for each specific project. This plan includes smoke management to comply with air quality regulations and protect visibility in smoke sensitive areas.
- b. Coordination with neighboring Districts and Fire Dispatch regarding planned ignitions, and analysis of transport winds and mixing heights will be utilized to avoid smoke impacts to major metropolitan areas downwind.

Herbicide Use

The environmental analysis considered the effects of herbicide application on human, wildlife and aquatic populations. The Forest Plan, Forest Wide Standard FW21 (LRMP page 3-4) requires that herbicides be applied at a level that minimizes the risk to human or wildlife/aquatic health. This analysis used *Human health and Ecological Risk Assessment Final Report* prepared for the Forest Service by Syracuse Environmental Research Associates, Inc. The analysis is documented in the Project File.

The direct spray and consumption of contaminated vegetation hazards would be

mitigated for by signing the treated area. The accidental spill hazard to fish, algae, and aquatic macrophytes, and consumption of contaminated water would be mitigated by:

- a.) No herbicide application would occur within 50 feet of any perennial or intermittent. All other herbicide application will follow label instructions for use near streams and other bodies of water.
- b.) Applicators will carry a spill contingency kit to prevent the spread of an accidental spill.
- c.) Label directions would be followed, which includes no applications during rain events or within 24 hours of any rain event.

vegetation, increased erosion, increased sedimentation, and disturbance.

MONITORING

All activities would be monitored to ensure mitigation measures are applied.

Applicable RLRMP monitoring and evaluation requirements (Table 5-1 of the RLRMP) would be implemented as directed within budgetary limitations. These requirements include measures to monitor current and past activities in terms of implementation, effectiveness, and validation monitoring levels.

1. The effectiveness of BMPs and other measures would be monitored to ensure compliance with the Forest Plan and Clean Water Act. The monitoring program would measure the success of BMPs and help improve future mitigation methods. The monitoring program would also identify unforeseen problems that require remedial measures. This monitoring would involve field measurements and inspections.
2. The action alternatives would be designed to reduce adverse impacts in riparian habitats, including both direct and indirect effects resulting from damage to

3.0 Existing Conditions and Environmental Effects

3.1 Forest Health and Timber Management

This section addresses appropriate age class distributions and the Forest Services' obligation to provide a continuous flow of wood products under the Forest Plan and the Multiple-Use Sustained Yield Act (MUSYA). The issues of overstocking within the stands and tree age will also be discussed as they relate to forest health. The discussion focuses on the number of acres in each age class and the correct stocking levels for the proposed treatment areas. For this section, 1,817 total acres represents the total stand area.

Existing Conditions. All acres of National Forest land within the project area are classified as suitable for timber management. The species composition for these acres is almost exclusively of the red oak/white oak/hickory forest type. The 1,817-acre project area comprises only 0.15% of the total Ozark National Forest landbase and only 0.94% of the Boston Mountain District landbase. The project area contains a high percentage of trees 71 years or older (79%) and only 90 acres (5%) that are in the 0-10 age class (Table 3.1.1). Additionally only 17% of trees are distributed among the 11-70 age classes consisting of 301 acres. This represents an unbalanced distribution of age classes with all species. The distribution indicates an aging forest that has very little regeneration or immature timber and would be incapable of sustaining a healthy forest or a continuous flow of timber.

In addition to having an unbalanced age class distribution, the stands that are proposed for treatment in this project area are overstocked. The Forest Plan directs that a target basal area of 80 sq ft per acre be maintained throughout the rotation of the stands that are in Management Area 3.E- High Quality Forest Products. The proposed stands, currently, all have basal areas greater than 100 sq ft per acre.

3.3.1. Effects from Alternatives 1 and 2 Direct and indirect effects:

In order to provide for an early seral habitat component, the LRMP requires that 3.8 to 6.8% of the project area be represented in the 0-10 age class, and MUSYA suggests 13%. Harvesting stands in the older age classes to promote regeneration would contribute to balancing the age class distribution (by creating young stands in the 0-10 age class) and insuring a sustainable fiber supply for the future. Implementation of these alternatives utilizing regeneration harvests would result in changing the age class of 0-10 year to 157 acres. This would create a 8.6% distribution in the 0-10 year age class (Table 3.1.2).

Table 3.1.1 Age class distribution based on existing condition in 2009.

Age Group	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	100+
Acres	90	144	69	0	0	53	35	265	567	138	457
%	5.0	7.9	3.8	0	0	2.9	1.9	14.6	31.2	7.6	25.1

Table 3.1.2 Age class distribution following regeneration harvest in 2009.

Age Group	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	100+
Acres	157	144	69	0	0	27	35	237	567	138	444
%	8.6	7.9	3.8	0	0	1.5	1.9	13.0	31.2	7.6	24.4

In addition to moving towards a more balanced age class distribution, Alternatives 1 and 2 would return the stands back to their correct stocking levels of 80 sq ft per acre of basal area. These actions would keep the healthiest and most desirable trees in the stand while providing them space to grow and acquire the necessary resources to flourish.

Ultimately, these actions would result in stronger, more viable trees within each stand, making them more resistant to attacks from insects, disease, and other harmful pathogens. The overall project area would move towards a more balanced age class distribution helping to provide for more sustainable growth in the future. The improved vigor and growth would also increase carbon sequestration within the area.

Cumulative effects:

No additional treatments are predicted that would affect age class distribution. Table 3.1.3 discloses changes to the District and Forest age class distributions. Changes to both District and Forest levels are m

Table 3.1.3 Age class distribution following project work in 2009.

Focus area	0-10	11-20	21-40	41-70	71-100	101+	Total
District Totals, pre-project	1647	6927	13,704	17,792	111,466	35,917	187,453
Project Change acres	67	0	0	-26	-28	-13	
Project Change Percent	4.1%			-0.15%	-0.03%	-0.04%	
Project Change in Percent	0.38%			-0.02%	-0.004%	-0.007%	

Table 3.1.4. Age class distribution in 2019 with no treatment.

Age Group	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Acres	0	90	144	69	0	0	53	35	265	567
%	0	5.0	7.9	3.8	0	0	2.9	1.9	14.6	31.2

3.1.2. Effects from Alternative 3- No Action
Direct and indirect effects:

Vegetation would continue to age with this alternative. In the stands presently 70 years of age and older, there would be a loss in growth rates and a higher rate of mortality. There are only 391 acres (21.5%) in the project area in age class less than 70 years of age. This alternative would not meet the objectives of the project, the RLRMP, or the MUSYA for providing a balanced age class distribution for sustainable timber supplies, now nor in the next ten year period (Table 3.1.4). As growth decreased and the stands stagnated carbon sequestration within this area would also decrease and trend towards a net low of carbon sequestration.

Cumulative effects. No other treatments in the project area are predicted that would affect age class distribution. Continued aging of timber in all areas of the project would reduce the Forest wide 0-10 year age class by 0.01% and would reduce the district-wide 0-10 year age class by 0.06%(table 3.1.3). A continued skewing of age class distribution to the older age classes would further the problems

associated with an unhealthy forest and its dependent ecosystems. This area would, over time, be unable to meet a sustainable and regular flow of wood products because of severely imbalanced age classes

3.2 Transportation

The project may change types of access within the area. This section discloses existing miles of open roads, miles of roads remaining open, and road density post-implementation.

Existing Conditions.

There are approximately 39.3 miles of existing forest development roads (FDR), 22.7 miles of county jurisdiction roads, and 0.7 mile of private jurisdiction road in the project area, for an overall road density of 4.3 mile of road per square mile. State Highway 71 provides major access to the project area. Washington County Roads 126, 130, 106, 129, 110 and Crawford County’s Winfrey Valley Road provide access into the project area. Routine road maintenance is performed on these access roads to the project area. This maintenance includes road grading, road side brushing, spot gravel and culvert replacement.

Several additional system roads provide access into the interior of the project area. All roads accessing the project area are in need of general repair. These roads are listed in table 3.2.1 and are shown on the Existing Road System Map in Appendix A.

Field visits were made documenting the current condition of closed roads and roads proposed to be closed. This documentation is part of the

process file.

Certain roads within the project area are no longer needed for management in the near future. Their continued use by the public creates an unfavorable situation for wildlife through unnecessary disturbance and adds to soil loss through erosion.

Table 3.2.1. Proposed road changes in the project area

Road	Current Status	Future Objective	Length (miles)
95512A	Closed	Maintain	1
95513A	Open	Maintain/Open	2
95513C	Open	Maintain/Close	1.07
95513D	Open	Close	0.74

3.2.1. Effects from Alternatives 1 and 2

Direct and indirect effects:

Approximately 5 mile of temporary road construction are being proposed. These roads would be constructed and would be used for access to treated stands, and then decommissioned when no longer needed for the project. Best Management Practices would be used in all road building activities. Road decommissioning includes blocking the road entrance, installing adequate drainage such as water-bars or leadoff ditches, obstructing the roadway as much as practical with large debris or falling trees, and seeding the entire road surface with a grass mix designed for erosion and wildlife forage value.

Approximately 32.2 miles of public roads would remain open. These roads would be available and maintained over time for legal vehicle use.

Approximately 4.07 miles of FDRs would receive maintenance for access to treatment areas; this maintenance consists of grading the road, placing surface gravel as needed, adding or replacing culverts as needed, cleaning existing culverts, pulling ditches and cutting back encroaching brush from the right-of-way.

By requiring road maintenance, during, or after timber management activities, excessive road wear caused by logging vehicles is prevented or repaired, and roads are left in suitable condition for their intended public use. Approximately 1.8 miles of FDR's would be closed. When timber activities are completed, these roads would not be needed for normal management activities but would likely be needed at some future date, for example, for firefighting purposes. These roads would be seeded with erosion control and wildlife mixes, water-barred, or blocked or gated. This would protect wildlife from vehicular disturbance and poaching, provide additional wildlife food sources, and reduce erosion from these roads. These roads would be closed following the proposed activities.

There would not be any new road construction or road relocation planned other than the approximately 5 miles of temporary roads noted above.

After completion of the project, FDR 95513C and FDR 95513D should be closed at their beginning mile post.

The 2005 LRMP allows ORV use on designated roads and designated ATV trails and prohibits ORV use on all other areas, including unauthorized roads and closed roads. The 1.8 miles of system roads that would be closed would be available for administrative use for forest management.

Cumulative effects: Some users of the area may disregard the road closures, or begin developing and using illegal unauthorized roads again over time. This would not increase the miles available to motorized vehicles use. These trails would still be unauthorized trails that would not be legal to use. However, these unauthorized activities may require more resource work to repair damage and to re-close trails and roads in the future. These activities would also negate wildlife habitat improvements by disturbing the area, or by damaging vegetation planted for wildlife and erosion purposes.

3.2.2 Effects from Alternative 3 –No Action

Direct and indirect effects:

Roads would continue to deteriorate at the current rate with the exception of roads already receiving routine maintenance. Deterioration can be expected from natural and manmade processes such as erosion and plant encroachment into the roads existing right-of-ways and unauthorized vehicle use. The road maintenance, reconstruction, closure, and road decommissioning indicated as needed would not be achieved.

Cumulative effects: More unauthorized or user created trails would likely develop over time, leading to more of the area being accessed by vehicles. More trash dumps and littering would likely appear over time. These trails would still be unauthorized and would not be legal to use.

3.3 Soils and Water

This section addresses how the alternatives may compact and displace soils in the project area and how this may affect stability, erosion, and sedimentation of area streams.

A watershed provides a spatial context into which land management effects can be examined. It can be described as a user-defined point above which all surface water flows. Watersheds are natural divisions of the landscape that include both the waterway and the land that drains to it. Watersheds are hierarchical – smaller ones are nested within larger ones.

Existing Conditions

The project area for this analysis is the headwaters of the Jones Fork River an area of approximately 8910 acres. This small watershed makes up the northern portion of the Jones-Fork Frog Bayou watershed (Appendix B). It in turn is the headwaters of a municipal supply watershed, the lower Frog Bayou. For more information on the watersheds and soils associated with the project area see the specialist report in the project file at the district office (USDA 2009).

Waters in this area support the uses of domestic drinking water, fish consumption, aquatic life, swimming, secondary contact recreation, agriculture, and industry. Approximately 3596 acres in the watershed is Forest Service and the majority (60%) 5310 acres is in private ownership (figure 3.3.1).

Geology

Most of the watershed is of the Atoka formation with a small swath roughly corresponding to the Jones Fork area part of the Bloyd shale formation. These formations are composed of Pennsylvanian age sandstone and shale. The sandstones of the upper part of the formation are very resistant to erosion and

form many of the prominent bluffs in the project area

Land type associations

The project area is comprised of Hale Mountain Valleys (4859 ac) and Mesic Atoka Mountain Uplands (4051 ac).

The Hale is characterized by rugged, heavily dissected, mostly south facing very steep terrain, with bench and bluff topography. The slope gradient ranges from 0 to 65% with bluffs that are vertical, and local relief is 800 to 1,000 feet per square mile. The elevation ranges from 800 to 1,800 feet above sea level. The Mesic Atoka also has a rugged land surface form characterized by moderately dissected uplands with broad ridges and sharply defined narrow valleys. The slope gradient ranges from 0 to 60% and local relief is less than 900 feet per square mile. The elevation ranges from 1,800 to 2,500 feet above sea level.

Soils

Most of the soils are well drained and formed in residuum and colluvium from loamy and clayey material that weathered from sandstone and shale of Pennsylvanian age. These soils are low in plant nutrients and organic matter. The soils have very low to moderate plant available water. Permeability ranges from very slow in the moderately deep clayey soils on the sideslopes to moderately rapid in the shallow loamy soils on the ridgetops. About 70 % of the soils in the watershed are Nella of the Allen Hector type either 20-40 % or 40-55% slopes. A more complete description of the soils soil types of this watershed can be found in the project file.

Water

The narrow flat ridges of the Upper Jones Fork watershed are highly dissected by stream networks. Valley floodplains are narrow with alternating shale slopes and resistant sandstone

benches. The surface water is soft with low alkalinity.

Streams are flashy in response to storm runoff and have fairly high turbidity. The steep slopes and high stream gradients promote rapid runoff. Summer water temperatures are very high. These streams do not have perennial surface flow.

There are approximately 26 miles of streams discernable on a 1:24,000 scale quadrangle map with many smaller headwater tributaries and springs. Brown Hollow in the northeast includes an unnamed tributary that flows southwest about 2.5 miles and confluences with streams draining the north and northwestern sections of the area.

The stream in Raschal Hollow flows east and confluences with 2 south flowing streams in the extreme northern portion which then proceed south about 1 mile and confluence with the stream in Brown Hollow. The stream flows another ½ mile south and picks up the headwaters of Jones Fork to the east and Jones fork then flows another 1.5 miles south to the confluence with the stream in Sugar tree Hollow draining the western portion of the area.

About 630 acres of riparian area exist in the watershed measured by taking a 100 ft buffer on each side of stream.

Land use/cover

Most of the area is forest (including private property) with a few residences. Of the Forest Service inholdings nearly all of the area (about 3500 acres) is categorized as either dry/mesic oak forest or dry oak forest and woodland. Farming and pastureland is present but not common with cattle grazing and chicken farming the primary outputs. There are 2 gas wells in the area. Only about 25 acres of the Forest Service inholdings is non-forest (there is

slightly more non-frested areas on private inholdings) and about 21 acres are made up of ponds and waterholes.

Roads

There are at least 55 road/stream crossings in the analysis area. About 29 of these are on Forest Service lands. Areas where the roads cross or run along streams – particularly in the lower sections of the analysis area below the confluence of Jones Fork and the stream in Brown Hollow south of Miller’s chapel, (primarily in private in-holdings) have generated excess sedimentation along with

aggradations of bed material in the lower sections of Jones Fork and the channel in Brown Hollow. In the upper reaches of these two streams, crossings tend to be well armored of primarily bedrock material and do not generate as much sediment from erosion (figure 3.4.1). This watershed is small and remote with less road access to creeks than other local waterways such as Lee Creek and Lake Fort Smith and so the road system does not meaningfully influence water quality in downstream municipal water supplies.

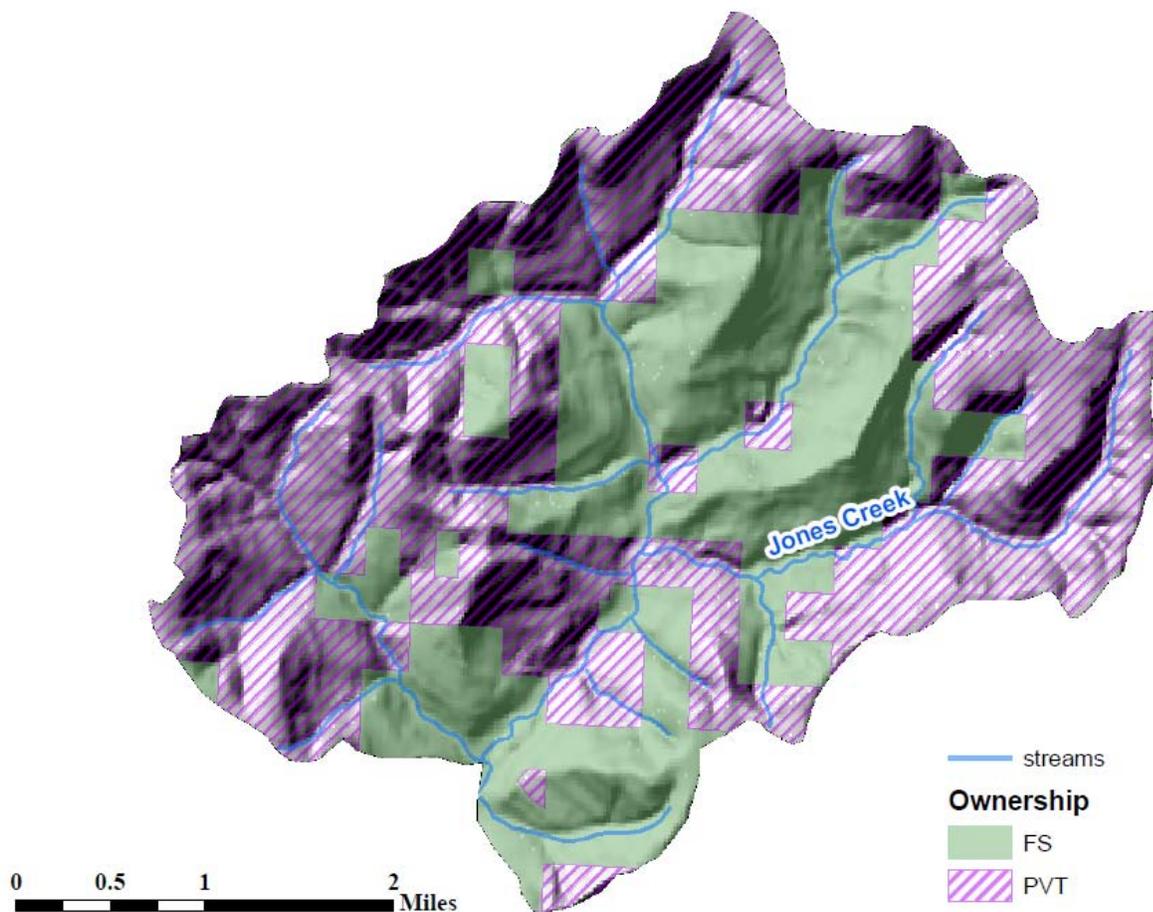


Figure 3.3.1. Upper Jones Fork watershed analysis area.

3.3.1. Effects from Alternatives 1 and 2 Direct, indirect and cumulative effects.

Any ground disturbing activity using mechanical methods in wildlife or timber treatments may cause disturbance of the soil with significant changes in soil porosity or soil depth.

Indirectly, a decrease in soil cover can result in an increased risk of erosion from burning or broadcast herbicide treatment. Addition of chemicals to the soil could change soil properties or communities of microorganisms.

Management actions that conserve topsoil retain the litter and duff layer, and other woody material generally provide for nutrient cycling and soil productivity maintenance. By requiring road maintenance, during and after timber management activities, excessive road wear caused by logging vehicles is mitigated and roads are left in suitable condition for their intended public use. Soils in this area can support these activities and there will be no long-term negative effects from these alternatives.

3.3.2. Effects from Alternative 3 – No Action Direct, indirect and cumulative effects.

Management activities will continue as they have in the past with this alternative. Road treatments will not take place which may eventually lead to increases in sedimentation in this watershed. This alternative will not cause any long-term negative effects.

3.4 Biological Resources

For the purpose of this wildlife habitat analysis, the analyzed area will be the project area (except in the fisheries section). The project area consists of approximately 1,817 acres and lies within Washington County, Arkansas.

Wildlife, fish and plant species and their habitats in the analysis area are managed in cooperation with the Arkansas Game and Fish Commission (AGFC), and the Arkansas Natural Heritage Commission (ARNHC). The

state wildlife management agencies main responsibilities are to set policy for hunting and fishing regulations and law enforcement programs. The Natural Heritage Commission is responsible for collecting and maintaining information on rare plants, animals and natural communities in Arkansas. The Forest Service is responsible for managing fish and wildlife habitat conditions. The following discussion focuses on the habitat conditions that support wildlife populations and fisheries.

Terrestrial Habitat

The analysis area overstory consists of primarily of hardwood stands of red & white oak and hickory with some red cedar inclusions. A large portion of the analysis area consists of closed canopy conditions, with a buildup of leaf/litter duff and scattered herbaceous vegetation under the canopy. See the vegetation section of this document for more detailed information on the overstory. Stands directly proposed for thinning are crowded and dense and are composed of oak/hickory with some short-leaf pine.

The mid-story and ground vegetation components and densities in the analysis area are typical of those found in the cover types of the area. The species composition in the mid-story consists of oak, hickory, dogwood, persimmon, sassafras, sweetgum, locust, blackgum, elm, pine, redcedar, and red maple. Common shrubs and vines found include French mulberry, hawthorns, blueberries, viburnums, greenbriers, blackberry, honeysuckle, and grape. Grasses and other herbaceous vegetation in the understory include bluestem, foxtail, nutsedge, poison ivy, greenbrier, Desmodium, and panicums.

Habitat for a variety of wildlife species is of poor to fair quality within the analysis area due to lack of herbaceous vegetation and closed

canopy conditions/overcrowded conditions. The hardwood stands are crowded, dense, and predominately immature, with little herbaceous vegetation in the understory. Other conditions that contribute to the lack of optimal wildlife habitat in the analysis area include overgrown wildlife openings.

Hard mast capability is well distributed across the landscape. The mast needs of many forest animals are met when at least 20 percent of 640 acres (one square mile) is occupied by well-distributed mast-producing hardwood trees (Wildlife Habitat Management Handbook, 204.1). The majority of the project area's hardwood forest types are currently of mast-producing age. These age classes are those which are 61+ years of age. These stands are found within the riparian corridors and on all aspects with the best representation found on the north and east slopes.

Detailed information about the effects of the alternatives on each species is provided in the Biological Assessment/Evaluation (BAE) , (USFS, 2009). Summaries are provided here. Other sources of information included the U.S. Fish and Wildlife Service, Forest Service Region 8 TES list, Arkansas Natural Heritage Commission database, historical compartment prescription records, district field survey reports, state universities, the Arkansas Game and Fish Commission, Arkansas Department of Environmental Quality (ADEQ) water quality reports and monitoring, City of Ft. Smith water quality reports and monitoring, numerous reference documents, and consultation with knowledgeable scientists, professionals, technicians and other agencies utilizing the best available science.

The Region 8 Landbird Strategy has been implemented on the Boston Mountain Ranger District with breeding birds being recorded by habitat type since 1997. Data collected for migratory birds as well as the Biological

Assessment/Evaluation ((BE) USFS 2009) can be viewed at the Boston Mountain Ranger District in Ozark, Arkansas.

Management Indicator Species (MIS):

MIS is a planning and monitoring tool that reflects a way to analyze a change in conditions. MIS generally fall into three broad categories:

1. Demand species are those species that provide important recreational and/or economic values.
2. Species of concern are those species for which there is a concern about their population numbers.
3. Ecological indicators are species that are tied to a particular element(s) of biological diversity and serve as surrogates for other species associated with that element(s).

Seventeen species were selected as MIS for the Ozark National Forest. These 17 species resulted from the Planning Team's review of the list of vertebrate species dependent upon forest habitats (RLRMP, 2005).

A MIS Report on population data including population trends was completed on July 6, 2001 (amended August 15, 2001) for the Ozark- St. Francis National Forest. This document is a part of the analysis file and was used for analysis of effects to MIS species associated with implementation of project alternatives. The 2001 MIS Report contains some but not all of the current MIS as selected for the Revised LRMP.

The Environmental Impact Statement (EIS) for the Revised Forest Plan (2005) also analyzed the current trends of populations of MIS species. This analysis was also used to look at MIS species trends for this assessment.

The following table shows Ozark National Forest MIS species pertinent to the analysis area, the habitat type they represent and

population trends (USDA, 2001 and NatureServe, 2007). From the Forest MIS list, 12 species have potential habitat based on occurrence records and/or habitat requirements within the analysis area and will be addressed. The aquatic MIS species will be analyzed under the fisheries section of this EA.

Table 3.4.1. MIS Species, Habitat Requirements and Population Trends

Species	MIS Type	Habitat Requirements	Population Trend
Northern bobwhite	ecological indicator	pine and oak woodland and native grasslands	decreasing
Whitetail deer	demand	mosaic of forest age classes	increasing
Black bear	demand	remote habitat with mature forest component with intermixed 0-5 year old regeneration	increasing
Wild turkey	demand	mature forest with open areas containing grasses/forbs/soft mast	increasing
Prairie warbler	ecological indicator	regenerating forest communities	decreasing
Cerulean Warbler	ecological indicator	communities associated with mature hardwood forest with complex canopy structures, and dry-mesic oak Forest communities	decreasing range-wide, apparently secure in AR
Northern parula	ecological indicator	communities associated with forests in riparian areas	stable
Ovenbird	ecological indicator	dry-mesic oak forests	stable to increasing
Red-headed woodpecker	ecological indicator	oak woodland overstories	decreasing
Pileated woodpecker	ecological indicator	large snags	stable
Scarlet tanager	ecological indicator	mature dry-mesic oak forest communities	stable
Smallmouth bass	demand	cool water stream communities	stable

The change of any habitat type would be expected to benefit some species, and potentially have negative effects on others. The proposed or modified actions will not affect the viability of any MIS species.

Terrestrial Management Indicator Species 1

More detailed information on the habitat requirements for these species can be found in the project file (USFS 2009).

Northern Bobwhite (*Colinus virginianus*)

Alternative 1 –Proposed Action:

If the Proposed Action alternative is implemented, it is anticipated that approximately 230 acres of new early seral habitat would be created as a result of the vegetation management treatments and wildlife opening work. Site prep prescribed fire as called for in this action would create a mosaic of habitat preferred by this species. Herbicide use as proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. A discussion on herbicide effects to all the MIS species and wildlife can be viewed at the end of this section. The implementation of this alternative should reduce the amount of disturbance to nesting birds through the proposed gating of FS Roads 3WA0918 & 95513C. Direct and indirect effects with this alternative would be beneficial to this species. Cumulatively, trends in habitat quality and quantity on nearby private lands are likely to remain the same. Local (project level) population trends should increase in the short-term (10 years), however, overall bob-white quail populations are expected to remain around current levels with forest-wide management activities combined with actions occurring on private lands as well.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1. However, mechanical site prep replacing herbicide for timber actions

is not as effective and could cause more disturbance to nesting birds, particularly in wildlife openings. Direct and indirect effects to the quail with this alternative would be beneficial, although nesting birds could have an increase in disturbance due to mechanical versus herbicide site prep and wildlife opening maintenance treatments.

Cumulatively, trends in habitat quality and quantity on nearby private lands are likely to remain the same. Local (project level) population trends should increase in the short-term (10 years), however, overall bob-white quail populations are expected to remain around current levels with forest-wide management activities combined with actions occurring on private lands as well.

Alternative 3-No Action:

It is expected that the predicted effects from implementation of the No-Action alternative would be a continued decline in local (i.e., stand level) quail populations. The current condition has minimal amounts of grassy vegetation caused largely by closed canopy forests. The No-Action alternative does nothing to improve habitat for this species. Natural conditions will continue and will not provide the early successional habitat that quail need. Direct and indirect effects would be negative to this bird with implementation of this alternative. A lack of active management could cause a local (project area) decline to this species. Cumulatively, trends in habitat quality and quantity on nearby private lands are likely to remain the same. Local (project level) population trends will likely decrease in the short-term (10 years) if no action is implemented. Overall bob-white quail populations are expected to remain around current levels with forest-wide management activities combined with actions occurring on private lands as well.

Eastern Wild Turkey (*Meleagris gallopavo silvestris*)

Alternative 1 –Proposed Action:

If the Proposed Action alternative is implemented, it is anticipated that approximately 230 acres of new early seral habitat would be created as a result of the proposed vegetation management treatments and wildlife opening work. Site prep prescribed fire as called for in this action would create a mosaic of habitat preferred by this species. This type of habitat is critical for turkey brood range. Site prep prescribed fire and thinning as called for in this action would create an open understory, improve the sight distance for turkeys, stimulate the growth of legumes and other plants that turkeys use for food, and maintain natural grassy savannas that are used for brood habitat. Herbicide use as proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. Mechanical wildlife opening maintenance used in lieu of herbicide is not as effective and could cause more disturbance to nesting birds. The implementation of this alternative should reduce the amount of disturbance to nesting birds through the proposed gating of FS Roads 3WA0918 & 95513C. Direct and indirect effects with this alternative would be beneficial to this species. Cumulatively, trends in habitat quality and quantity on nearby private lands are likely to remain the same. Local (project level) population trends should increase in the short-term (10 years), however, overall turkey habitat capability will remain stable with forest-wide management activities combined with actions occurring on private lands.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use in timber management activities. Mechanical site prep used in lieu of herbicide is not as effective and could cause more disturbance to nesting birds. Direct and indirect effects to the turkey with this

alternative would be beneficial, although nesting birds could have an increase in disturbance due to mechanical versus herbicide site prep and wildlife habitat treatments. Cumulatively, trends in habitat quality and quantity on nearby private lands are likely to remain the same. Local (project level) population trends should increase in the short-term (10 years), however, overall turkey habitat capability will remain stable with forest-wide management activities combined with actions occurring on private lands.

Alternative 3-No Action:

It is expected that the predicted effects from implementation of the No-Action alternative would be a decline to local (i.e., stand level) turkey populations. The current condition has minimal amounts of grassy vegetation caused largely by closed canopy forests and lack of grassy openings in the area. The No-Action alternative does nothing to improve habitat for this species. Natural conditions will continue and will not provide the early successional habitat that turkey need. Direct and indirect effects would be negative to this bird with implementation of this alternative. A lack of active management could cause a local (project area) decline to this species. Cumulatively, trends in habitat quality and quantity on nearby private lands are likely to remain the same. Local (project level) population trends will likely decrease in the short-term (10 years) if no action is implemented. Overall turkey habitat capability is expected to remain stable with forest-wide management activities combined with actions occurring on private lands as well.

White-tailed Deer (*Odocoileus virginianus*)

Alternative 1 –Proposed Action:

If the Proposed Action alternative is implemented, it is anticipated that approximately 230 acres of new early seral habitat would be created as a result of the vegetation management treatments and wildlife

opening work. Site prep prescribed fire as called for in this action would create some new herbaceous growth for browse. Herbicide use as proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. Mechanical wildlife opening maintenance used in lieu of herbicide is not as effective and could cause more disturbance to deer that are bedded down. Direct and indirect effects would be that local deer populations may slightly increase because the new habitat created by this alternative would exhibit a higher amount of available forage (primarily soft mast and browse) than the current existing habitat. Cumulatively, no long-term declines in deer populations are expected with this alternative combined with both forest-wide and private land management in the area.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use in timber management activities. Mechanical site prep used in lieu of herbicide is not as effective and could cause more disturbance to deer that are bedded down. Direct and indirect effects would be that local deer populations may slightly increase because the new habitat created by this alternative would exhibit a higher amount of available forage (primarily soft mast and browse) than the current existing habitat. Cumulatively, no long-term declines in deer populations are expected with this alternative combined with both forest-wide and private land management in the area.

Alternative 3-No Action:

It is expected that the predicted effects from implementation of the No-Action alternative would be minimal. Direct and indirect effects would be that the local (i.e., stand level) population would likely remain stable.

However, this alternative does nothing to create browse and soft mast habitat. Cumulatively, after approximately a ten-year period, there could be a slight decline in the local deer population, however, there should be no effect to the overall population with implementation of the no-action alternative when combined with projects on both Forest Service and private lands.

Black Bear (*Ursus americanus*)

Alternative 1 –Proposed Action:

If the Proposed Action alternative is implemented, it is anticipated that approximately 230 acres of new early seral habitat would be created as a result of the vegetation management treatments and wildlife opening work. This type of habitat provides the high-protein foods needed after emerging from dens. Burns also increase production of fruits such as blackberry and low bush blueberry. Herbicide use as proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. Mechanical wildlife opening maintenance used in lieu of herbicide is not as effective and could cause more disturbance to black bears. Direct and indirect effects to the local (project area) black bear population could be a slight increase in disturbance due to the vegetation treatments. Local black bear populations and patterns of use may be slightly affected, however, disturbance will be short-term. The gating of FS Roads 3WA0918 & 95513C.as called for in this alternative will have positive effects by reducing human disturbance. This alternative will create the regeneration areas that bears prefer. Black bear populations are expected to continue to increase over time. There are no known negative cumulative effects to this species with implementation of the proposed action.

Alternative 2-Modified Action:

The effects of this alternative would be similar

to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use in timber management activities. Mechanical site prep used in lieu of herbicide is not as effective and could cause more disturbance to black bears. Direct and indirect effects to the local (project area) black bear population could be a higher increase in disturbance due to the mechanical vegetation treatments, more than what is in the Proposed Action. Local black bear populations and patterns of use may be slightly affected, however, disturbance will be short-term. This alternative will create the regeneration areas that bears prefer. Black bear populations are expected to continue to increase over time. There are no known negative cumulative effects to this species with implementation of the modified action.

Alternative 3-No Action:

It is expected that the predicted effects from implementation of the No-Action alternative would be negative. Direct and indirect effects would be that the local (i.e., stand level) population would likely remain stable. However, this alternative does nothing to create conditions for high-protein food needed for the bear. Cumulatively, there should be no effect to the overall population with implementation of the no-action alternative when combined with projects on both Forest Service and private lands.

Prairie Warbler (*Dendroica discolor*)

Alternative 1 –Proposed Action:

Direct and indirect effects to this bird could be a slight negative effect on local prairie warbler populations that are nesting in the area where vegetative activities occur. The regeneration cuts proposed in this alternative will provide a slight increase in habitat for this species. Concurrently, the current mature forest habitat does not likely provide significant benefits to the prairie warbler. Herbicide use as proposed in this alternative should not pose any risk to

this species as long as label instructions and RLRMP guidelines and standards are followed. Mechanical wildlife opening maintenance used in lieu of herbicide is not as effective and could cause more disturbance to nesting birds. Cumulatively, there will be no know negative effects to this species with implementation of this alternative when combined with actions that occur on public and private lands.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use in timber management activities. This species nests low in small bushes and trees. Direct and indirect effects to the prairie warbler with this alternative would be beneficial, although nesting birds could have an increase in disturbance due to mechanical versus herbicide site prep treatments.

Alternative 3-No Action:

It is expected that implementation of the No-Action alternative will have no cumulative or negative direct or indirect effect on the overall populations of this species. It is expected that if the No-Action alternative is implemented, there will be a decrease of available habitat (even-aged regeneration forests) in the project area. Different portions of the Ozark National Forest may receive varied levels of use as land management actions are implemented and desirable habitats are created, as others become less desirable through natural succession.

Pileated Woodpecker (*Dryocopus pileatus*)

Alternative 1 –Proposed Action:

Implementation of the Proposed Action alternative would very slightly reduce the available habitat for this species. Local riparian corridors do provide habitat that this woodpecker requires. Direct and indirect effects are that it is not expected that local populations of this species will experience a

decline and forest-wide population goals should not be affected. Cumulatively, when combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use in timber management activities. Direct and indirect effects are that it is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. Cumulatively, when combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Alternative 3-No Action:

Implementation of the No-Action alternative may have positive long-term effects on the pileated woodpecker as current forest types in the project area continue to age and snag abundance (presumably) increases. The No-Action alternative does not propose any new construction of roads or tree removal. It is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. Cumulatively, when combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Scarlet Tanager (*Piranga olivacea*)

Alternative 1 –Proposed Action:

Implementation of the Proposed Action would result in direct and indirect effects, such as a slight loss of habitat for the scarlet tanager. Because trails, roads and wildlife openings would be maintained in an early seral stage, any scarlet tanagers using the project area near these sites would be forced to relocate to nearby suitable habitats. Herbicide use as

proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. The management of the analysis area would be expected to continue to provide the mature forest habitat preferred by this species, especially in the riparian corridors and unsuitable/inoperable areas. This alternative could also affect the nesting of this tanager, as it nests 20-25 feet in the canopy. Cumulatively, however, forest-wide population declines are not anticipated.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use in timber management activities. Implementation of the Modified Action would result in direct and indirect effects, such as a slight loss of habitat for the scarlet tanager. Because trails, roads and wildlife openings would be maintained in an early seral stage, any scarlet tanagers using the project area near these sites would be forced to relocate to nearby suitable habitats. The management of the analysis area would be expected to continue to provide the mature forest habitat preferred by this species, especially in the riparian corridors and unsuitable/inoperable areas. This alternative could also affect the nesting of this tanager, as it nests 20-25 feet in the canopy. Cumulatively, however, forest-wide population declines are not anticipated.

Alternative 3-No Action:

Implementation of the No-Action alternative may have positive long-term effects on the scarlet tanager as current forest types in the project area continue to age and mature. The No-Action alternative does not propose any new construction of roads or tree removal. Cumulatively, forest-wide population declines are not anticipated.

Northern Parula (*Parula americana*)

Alternatives 1, 2 & 3:

Implementation any of the three alternatives should have no effect on the northern parula. Mature riparian habitats (e.g., Brown Hollow, Jones Fork Creek corridors) would continue to provide desired habitat. Disturbance to nesting species with all three alternatives should be minimal as this bird generally nests a height of 20 feet in the canopy in riparian corridors. Herbicide use as proposed in Alternatives 1 and 2 should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. Because this species is considered common and because suitable adjacent and nearby habitat is present on both public and private lands, there will be no known cumulative adverse effects to this species with implementation of any of the alternatives.

Cerulean Warbler (*Dendroica cerulea*)

Alternative 1 –Proposed Action:

Implementation of the Proposed Action would result in direct and indirect effects, such as a slight loss of habitat for the cerulean warbler with some of the treatments initially, however, treatments such as shelterwood harvest and pre-commercial thinning will create the complex, un-even aged stand type that this species prefers. Herbicide use as proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. Site prep prescribed burning as proposed would create the lack of undergrowth that this bird favors. Cumulatively, it is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. When combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1, however, without any

potential negative effects that could occur from herbicide use in the timber treatments. Cumulatively, it is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. When combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Alternative 3-No Action:

Implementation of the No-Action alternative should have no effect on the cerulean warbler as current forest types in the project area continue to age and mature. Natural disturbances to the forest could create the complex canopy habitat that this species prefers. The No-Action alternative does not propose any new construction of roads or tree removal. Cumulatively, forest-wide population declines are not anticipated when combined with activities on private and public lands.

Ovenbird (*Seiurus aurocapillus*)

Alternative 1 –Proposed Action:

Implementation of the Proposed Action would result in direct and indirect effects, such as a slight loss of habitat for the ovenbird through clearing of habitat caused by new wildlife opening and pond construction. Site prep prescribed burning could benefit this species when conducted outside of the nesting season by removing some of the understory densities, combined with silvicultural treatments such as commercial and pre-commercial thinning. Herbicide use as proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. Cumulatively, it is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. When combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Alternative 2-Modified Action:

The effects of this alternative would be similar to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use in timber management.

Implementation of the Proposed Action would result in direct and indirect effects, such as a slight loss of habitat for the ovenbird through clearing of habitat caused by pond and wildlife opening construction and some of the timber treatments. Site prep prescribed burning could benefit this species when conducted outside of the nesting season by removing some of the understory densities, combined with silvicultural treatments such as commercial and pre-commercial thinning. Cumulatively, it is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. When combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Alternative 3-No Action:

Implementation of the No-Action alternative could have a negative effect on the ovenbird over time as this alternative does not provide for open woodlands and a forest devoid of thick understory. Natural conditions will continue. Cumulatively, it is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. When combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Red-Headed Woodpecker (*Melanerpes erythrocephalus*)

Alternative 1 –Proposed Action:

Implementation of the Proposed Action would result in direct and indirect effects, such as a slight loss of habitat for the woodpecker through clearing of habitat caused by new wildlife opening construction. The majority of the silviculture treatments, combined with site

prep prescribed burning as proposed in this alternative will provide fair to good habitat for this species. Herbicide use as proposed in this alternative should not pose any risk to this species as long as label instructions and RLRMP guidelines and standards are followed. Very little habitat for this species resides on adjacent private lands and it is anticipated that National Forest lands provide better habitat. Cumulatively, it is expected that implementation of this alternative will have positive effects to this species, particularly to the analysis area populations.

Alternative 2 –Modified Action:

Implementation of the Modified Action would be the same as in the Proposed Action, but without any potential negative effects that herbicide use in timber management could cause. This alternative could result in direct and indirect effects, such as a slight loss of habitat for the woodpecker through clearing of habitat caused by road and trail construction. The majority of the silviculture treatments, combined with site prescribed burning as proposed in this alternative will provide fair to good habitat for this species. Very little habitat for this species resides on adjacent private lands and it is anticipated that National Forest lands provide better habitat. Cumulatively, it is expected that implementation of this alternative will have positive effects to this species, particularly to the analysis area populations.

Alternative 3-No Action:

Implementation of the No-Action alternative could have a negative effect on this bird over time as this alternative does not provide for open woodlands that this species prefers. Natural conditions will continue. Cumulatively, it is not expected that local populations of this species will experience a decline and forest-wide population goals should not be affected. Very little habitat for this species resides on adjacent private lands and it is anticipated that National Forest lands

provide better habitat. When combined with increased development and stand clearing on nearby private property, a local decrease in suitable habitat may occur.

Summarized Effects For MIS for Alternatives 1&2:

Direct and indirect effects:

There would be an initial reduction of older stands due to regeneration cutting and thinnings. The abundance of medium-aged stands that would become late seral habitat over the next ten years would be of more significance to species that use late seral habitat than the loss of stands converted to much needed early seral habitat. Thinning of stands would also enhance late seral habitat by allowing remaining trees to grow faster; thereby, attaining the tree size thought of as “late seral habitat” at a younger age. This would also decrease the susceptibility of trees to oak decline by improving the overall stand health.

These alternatives would create early seral habitat for species such as deer, turkey and quail and improve the overall habitat capacity of this area while having a small reduction in late seral habitat for pileated woodpecker. Suitable habitat for scarlet tanager would decrease slightly over the next 10 years due to harvest activities proposed in both alternatives. Suitable habitat for yellow-breasted chat would increase over the next ten-year period with both alternatives.

Early seral habitat would be created by shelterwood harvest. Opening up the forest floor to additional sunlight through harvesting activities would permit the expansion of plant diversity and increase the quantity of forbs, grasses and young trees. This action would result in increases of animal populations that use this habitat, such as mice, voles, snakes, fox, various raptors and numerous Neotropical migrant birds. Additionally, existing permanent wildlife openings totaling

approximately 15 acres would be constructed, reconstructed, mowed and planted to provide a continuing source of opening habitat.

Hardwood thinnings and shelterwood removal would have some benefits to early seral species. In addition, thinned hardwood stands achieve higher bird abundance and species richness than unthinned stands during both breeding and wintering seasons (Dickson et al., 1995). Bird communities are expected to react to thinning harvests in ways similar to singletree selection harvests, i.e. diversity and abundance of some species would increase. Thinnings would improve the habitat quality of older stands for scarlet tanagers as well as many other Neotropical migrant birds.

The thinning of hardwoods would improve growth of remaining trees and allow them to attain conditions thought of as mature interior forest and old growth at an earlier age. Crowns on remaining trees would expand resulting in increased acorn production. Acorn production is especially important in carrying animals through the winter months when food is a limiting factor for many species.

Reduction of basal area and stem density through precommercial thinning, release and site preparation treatments using handtools, chemicals and prescribed burning actions would increase the herbaceous/forb/shrub component in the understory. Early seral species such as deer, turkey, bobwhite quail, cottontail rabbit, and various small mammals would benefit from this vegetative change.

Direct mortality of less mobile wildlife species such as shrews, voles, various reptiles and amphibians can be expected with site prep prescribed burning. This loss is offset by the increased abundance of forage and insect numbers following a burn, which allows population numbers to increase beyond pre-burn levels. Removal of shading vegetation

may adversely affect some reptile and amphibian species in the short term, but fallen snags eventually create cover for amphibians and sunning sites for reptiles.

Wildlife species associated with continuous canopy forests and old growth conditions would be maintained, particularly in the riparian corridors; however, habitat area would be reduced for a period of time with these alternatives. Snag retention applied according to the Revised Land and Resource Management Plan (RLRMP) will increase the number of standing snags and loose bark trees and provide improved habitat for woodpeckers, cavity nesting birds and some woodland bats. Harvesting would commit stands to regeneration which would initially reduce the number of acres available to forest interior species but over the next ten years additional acres would become available for forest interior species due to succession. Regenerated stands would become suitable habitat for many neotropical migrant species such as the prairie warbler, white-eyed vireo and yellow-breasted chat as well as variety of small mammals and reptiles, which currently are limited in habitat opportunities.

Mechanical treatments such as mowing, disking and dozer work associated with wildlife opening and pond construction and reconstruction will disturb and potentially kill or harm insects, small mammals and reptiles at the time treatments take place. Improved forage and cover availability following this work will increase numbers of insects, small mammals and reptiles to population levels greater than before treatment.

Forage availability would also increase temporarily with the seeding of skid trails, and landings used for harvest. These actions would provide linear strips of potential forage for wildlife species such as deer, turkey and quail. Temporary openings created by re-vegetation

of skid trails would provide additional forage and brood areas for turkey. Maintenance, spot reconstruction and reconstruction of existing forest roads would utilize the original roadbed; therefore effects to wildlife would be minimal.

Construction of temporary roads would temporarily disturb vegetation, increase sunlight to the ground and provide access to a previously inaccessible stands of timber. Long-term impacts on wildlife would be minimal. Some disturbance of wildlife can be expected and individuals of slower moving or less mobile species may perish during the construction process. Soon after closure of these roads, wildlife numbers should increase to levels equal to or greater than those expected prior to construction. The closure of temporary roads after use and closure of additional unneeded roads in the project area would reduce disturbance to wildlife and should improve survival and reproductive success for several species such as black bear, turkey, quail and bats.

These alternatives call for prescribed burning for site prep for reforestation. Prescribed burning would not alter the seral stage of any forested stand; however, reduction of shade tolerant plant species would occur. There would be a short term clearing of the understory and an increase in herbaceous vegetation. These burns would create a mosaic of burning intensities that create a variety of understory conditions including unburned areas. This has been shown to provide habitat conditions for all native animals that typically inhabit hardwood stands including Neotropical migrant birds that require understory vegetation.

Some individuals of less mobile species will likely be injured or possibly perish in the prescribed burn. Most of these species rebound quickly to population levels greater than those found prior to the burn because of

improvements in habitat quantity and quality.

Cumulative Effects:

When effects of implementation of these alternatives are combined with those of other projects anticipated to occur both on and off the forest, there will be a continuing supply of early seral habitat provided locally (project area), which will add to the available habitat found in nearby areas across the forest. The change of any habitat type would be expected to benefit some species, and potentially have negative effects on others. The proposed or modified actions will not affect the viability of any MIS species.

Herbicide Effects for Alternatives 1&2- Terrestrial Species (MIS and TES):

Herbicide use as proposed in both Alternatives 1 and 2 will be applied at the lowest effective rate in meeting project objectives. All label instructions and RLRMP standards and guidelines will be followed. Forest wide standards and site specific analysis will minimize effects to terrestrial species.

Terrestrial animals might be exposed to any applied herbicide from direct spray, the ingestion of contaminated media (vegetation, prey species or water), grooming activities, or indirect contact with contaminated vegetation. Species of wildlife are likely to spend longer periods of time, compared to humans, in contact with contaminated vegetation. (Syracuse Environmental Research Associates (SERA) 2003) The highest exposures for terrestrial vertebrates would occur after ingesting contaminated vegetation or insects. The ingestion of treated vegetation over a prolonged period, however, seems implausible as plants are damaged and begin to die soon after herbicide is applied.

The weight of evidence suggests that no adverse effects are plausible for terrestrial animals using typical or even very conservative

worst-case exposure assumptions of imazapyr (SERA 2004). Imazapyr has been tested in only a limited number of animal species and under conditions that may not well-represent populations of free-ranging non-target animals. Notwithstanding this limitation, the available data are sufficient to assert that no adverse effects associated with the toxicity of imazapyr can be anticipated in terrestrial animals from the use of this compound in Forest Service programs.

The current risk assessment for glyphosate generally supports the conclusions reached by U.S. EPA. Based on the current data, it has been determined that effects to birds, mammals, fish and invertebrates are minimal (SERA 2003a). As with all longer term exposure scenarios involving the consumption of contaminated vegetation, the plausibility of this exposure scenario is limited because damage to the treated vegetation – i.e., vegetation directly sprayed at the highest application rate – would reduce and perhaps eliminate the possibility of any animal actually consuming this vegetation over a prolonged period.

For terrestrial mammals, the central estimates of hazard quotients for triclopyr do not exceed the level of concern for any exposure scenarios (SERA 2003b). At the upper range of exposures, the hazard quotients exceed the level of concern for large mammals and large birds consuming contaminated vegetation exclusively at the application site. This risk assessment is consistent with the risk characterization given by U.S. EPA indicating that contaminated vegetation is the primary concern in the use of triclopyr and that high application rates would exceed the level of concern for both birds and mammals in in longer term exposure scenarios.

Fisheries

Existing Conditions

For the purpose of this fisheries habitat analysis, the analyzed area will be the upper Jones Fork drainage (Figure 3.3.1).

The aquatic habitat within the analysis area is diverse, consisting of small high gradient headwater streams with some springs, and larger lower gradient intermittent streams. Ponds are also present in the analysis area both on private and public lands some of which

were created before the Forest Service had possession. Human impacts are evident throughout the project area, particularly in the riparian corridors. There are several stream crossings originating on private in holdings that have washed out, which have contributed to erosion and bank instability throughout the watershed.

We performed stream surveys on Jones Fork and an unnamed tributary in Brown Hollow within the analysis area during 2009. Some pools in both streams may benefit from inclusions of large woody debris (USDA 2009).



Figure 3.4.1. Upper section of Jones Fork Creek.

Aquatic TES Species

The longnose darter, *Percina nasuta*, a forest sensitive species, which has the potential to be found in the Frog-Bayou watershed, is discussed in the threatened, endangered, and sensitive species section of this EA.

Aquatic Management Indicator Species

(MIS)

Smallmouth Bass (*Micropterus dolomieu*)

This species is popular as a sport fish and an indicator of high quality stream habitat. Optimal smallmouth bass riverine habitat includes cool, clear streams greater than 35 feet wide with abundant shade, cover, and deep pools with moderate current and gravel or rubble substrate. We did not encounter this

species during stream surveys of Jones Fork and the creek in Brown Hollow, but it is potentially present at lower elevations during high flows and has been found in Frog Bayou and lower Jones Fork Creek. Currently, the primary concerns for smallmouth bass habitat in the Ozark National Forest are large wood habitat availability, sedimentation, canopy cover to maintain water temperature regimes, and impacts from roads and trails.

Direct and Indirect Effects-Alternatives 1&2-

Following streamside Management Zone (SMZ) standards as well as other Best Management Practices (BMPs) would protect habitat for salamanders, snakes, and other riparian dependent species. Project level compliance with these mitigation/protective measures and adherence to BMP's would mitigate potential negative effects to wetlands, riparian areas and streamside protection zones.

The addition of large woody debris to Jones Fork and the creek in Brown Hollow should increase the available habitat for smallmouth bass in both alternatives. This would help to increase the overall carrying capacity of these systems in turn increasing the overall population and condition of populations of this species. Construction/reconstruction of ponds and subsequent stocking of fish to larger ponds will improve the aquatic conditions in the project area in both alternatives.

Prescribed burning, timber/silviculture, wildlife opening and pond construction, temporary road construction as proposed in both alternatives could slightly increase sedimentation in the watershed, however, this increase would be short in time and duration. The closure of FS Roads 3WA0918 & 95513C within the watershed and the stabilization of streambanks as proposed in both alternatives will improve overall erosion conditions and will reduce sedimentation into the area streams. Nest or egg laying habitat for the smallmouth bass

should increase with the implementation of Alternatives 1 or 2. Alternative 2, however, proposes mechanical treatment instead of chemical site prep for timber activities. Alternative 2 will generate more erosion and sedimentation into area streams than Alternative 1 will. Alternative 1 will have less negative impacts to aquatic organisms than Alternative 2.

Herbicide Effects for Alternatives 1&2-aquatic species:

Direct and Indirect Effects:

The current risk assessments for forest – approved herbicides generally supports the conclusions reached by the U.S. EPA. The effects to birds, mammals, fish and invertebrates are minimal. (SERA 2003) In a worst case scenario involving a direct spill of herbicide to a body of water, the decomposition of dead plants in the water could result in an oxygen loss which could cause a fish kill (EPA 1993). However, following mitigation measures as outlined in the RLRMP significantly reduce the possibility that a direct herbicide spill to a body of water would occur. These measures, in addition to water quality monitoring will help ensure the protection of the present high quality of the streams in the proposed treatment areas.

Due to observations of deformities in populations of amphibians there is increased concern for the effects of **xenobiotics**: chemicals found in living creatures but which are not normally produced or expected to be present. Garlon 3A and Garlon 4 have been specifically tested for malformations in frog embryos and no statistically significant effects were noted (SERA 2003).

Cumulative Effects-Alternatives 1&2

Monitoring of past treatment activities similar in intensity and duration to those planned here has continued to note very little aquatic habitat change. When effects of implementation of both Alternatives 1 and 2 are combined with those of other projects on both public and private lands, there would be a slight improvement in habitat for the aquatic MIS species that include the smallmouth bass with implementation of either Alternatives 1 or 2. There would be no known negative cumulative effects to aquatic species with the proposed or modified actions.

Direct, Indirect & Cumulative Effects-Alternative 3:

Currently approved management actions would be maintained under this alternative and natural conditions would continue. Movement of forested stands toward older age classes would continue. This alternative does not meet forest plan objectives or standards for the watershed or management areas within the watershed.

This alternative does not propose any road closures, or stream bank stabilization activities. Natural erosion processes will continue, which could in turn increase sediment in the watershed streams. Large-woody debris would fall at a natural rate into the streams and improve conditions in the long-term, but would not improve conditions for the short-term. There would be no known direct, indirect or cumulative effects to any aquatic species or MIS aquatic species with implementation of the no-action alternative.

Threatened, Endangered, and Sensitive species

For the purpose of this analysis, the analyzed area will be the project area of approximately 1,817 acres within Washington County, Arkansas.

Existing Conditions

Almost 80% of the analysis area resides in closed canopy conditions, with most of the project area with an age class of 71 years of age or older. Habitat for a variety of wildlife species (including TES), is of fair quality within the analysis area due to lack of herbaceous vegetation and closed canopy conditions. Other conditions that contribute to the lack of optimal wildlife habitat in the analysis area include lack of grass and forbs preferred by many wildlife species, lack of soft mast, and several stream crossings that have contributed to stream bank erosion and sedimentation into area creeks and streams..

For more detailed information on potential effects of activities on these species see the specialist report in the project file at the district office (USDA 2009).

Bald eagle – This species, recently de-listed as a threatened species, but still on the Regional Forester’s sensitive species list, has been noted in the project area and is a common winter visitor to Frog Bayou, Lake Fort Smith and Shores lake. Normal forest management activities, that take place well away from nest and communal roost areas and are well removed from large rivers, impoundments and other significant foraging areas, have little or no impacts on transient wintering bald eagles. The actions in both proposals are considered normal forest management activities.

Direct, Indirect and Cumulative Effects-Alternatives 1&2-

There would be no direct or indirect impact on this species with any of the proposed treatments. When the effects of the proposed or modified actions within the project area are combined with potential effects of all other planned or anticipated projects on both public and private lands, which would include the Hollow Brown Project, there would be no cumulative impacts . The proposed or

modified actions will not impact individuals, cause a decline in populations, affect its federal listing, or cause loss of viability.

Ozark big-eared bat – This species has not been documented in the project area, however, suitable summer foraging and winter hibernation habitat exists for this bat.

Direct, Indirect and Cumulative Effects- Alternatives 1&2-

No activities are planned that would impact either bluff lines or caves favored by this species. Road closure as proposed with either alternative will reduce potential adverse effects of human disturbance to hibernacula and roosting sites.

Timber treatments as proposed in both alternatives will create more foraging habitat for this species. Wildlife opening construction will also create additional foraging habitat for this species.

Site prep prescribed burning as proposed in both alternatives will create additional foraging habitat for this bat. The timing of burns is generally in the spring, which is past the time when this bat will be hibernating.

Wildlife opening and pond construction will supply more foraging habitat preferred by this bat species.

All activities proposed with both alternatives are consistent with the RLRMP. In the Biological Assessment dated July 28, 2005, the Forest Wildlife Biologist (with concurrence from the USFWS), determined that the Ozark big-eared bat is “not likely to be adversely affected” from standard forest management, as long as the Revised Forest Plan guidelines and mitigations are followed.

Indiana bat – This area provides suitable summer foraging and roosting habitat for the Indiana bat, although it has not been documented in the project area.

Direct, Indirect and Cumulative Effects- Alternatives 1&2-

Road closure as proposed with both alternatives will reduce potential adverse effects of human disturbance caused by motorized vehicles, disturbance to hibernacula and roosting sites for this bat.

Wildlife opening and pond construction will supply more foraging habitat preferred by this bat species.

Site-prep prescribed burning as proposed in both alternatives will create additional foraging habitat for this bat. The timing of burns is generally in the spring, which is past the time when this bat will be hibernating.

The proposed and modified actions follow the Indiana bat recovery plan and RLRMP standards and guidelines to create optimal Indiana bat habitat. Recent telemetry studies by Arkansas State University (USFS, 2004) showed that the Indiana bat was utilizing snag roost trees in heavily thinned and burned, actively managed stands on the Boston Mountain Ranger District.

Gray bat – This bat has been documented foraging in the Frog Bayou stream corridor. However, there are no records of hibernacula or maternity sites found within the analysis area for the gray bat.

Direct, Indirect and Cumulative Effects- Alternatives 1&2-

No activities are planned that would impact either blufflines or caves favored by this species. Road closures as proposed with both alternatives will reduce potential adverse

effects of human disturbance caused by motorized vehicles.

Forest-wide standards will provide for the protection of all existing or discovered gray bat caves. Hibernacula and summer roost sites are protected by the implementation of forest-wide standards, which maintain vegetation buffers of 200 feet around all caves.

Prescribed burning as proposed in both alternatives will create additional foraging habitat for this bat. The timing of burns is generally in the spring, which is past the time when this bat will be hibernating.

Wildlife opening and pond construction will supply more foraging habitat preferred by this bat species.

American burying beetle – Numerous surveys have failed to document the occurrence of this species north of the Arkansas River in Arkansas. Surveys for this species were conducted near the project area in 2005 with no captures (USFS, 2005).

Direct, Indirect and Cumulative Effects- Alternatives 1&2-

Both alternatives would have no direct or indirect effect on this species. Potential habitat for this species will be improved with the construction of wildlife opening and timber thinning treatments.

Timber treatments and site prep-prescribed burning as called for in both alternatives could harm individuals, however, because there have been no occurrences of this species historically or currently, there would be no direct or indirect effects on populations with prescribed burning. Prescribed burning can create some of the early successional habitat that this beetle prefers.

Alternative 2, the modified action, calls for

mechanical treatments in lieu of herbicide for timber site prep treatments. Mechanical treatments could harm the habitat for this species more so than herbicide use as called for in the Proposed Action alternative.

Generally, the indirect effects of forest management activities will be beneficial to American burying beetle (ABB) habitat in this alternative. Increased establishment and maintenance of early seral habitat will provide enhanced habitat for the ABB food base of small vertebrate carrion. Indirect beneficial effects on ABB habitat would primarily involve maintenance and/or enhancement of grass/forb/shrub conditions that harbors small mammal and other potential carrion populations. The cumulative effects of forest management activities in the proposed alternative on ABB habitat would be continued enhancement of the grass/forb habitat, providing conditions beneficial to this species, but ground-disturbing activities in proximity to individuals may directly harm them (USFS-BA, 2005).

Ozark chinquapin – Until the introduction into this country of the chestnut blight (*Endothia parasitica*) and its subsequent spread, the Ozark chinquapin had been considered a locally abundant and widespread tree species in the Interior Highland region. As a result of the spread of this parasite, few mature trees of this species still exist although sprouting from stumps is quite common (Tucker, 1980). Field observations indicate that Ozark chinquapin, despite its infection with chestnut blight, can be expected to hold its own in competition with other tree species in almost all kinds of disturbance factors resulting from normal forest management practices (Tucker 1989).

Direct, Indirect and Cumulative Effects- Alternatives 1&2-

The Ozark chinquapin was found in the project area. Prescribed burning and some timber

treatments could be beneficial to this species, as it prefers disturbance, which often results in incidental stump sprouts. Repeated prescribed burns would likely be detrimental to individual plants.

The construction of wildlife openings should not impact this tree as none were found in the opening areas where construction and maintenance will occur.

Herbicide treatments as proposed in both alternatives could have negative direct and indirect impacts to this species, however, mitigation measures as described in chapter 2, will protect this tree during proposed treatments.

Implementation of both alternatives (1 or 2) may impact individuals but are not likely to cause a declining trend to the Ozark Chinquapin federal listing or loss of viability.

Longnose darter– The Longnose darter is currently believed to occur in four major basins in Arkansas including the Arkansas River. Habitat preferences appear to be clear, silt-free, upland streams and small rivers with cobble and gravel bottoms. Habitat reduction and fish competition are chiefly caused by recent developments of reservoirs (Robison and Buchanan, 1988) with siltation possibly affecting it to some degree. The Longnose darter appears to be very sensitive to environmental disturbances (Robison and Buchanan, 1988). This species does occur in the Mulberry River watershed, but to date has not been noted in the analysis area.

Direct, Indirect and Cumulative Effects- Alternatives 1&2-

Best management practices (BMPs) of clearly marking on the ground all stream management zones along all streams will be adhered to in order to protect the water quality of streams within the project area. Additional standards to

protect water quality in streams, springs, seeps, and other karst features can be found in the RLRMP.

Prescribed burning, timber/silviculture, wildlife opening and pond construction, road construction as proposed in both alternatives could slightly increase sedimentation in the watershed, however, this increase would be short in time and duration. The closure of roads and revegetation of eroding stream banks as as proposed in both alternatives will improve overall erosion conditions and will reduce sedimentation into the area streams.

Implementation of either the proposed or modified alternatives may impact individuals but is not likely to cause declining population trends, loss of viability, or changes in federal listing for the longnose darter.

Eastern small-footed bat – The Eastern small-footed bat is one of the last to enter caves in autumn and often hibernate near cave or mine entrances where temperatures drop below freezing and where humidity is relatively low. During summer months, they often inhabit buildings and caves. They emerge to forage shortly after sunset and fly slowly and erratically, usually 1-3 meters (3-10 feet) above the ground. In Arkansas, it is known in small numbers from only a few caves in the Ozarks. Recent surveys have not documented this unique species in the analysis area, however, some habitat exists in the project area.

Road closure as proposed with both alternatives will reduce potential adverse effects of human disturbance caused by motorized vehicles, disturbance to hibernacula and roosting sites. Wildlife opening and pond construction will produce more available foraging habitat for this bat.

Prescribed burning as proposed in both alternatives will create additional foraging habitat for this bat. The timing of burns is

generally in the spring, which is past the time when this bat will be hibernating.

All activities proposed with both alternatives are consistent with the RLRMP.

Implementation of forest-wide standards for the protection of caves, karst habitats, and riparian areas will help protect needed hibernacula and roosting sites as well as potential foraging sites for this species. There would be no cumulative impacts to this bat with implementation of the proposed or modified actions.

Ozark spiderwort – Ozark spiderwort is known to occur only in southern Missouri and northwestern Arkansas. This plant was not noted during field surveys of the analysis area, however, suitable habitat is present within the project area. This unusual plant occurs in shallow draws in cherty-flinty soils of oak-hickory, oak-pine, or oak-chestnut woodland in the Ozark region. Habitat loss is the primary threat to this species.

Prescribed burning and some timber treatments could be beneficial to this species, as it prefers some disturbance. The construction of temporary roads could be detrimental to individual species, through the uprooting of the plants. Closure of roads and trails should have beneficial impacts to this species.

The construction of wildlife openings should not impact this plant as none were found in the opening areas where construction and maintenance will occur.

Herbicide treatments as proposed in both alternatives could have negative direct and indirect impacts to individual species, however, known sites of this plant are not in stands proposed for treatments.

Implementation of either Alternative 1 or 2 may impact individuals but is not likely to

cause cumulative impacts, such as a declining trend to the Ozark spiderwort's federal listing or loss of viability.

Small-headed pipewort-This plant is found in Arkansas, Oklahoma, and Texas and is found in or near permanently moist to wet seepage areas (particularly upland sandstone glade seeps), bogs, and prairie stream banks. This plant is intolerant of shade. Field studies indicate this plant is an early successional and often times a persistent species. The margins of pipewort populations are often shortleaf pine, eastern red cedar, and winged elm, all of which are early successional species among the woody plant assemblage. A few sites show evidence of some soil disturbance, such as provided by occasional to frequent vehicle traffic through the edge of the population. The species appears to require full sun for its best development. Development of later seral stages in vegetation development probably shades out the pipewort. This plant is not known from the analysis area, however, there is suitable habitat present in the project area.

Prescribed burning and some timber treatments could be beneficial to this species, as it prefers disturbance. The construction of wildlife openings should not impact this plant as none were found in the opening areas where construction and maintenance will occur.

Herbicide treatments are not proposed in areas and stands where this plant is could be found.

Temporary road construction will not impact this species as it was not found in areas where road construction/maintenance will occur.

Implementation of either the proposed or modified alternatives will have no cumulative impacts to the small-headed pipewort.

Southern Lady Slipper-

This plant is found primarily in riparian

corridors. Known sites in the project area occur in riparian areas that are moist. These areas will further protect this plant as called for in the RLRMP (3- 37) from any potential negative impacts that the proposed or modified actions could cause.

Prescribed burning and some timber treatments could be beneficial to this species, as it prefers disturbance. The construction of wildlife openings should not impact this plant as none were found in the opening areas where construction and maintenance will occur.

Herbicide treatments are not proposed in areas and stands where this plant is found.

Road work as proposed in both alternatives will not impact this species as it was not found in areas where road maintenance will occur. Road closure should benefit this species and lesson any disturbance in the riparian areas.

Implementation of either the proposed or modified alternatives will have no cumulative impacts to the southern lady-slipper.

Bachman's Sparrow- The Boston Mountain Ranger District is located north of this species range. This species was not found during field surveys and no historic records are known from the analysis area.

Habitat for this species in both alternatives will be improved. Indirect and direct beneficial impacts to potential habitat for this species will occur with the proposed and modified alternatives. The proposed or modified actions will have no direct, indirect or cumulative impacts to the Bachman's Sparrow as none occur within the analysis area.

Ouachita False Indigo/Leadplant –Is most often found near streams on rocky outcrops or in open areas created by road construction or maintenance in full sunlight or light shade

(Tucker, 1989). The usual habitat for the Ouachita leadplant seems to be on rocky, open and sunlit areas having reliable moisture. It occurs on glades, roadsides and along ephemeral drainages and has been noted in the analysis area.

Prescribed burning and some timber treatments could be beneficial to this species, as it prefers disturbance. However, this plant generally occurs in riparian areas which are protected according to RLRMP guidelines (3-37).

The construction of wildlife openings and ponds should not impact this plant as none were found in the opening areas where construction and maintenance will occur.

Herbicide treatments are not proposed in areas and stands where this plant is found. This plant has been noted in riparian areas where treatments are not proposed to occur.

Road work as proposed in this alternative will not impact this species as it was not found in areas where road construction/maintenance will occur. Road closure should benefit this species and lesson any disturbance in the riparian areas.

Implementation of either the proposed or modified alternatives will have no cumulative impacts to this plant. Direct and indirect benefits to this plant should occur with any of the proposed treatments as it prefers open conditions that allow sunlit to reach the forest floor.

Alternative 2-Modified Action:

The direct, indirect and cumulative effects of this alternative would be similar to that of Alternative 1, however, without any potential negative effects that could occur from herbicide use for timber management. Mechanical site prep used in lieu of herbicide is not as effective and could cause more

disturbance to nesting birds and plants. Direct and indirect effects would be the same as in the proposed action, but TES species such as the bald eagle and the Indiana bat could have an increase in disturbance due to mechanical versus herbicide site prep treatments should they occur in stands proposed for treatments.

Herbicide Effects for Alternatives 1&2- TES:

See herbicide effects for Alternatives 1 and 2 under MIS section.

Alternative 3-No Action:

This alternative does not meet RLRMP standards or guidelines to maintain viable populations of TES species. Natural conditions would continue to occur-such as increased canopy closure, which will result in a continued decrease of early successional habitat. There would likely be an increase in erosion, with a subsequent increase in sedimentation into area streams. There would be no known direct, indirect or cumulative effects to any TES species with implementation of the no-action alternative.

Aquatic Species of Viability Concern/Locally Rare and Important Species

The bluntface shiner has historically been found in the Frog-Mulberry watershed in which the Jones Fork is nested, but may now be extirpated from Arkansas.

(<http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Cyprinella%20camur>) (accessed 8 Sept 2009)

The longnose darter, a Regional Forester's sensitive species is also found in the Frog-Mulberry watershed. Both these fishes are sensitive to degradation in habitat quality that could be caused by sedimentation from roads. The Ozark-St Francis national forest has classified three mussel species in the Frog-Mulberry as viability concerns: the elktoe,

Flutedshell, and purple lilliput. The status of these species will not be changed by project activities within the Jones Fork watershed.

Additional aquatic TES species

Nearctic Paduneillan Caddisfly The distribution of this species has not been extensively studied. There has been a historical record of this caddisfly from the Mulberry River. The project area has potential habitat, although the distribution of this caddisfly is unknown.

This species seems to have a low tolerance for sedimentation.

Isopod (Lirceus bicuspidatus)

The actual distribution of this species is not well known or understood. It is found in streams and possibly in caves that have moving water. This species has been found on both the Ozark and St. Francis National Forests and has been found historically from the Frog-Mulberry watershed. To date, this isopod has not been identified in the project area. The main impacts to this species seem to be activities that interfere with habitat and water quality. Populations on or near the Ozark-St. Francis National Forests would be most susceptible to management activities like herbicide used, pesticide use, and fire retardants but these treatment actions are typically not widespread and impacts are limited to the sites where they occur. It could also be susceptible to sediment increases from activities like logging, road construction, cattle grazing, burning, and over abundant recreational use.

Direct and Indirect Effects-Alternatives 1&2-proposed and herbicide option actions:

Following streamside Management Zone (SMZ) standards as well as other Best Management Practices (BMPs) would protect habitat for salamanders, snakes, and other riparian dependent species. Project level

compliance with these mitigation/protective measures and adherence to BMP's will eliminate negative effects to wetlands, riparian areas and streamside protection zones.

The addition of large woody debris to Jones Fork and Brown Hollow creeks could decrease the available habitat for both the Isopod and the Nearctic paduneillan caddisfly in both alternatives. Both species prefer running water. The addition of large woody debris could potentially stop the flow of water and cause pool habitat that both of these aquatic species could not survive in.

Construction/reconstruction of ponds and subsequent stocking of fish to larger ponds will improve the aquatic conditions in the project area in both Alternatives 1 and 2.

Prescribed burning, timber/silviculture, wildlife opening and pond construction, temporary road construction as proposed in both alternatives could slightly increase sedimentation in the watershed, however, this increase would be short in time and duration. The closure of FS Roads 3WA0918 & 95513C within the watershed and the stabilization of streambanks as proposed in both alternatives will improve overall erosion conditions and will reduce sedimentation into the area streams.

Alternative 2, however, proposes mechanical treatment instead of chemical site prep for timber activities. Alternative 2 will generate more erosion and sedimentation into area streams than will Alternative 1.

Alternative 1 will have less negative impacts to aquatic organisms than Alternative 2.

Cumulative Effects-Alternatives 1&2

Monitoring of past treatment activities similar in intensity and duration to those planned here has continued to note very little aquatic habitat change. When effects of implementation of both Alternatives 1 and 2 are combined with those of other projects on both public and

private lands, there could be a slight reduction in potential habitat for both the Isopod and the Nearctic paduneillan caddisfly with implementation of either Alternatives 1 or 2 due to the addition of large woody debris, however, there should not be any negative cumulative effects to either aquatic species with the proposed or modified actions.

Direct, Indirect & Cumulative Effects-Alternative 3:

Currently approved management actions would be maintained under this alternative and natural conditions would continue. Movement of forested stands toward older age classes would continue. This alternative does not meet forest plan objectives or standards for the watershed or management areas within the watershed.

This alternative does not propose any road closures, or stream bank stabilization activities. Natural erosion processes will continue, which could in turn increase sediment in the watershed streams. Large-woody debris would fall at a natural rate into the streams which would likely improve habitat for both of these aquatic species. There would be no known direct, indirect or cumulative effects to any aquatic species or MIS aquatic species with implementation of the no-action alternative.

3.5 Recreation & Scenery Resources

Visitors come to the OSFNF to participate in a wide variety of recreation opportunities in an outdoor setting. Since visitor perception of an outdoor setting is often greatly affected by changes in scenery, these two resource areas are discussed together. The Upper Jones Fork watershed serves as the analysis area for recreation and scenery resources.

Existing Conditions

Recreation Opportunity Spectrum (ROS)

The Recreation Opportunity Spectrum (ROS) is a mapping and classification system that distinguishes between different types of

recreation settings available in the Forest. The ROS provides a method for recreation managers and users to understand and visualize the variety of natural outdoor settings, the types of activities that can be pursued, what recreation experiences to expect, where these experiences are available, and how many other people may be found in a specific area of the Forest. This planning tool assists recreation managers in matching the diversity of recreation interests with appropriate opportunities in suitable locations. The ROS is divided into six major classes for Forest Service use: Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural, and Urban (FEIS to the RLRMP, pages 3-326 to 3-328).

The majority of the project area, approximately 5,124 acres, is classified as Roaded Natural and approximately 3,790 acres is classified as Semi-Primitive Motorized.

Roaded Natural is defined as an area characterized by predominantly natural-appearing environments with moderate evidences of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities. The recreation opportunity experience level provided would be characterized by the probability for equal experiencing of affiliation with individuals and groups and for isolation from sights and sounds of humans. Opportunities for both motorized and non-motorized forms of recreation may be provided.

Semi-Primitive Motorized is defined as an area characterized by a predominantly natural or

natural-appearing environment of moderate-to-large size. Interaction between users (or concentration of users) is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present but are subtle. The recreation experience opportunity level provided would be characterized by the high, but not extremely high (or moderate) probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk (opportunity to have a high degree of interaction with the natural environment). Motorized use is permitted. There are no developed recreation areas located in the project area. Designated roads through the area facilitate a variety of motorized and non-motorized recreational opportunities. Common recreational activities in the project area include Off-Highway Vehicle use (OHV), driving for pleasure, viewing scenery and wildlife, dispersed camping, hiking, mountain biking, horseback riding, hunting, fishing, and gathering forest products (i.e., berry picking).

Scenic Management System

The Ozark-St. Francis National Forest RLRMP (2005) adopted a Scenic Management System (SMS) to assist in inventory and management of the aesthetic values of Forest lands (FEIS for the 2005 RLRMP pages 3-372 to 3-379). Scenic Integrity Objectives (SIOs) are the desired levels of excellence based on sociological and physical characteristics of an area. The SIOs used in this analysis are defined below:

Definitions of Scenic Integrity Objectives:

High: Valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so

completely and at such scale that they are not evident.

Moderate: Valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Low: Valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but also compatible or complimentary to the character within.

The project area contains SIO zones High, Moderate, and Low. Additionally, 1,370 acres were not categorized, but are predominantly bordered by Moderate SIO zones; consequently, these areas were classified as Moderate for this analysis. Private land accounted for approximately 60% of the analysis area and are not assigned SIOs. Approximately 173 acres are zoned High, 3,250 acres are zoned Moderate, and 198 acres are zoned Low.

There are two High value zones in the project area. One is located in the NE corner of the area, south of Low Gap in the head of Brown Hollow. This area encompasses the headwaters of Jones Fork Creek. The other High value zone is located south of Millers Chapel and encompasses the top and north slope of Henderson Mountain. Moderate value zones are located throughout the project area. There are 7 Low value zones spread along the center of the project area adjacent to major roadways. Private lands are prevalent throughout this project area. The landscape character valued in the analysis area for

aesthetic appeal is generally defined as natural appearing forested ridges and valleys.

The area contains visual diversity, with the majority of private ownership consisting of homes, businesses, pasture for livestock, crops and private forested areas. Spring, summer and fall viewing from state highways, county roads and other primary forest roads are mostly rolling hills with mixed hardwoods, pine and some areas of open pasture land. Winter viewing from the county roads are mostly of mixed hardwoods and pine.

Distinctive features in the area include Jones Fork Creek, Brown Hollow, Henderson Mountain, and Weedy Rough Mountain.

Hunting for whitetail deer, eastern wild turkey and squirrels are popular recreational activities in this area. Dispersed hunter camps are located throughout the analysis area. Several roads in the analysis area are heavily used during hunting seasons.

There are no National Recreation Areas, Wilderness Areas, or Special Interest Areas (SIA) within the vicinity of the proposed actions.

3.5.1. Direct, Indirect, and Cumulative Effects from Alternatives 1& 2

Recreation users in the area may notice impacts from vegetation, roads, and wildlife habitat management activities.

A SIO rating of High refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident. The proposed project activities are not located in or near the High value areas, and therefore would have no effects. The proposed activities would occur along Low and Medium

value areas.

Vegetation Management

Proposed vegetation management activities include stand thinning, shelterwood harvest, planting, and associated site prep activities including herbicide treatments and prescribed burning. Recreation users and Forests visitors may notice the sounds of logging equipment and logging trucks on area roads. Some users may also be affected by road or trail closures due to logging or related activities.

Potential effects include decreased canopy cover, increased sunlight, increased visibility into the forest, visible logging debris and stumps, damaged living vegetation from logging activity, and browned or dying vegetation from the use of herbicides and prescribed fire. There would also be noticeable changes in forest texture and color due to the open character of the stand and exposed soil, particularly when viewed in conjunction with areas that have not been treated.

Blending the proposed treatment with surrounding areas by feathering the edges, screening access roads/log landings, and treating slash would particularly help mitigate impacts to scenery in seen portions of treatment areas. The short-term effects would be a more open understory allowing views further into the forest, potentially improved scenic and wildlife viewing, and some improved recreation opportunities such as hunting. Forest growth over a period of several years would continue to decrease any noticeable effects of management activity over time. With implementation of key design criteria found in the RLRMP and project file, the proposed vegetation treatment activities would meet the required SIOs.

Roads Management

Proposed roads management activities include installing a gate at intersection of FS Roads

3WA0918 & 95513C and conducting light maintenance (i.e., light brushing, grading, and spot aggregate placement) on FDRs 95512A, 95513A, 95513C and 95513D to support timber sale activities. At the conclusion of timber management activities, temporary roads and illegal user-created trails will be closed, blocked, and seeded. These activities will have no long-term negative effects on recreation activities in the project area.

Wildlife Habitat Management

Proposed wildlife habitat management activities include wildlife opening and road access maintenance/improvement, pond construction/maintenance/improvement, and stream habitat improvement. Recreation users and forest visitors may notice these activities, as some of these treatment areas are visible from open FS roads. These sites are destinations for hunting, fishing, and wildlife viewing. The proposed activities would improve these opportunities. With implementation of key design criteria found in the RLRMP the proposed vegetation treatment activities would meet the required SIOs.

3.5.2. Direct, Indirect, and Cumulative Effects from Alternative 3 – No Action

Under the No Action Alternative, there would be no perceivable short-term direct or indirect effects. Long-term direct and indirect effects from the No Action Alternative may decrease the scenic integrity of the area, but not below the assigned SIOs

Views into the forest would not be altered by project activities. However, long-term visual quality could decline as natural processes result in increased tree density and successional vegetation invades open areas. The result is reduced visual penetration into the forest. Successful viewing of wildlife species and habitats preferred by forest visitors would decline.

Wildlife habitat improvements would not be implemented; consequently, increased quality hunting, fishing, and wildlife viewing opportunities would not be realized.

The No Action Alternative would not result in increased cumulative effects in the analysis area. However, no beneficial effects to recreation, such as improved hunting, fishing, and wildlife viewing opportunities would result.

3.6 Air Quality

Existing Conditions

The entire project area lies within lands designated as a Class II area with respect to the air resource. **The Clean Air Act** defines a Class II area as “A geographic area designated for a moderate degree of protection from future degradation of the air quality

Existing emission sources occurring within the project area consist mainly of mobile sources. These include, but are not limited to, combustion engines, dust from unpaved

surfaces, and smoke from prescribed (federal, local, county) burning.

Air quality is not a significant issue in relation to the alternatives presented in this project. More information on Air Quality in general for the forest can be found in the specialist report at the district office (USFS 2009b).

3.6.1. Effects from Alternatives 1 and 2– Direct and indirect effects.

The majority of our prescribed burning takes place in the early spring. Atmospheric conditions are stable to unstable: ideal conditions for good smoke dispersal. Frontal passages occur almost weekly with rainfall amounts heavy at times. During this time just before green-up plants are taking in water and sap is on the rise causing rapid drying between showers. Nighttime inversions are common burning off by mid-morning. This pattern continues for several weeks prior to full leaf out.

Table 3.6.2 describes the estimated emissions for the project area for alternatives 1 and 2.

Table 3.6.1. Prescribed burning Emissions for Alternatives 1 and 2

	Ecosystem Burning
Acres proposed	67ac (Site Prep)
Fuel produced/acre	3 tons/ac
Total tons of fuel available	201 tons
Emissions Produced (tons)	
Carbon Dioxide (1.25)	251
Carbon Monoxide (0.13)	26
Water Vapor (0.50)	100
Particulate Matter (0.05)	10
Hydrocarbons (0.0125)	2.5
Nitrogen Oxides (0.0023)	.46
Total	390 tons

Alternative 3: No Action.

Direct, Indirect and Cumulative Effects

There would be no significant changes to present air quality. Exhaust emissions and dust from vehicles passing through the project area would continue. Occasionally, local residents will burn trash and small brush piles which will generate smoke.

3.7 Minerals

3.7.1. Existing Conditions.

The management areas within the project area are considered available for oil and gas exploration and leasing. Currently, there are only 240 acres leased on National Forest land for gas exploration within the project area.

There are no known gas wells on record in the area on National Forest land. This includes wells that may have been plugged and abandoned. Historically, when gas wells were located on National Forest land the gas well pads have been approximately two acres in size with an access road to the site. The access road would vary from a few feet to over a mile. The majority of access roads were less than a mile due to the roaded nature of the area. Pipeline to connect a producing gas well to an existing pipeline generally follows the road ditch line. At this time there are no gas pipelines in the project area. This includes both gathering lines and transmission lines.

3.7.2. Effects from Alternatives 1 and 2

Direct, indirect, and cumulative effects.

When leases exist, requests for surface occupancy through an APD to withdraw minerals within the project area shall be approved. Prior to approval, an on-site meeting with the Operator, Bureau of Land Management, and Forest Service Specialists shall take place. The APD will be reviewed for

compliance with all Federal regulations. Road, pad, pit, and pipeline locations shall be determined based on the surrounding area, existing roads, topography, and existing pipeline.

The location for these sites would be chosen in consideration of environmental concerns as well as accommodation of the operator's right to entry for mineral withdrawal under the lease. The acreage for each new site shall be less than five (5) acres of new ground disturbance. This would include any new construction of roads, the pad area, the pit area, and any other areas that are cleared of vegetation. The rehabilitation of areas shall be done in a timely manner with direction given individually for each site. Rehabilitation measures could include restoration to original conditions, maintenance as a wildlife opening, or as a dispersed recreation area.

Based on this analysis, there should be no significant direct, indirect, or cumulative effects to human health and the physical environment from oil or gas exploration in the project area.

Cumulative effects from oil & gas leasing and explorations surrounding the project area have previously been analyzed through an environmental analysis and associated environmental documents for each proposal for surface occupancy for gas exploration within the project area. At this time, producers believe there is potential for gas in areas that have not yet been drilled. Based on this assumption, it is likely that additional requests within lease areas to drill would be received by the Forest Service.

As an Application for Permit to Drill (APD) is received, it would be evaluated on its own merit to minimize impacts to the area, including cumulative impacts. Whenever possible, the existing access roads would be utilized by multiple drilling areas. This is the practice that has been followed in the past and

reduces the number or linear miles of roads on the ground. As wells become unprofitable, they are generally abandoned by the producer, at which time the area is rehabilitated to meet Forest Service standards.

As gas wells within the project area are plugged and abandoned, the surface areas are restored to meet Forest Service standards. Former well sites have become wildlife openings, dispersed recreation areas, or have been returned to their natural contours and vegetative types. In following the President's Energy Initiative, the Forest Service must continue to honor access to the minerals under existing leases and look at potential areas that can environmentally accommodate additional leases.

If no gas reserves are found within the project area and surrounding areas located within this project area, and the price of gas were to go down, it is likely that over the next several years most wells within the field would be abandoned and rehabilitated. Additional exploration in other known fields or wildcat areas could then occur.

Cumulative effects to vegetative resources from existing and potential future gas well development in the area will be from conversions of small areas of forest to permanent openings. In the foreseeable future, if gas exploration becomes present in this area, gas wells could be developed. Each gas well would entail a small (approximately 2 acres) permanent opening where the native vegetation would be removed. Overall, these new and existing openings would amount to less than one percent of the overall project area.

3.7.3. Effects from Alternative 3-No Action

Direct, indirect, and cumulative effects.

Under the "no action" alternative, within an existing lease, all requests for surface occupancy for gas exploration would be reviewed and analyzed on an individual basis with environmental documentation prepared for each request. This would involve time and personnel resources in order to follow the President's Energy Initiative in responding in a timely manner to all APDs.

3.8 Special Uses

Special uses serve public needs, provide public benefits, and conform to resource management and protection objectives. The uses authorized are in full compliance with the terms and conditions of the authorization.

Existing conditions.

There have been several special use permits issued in the past within the vicinity of the Hollow Brown Project Area. The majority of special use permits are issued to individuals requiring legal access to private lands. There is also a special use permit issued authorizing the operation and maintenance of a natural gas pipeline. Other activities requiring a special use permit have been the temporary use of forest development roads for the purpose of commercially hauling timber from private lands.

The following currently issued special use permits have been identified within the Hollow Brown Project Area:

Table 3.8.1 Special Use Permits within the Project area

Type	Permit Holder	T	R	Sec	Expiration Date
Forest Road Permit	Scates, Cory	13N	29 W	27	12/31/2024
Forest Road Easement	Castleman,R	13N	29 W	21	12/31/2016
Forest Road Permit	Nelson, D	13N	29 W	10,15	None Stated
Natural Gas Pipeline	CenterPoint Energy	13N	29 W	17,20,21,27 & 28	12/31/2024

3.8.1. Effects from all alternatives

Direct, indirect, and cumulative effects.

Special uses serve public needs, provide public benefits, and conform to resource management and protection objectives. The uses currently authorized are in full compliance with the terms and conditions of the special use authorization.

The Hollow Brown Project is compatible with the management of special uses in the area. A review of private in-holdings within the project area shows it to be moderate in that the Forest Service will receive additional special use proposals for access in the future. (This is based on the existing private in-holdings within the analysis area). Special Use Permits for other activities such as commercial logging and recreation events is expected to continue. These uses would be in agreement with the types of occurring commercial and non-commercial uses already in the project area. Any new special use proposals would be reviewed on an individual basis when they are received.

It should also be noted that with the continued growth in population within the Northwest Arkansas region, the potential for special use permit requests concerning recreational type events/activities is high.

3.9 Human Health

Existing Conditions. Some roads in this area are in need to maintenance, closures or relocation in order to improve safety and to be more effective in resource management activities.

3.9.1. Effects from Alternatives 1 and 2-

Direct, indirect effect and cumulative effects.

Roads and trails would be constructed and/or maintained to a standard that would provide for user safety. Beyond that it is the users’ responsibility to make use of the facilities in a safe and prudent manner as well as having appropriate personal protective equipment.

Herbicide treatments: There is little, if any, risk to the public from the proposed herbicide treatments, the most likely being a skin reaction in sensitive individuals from contact with liquids on freshly treated vegetation. Herbicides present a minor adverse risk to applicators from overexposure due to accidental release or contact, or repeated exposure to and contact with high concentrations of some products. This is minimized by training and proper supervision. The proposed herbicides do not accumulate in tissue and are passed through the body without significant impact.

Forest Service Risk Assessments are available online through the Forest Service Website at www.fs.fed.us/foresthealth/pesticide/risk.shtm. A risk assessment was conducted specifically for this project and is available for viewing as part of the project file at the district office.

To improve visitor safety, forest visitors may be prohibited from entering certain areas during prescribed burning. At the conclusion of the harvest activities and prescribed burning, certain roads will be closed, blocked and seeded. These activities will have no long-term negative effects on user safety. Overall these actions should increase public safety.

3.9.2. Effects from Alternative 3-No Action
Direct, indirect, and cumulative effects.

The improvements proposed for roads would not be carried out and will do nothing to improve safety for visitors. Chances for serious injury from falling limbs may increase. There would possibly be negative cumulative effects on health and human safety as a result of this alternative.

3.10 Heritage Resources

Existing conditions:

Information concerning possible heritage resources within the project area was obtained from the Master Site and Project Tracking Atlas, field-going personnel, historical maps, aerial photographs, land acquisition files, local historical and genealogical societies, descendant family members, and project and site records at the Boston Mountain Ranger District office and Supervisor's Office.

The Master Site and Project Tracking Atlas indicates that there have been archeological projects conducted within or immediately adjacent to the proposed project area. These include the Jones Fork Sale and Miller's Chapel Project conducted by the forest service in 1989 and 1995 respectively. :

The project area includes 11 recorded archeological sites. Six sites were recorded during fieldwork for earlier projects, and an additional five sites were located and

recorded during fieldwork in 2009 for this project. The results of the 2009 fieldwork were submitted to the Arkansas State Historic Preservation Officer in July, 2009, and concurrence was received from the SHPO in August 2009.

These 11 sites include six prehistoric sites, four historic sites, and one historic site with a prehistoric component. Prehistoric sites include lithic scatters and bluff shelters. Historic sites include the Miller's Chapel school and cemetery, farmsteads, and a rock alignment. One site (the school/cemetery) is recommended eligible for nomination to the National Register of Historic Places. Two sites are recommended not eligible for nomination, and recommended eligibility for the remaining eight sites is undetermined.

Two sites are located on private property and should not be impacted by activities associated with this project. One site is located adjacent to, but not within, the project area, and it also should not be impacted by proposed actions. For the remaining eight sites, those recommended eligible for nomination to the National Register and those with undetermined eligibility will be protected from ground-disturbing activities associated with this project. Sites will be protected by flagging and painting site boundaries and by planning project activities so as to avoid impact to these sites. Sites recommended not eligible warrant no further protection; however, rock alignments and field clearing piles will be avoided where possible and retained as indicators of historic land management. Prehistoric sites located along drainages into Jones Fork may represent an intact prehistoric landscape. These sites are located in an area where no activities are planned, and they should not be impacted by proposed actions associated with this project.

***3.10.1. Effects from Alternatives 1 and 2–
Direct, Indirect, and Cumulative Effects.***

The project has been designed so that all sites that may be eligible for the National Register of Historic Places, or that are of undetermined eligibility, will be avoided by planned activities. Rock alignments will be preserved as indicators of past management activities if feasible. Historic site areas which contain no organic cultural material will undergo prescribed burning. Past research has shown that sites such as these will not be affected by a low-intensity prescribed burn.

Should any additional sites be found during project implementation, they will be examined by a professional archeologist (mitigation measure 3), who will prescribe necessary mitigation measures.

Based on these findings, all sites will be preserved intact and no significant effects will be produced upon significant historical or prehistoric sites that may be eligible for nomination to the National Register of Historic Places.

***3.10.2. Effects from Alternative 3
Direct, Indirect, and Cumulative Effects.***

This alternative would have no effect on heritage resources. No additional surveys will be conducted. No sites will be addressed for their National Register of Historic Places

3.11 Environmental Justice and Civil Rights

This section addresses the adequacy of the opportunity for comments from all ethnic populations. Civil Rights impact analysis need is also discussed.

Table 3.11.1. Population Demographics for Washington County and Arkansas.

<i>Race</i>	<i>Washington County</i>	<i>Arkansas</i>
White	90%	81%
Black or African American	3.5%	16%
American Indian and Alaska Native	2%	1%
Asian	2%	1%
Native Hawaiian and Other Pacific Islander	1%	0.1%

Civil rights implications were considered related to each alternative. This included the effects of the alternatives on minority groups, women and consumers. Civil rights imply the fair and equal treatment under law, both within the agency and in relations with the public. No potentially major civil rights impacts were found related to any alternative. Therefore, a civil rights impact analysis and statement of findings are not required for this project.

3.12 Economics

Because users come from all areas of Arkansas and other states, this analysis does not intend to report the entire value of benefits to the local economy. However, some portions of these expenditures do benefit the local and county economy. The percentage of benefit for each sector is not quantifiable, so the entire value is reported.

Existing conditions.

Washington County contains part of the Fayetteville metropolitan area and the small cities of Prairie Grove, Lincoln, and Greenland. Continued growth in the area will likely increase the demand for recreational and hunting opportunities and access to the Forest.

3.12.1. Effects from Alternatives 1 and 2.–

Direct, indirect and cumulative effects.

We estimate that 2000 ccf of hardwood timber would accrue from timber harvest activities. This would result in about \$32,800 of revenue. A portion of that would be returned to the county with a majority going to the US treasury.

Treatments following harvesting would comprise the bulk of costs (table 3.12.1). Alternative 2 includes the additional expense of a second release treatment in the absence of the use of herbicides for timber treatments and so is more cost prohibitive.

Benefits would continue for several years following treatments. Benefits to the economy would continue from changes to wildlife habitat that improves hunting and

viewing opportunities. Changes on private land and poaching could affect the actual returns from wildlife by increasing or reducing the number of animals available for use.

3.12.2. Effects from Alternative 3. Direct, indirect and cumulative effects: Benefits to the economy would continue from hunting and viewing opportunities though likely below current levels. Changes on private land and poaching could affect the actual returns from wildlife by increasing or reducing the number of animals available for use.

No funds would be returned to counties or to the United States Treasury because no harvest would occur. All money received from hunting would be distributed across area stores, food establishments and gas stations by the user.

Although no costs are associated with this alternative in terms of treatments except for routine maintenance on roads, other costs that are not quantifiable would eventually accrue from events such as degradation of the watershed from increased erosion from unmanaged roadways.

Table 3.12.1. Economic Analysis

ACTION	ALT 1	ALT 2	ALT 3
<i>GROSS REVENUE GENERATED BY HARVEST</i>	\$32,800	\$32,800	0
<i>REVENUE GENERATED BY WILDLIFE</i>	\$25,000	\$25,000	\$25,000
<i>ROADS COST</i>	\$10,000	\$10,000	\$6,000
<i>SILVICULTURAL ACTIVITIES COST</i>	\$15,000	\$27,500	0
<i>WILDLIFE HABITAT ACTIVITIES COST</i>	\$8,000	\$5,000	0
<i>PRESENT VALUE REVENUES</i>	\$57,800	\$57,800	\$25,000
<i>PRESENT VALUE COSTS</i>	\$33,000	\$42,500	\$6,000
<i>NET PRESENT VALUE</i>	\$24,800	\$15,300	\$19,000
<i>B/C RATIO</i>	1.75	1.36	4.2

4.0 Agencies and Persons Consulted

INTERDISCIPLINARY TEAM MEMBERS

Ben Gentry	GIS Technician - Boston Mountain and Magazine Ranger Districts.
John Lane	Multiple-Resource Assistant – Boston Mountain Ranger District
Frank Palmer	FMO Boston Mountain Ranger District
Rhea Whalen	Wildlife Biologist – Boston Mountain Ranger District
Seth Cole	Forester– Boston Mountain Ranger District
Jobi Brown	NEPA Coordinator/ Biologist– Boston Mountain Ranger District
Mike Hennigan	Timber Management Assistant – Boston Mountain Ranger District
Ricky Adair	Engineering Technician – Boston Mountain Ranger District
James Bicknell	Minerals and Special Uses – Pleasant Hill and Boston Mountain Ranger Districts
Len Weeks	Forest Soils Scientist – Supervisor’s Office, Ozark NF
Mary Brennan	Zone Archeologist – Pleasant Hill and Boston Mountain Ranger Districts
Keith Whalen	Forest Fisheries Biologist - Supervisor’s Office, Ozark NF
Kevin Lynch,	Arkansas Game and Fish Commission, Biologist

AGENCIES AND PERSONS CONSULTED

The following is a list of agencies and persons who were consulted during this analysis:

State Historic Preservation Office, Little Rock, AR

Resource Staff in the Forest Service Supervisor's Office, Russellville, AR

U.S. Fish and Wildlife Office, Conway, AR

LIST OF APPENDICES

Appendix A –Proposed Treatments Map

Appendix B – Watersheds Associated with the Project Area

Appendix C— Tiered Documents and References



Ozark-St. Francis
National Forests
Boston Mountain Ranger District

Hollow Brown Project

Proposed Actions

Forest Service

private

stands

Pre-Commercial Thin

shelterwood

thin

new_openings

reconstruct_opening

new_ponds

reconsruct_pond

large_woody_debris

new_gate



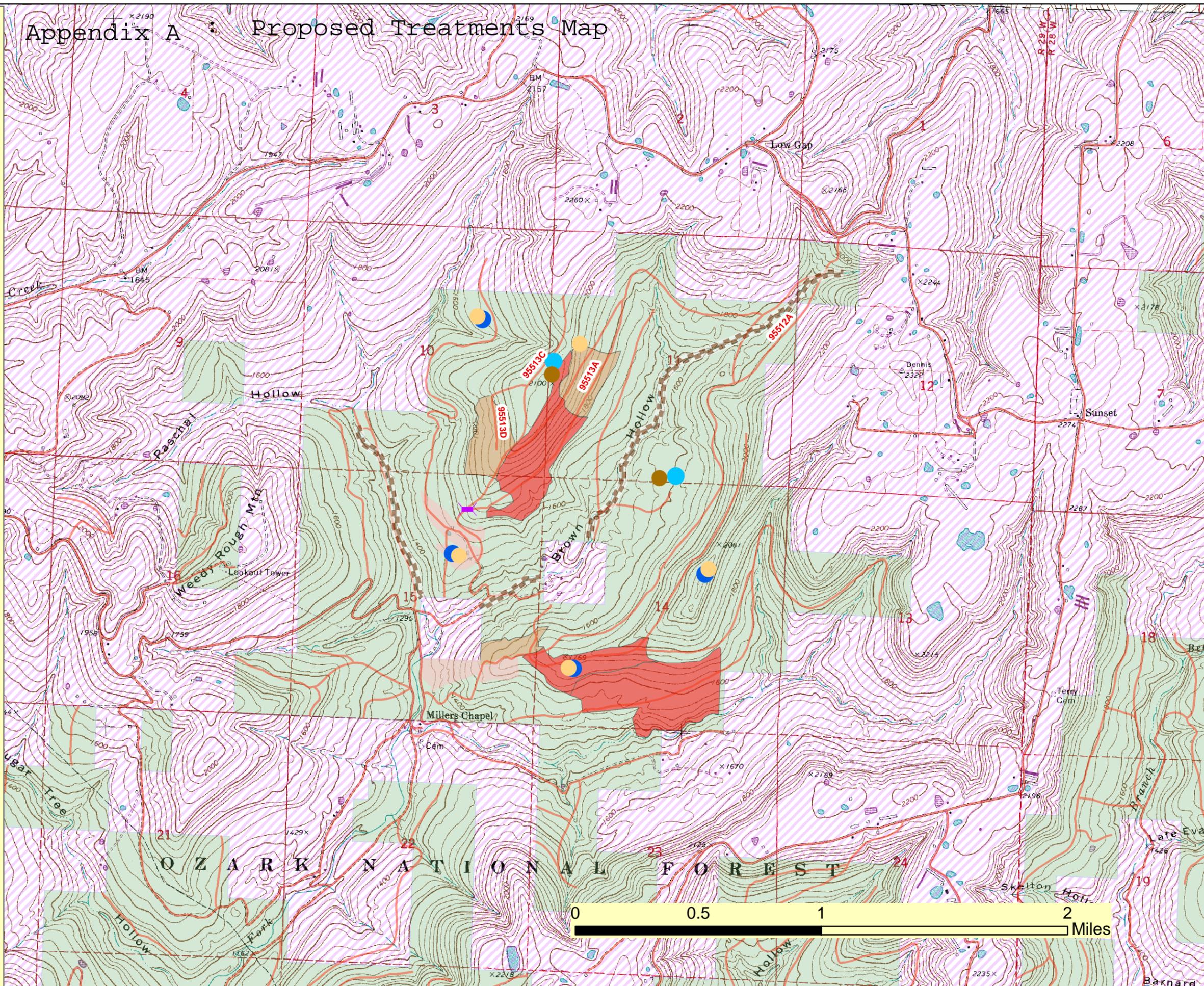
This GIS product was compiled from various resources and may be corrected, updated, modified, or replaced at any time.

For more information contact

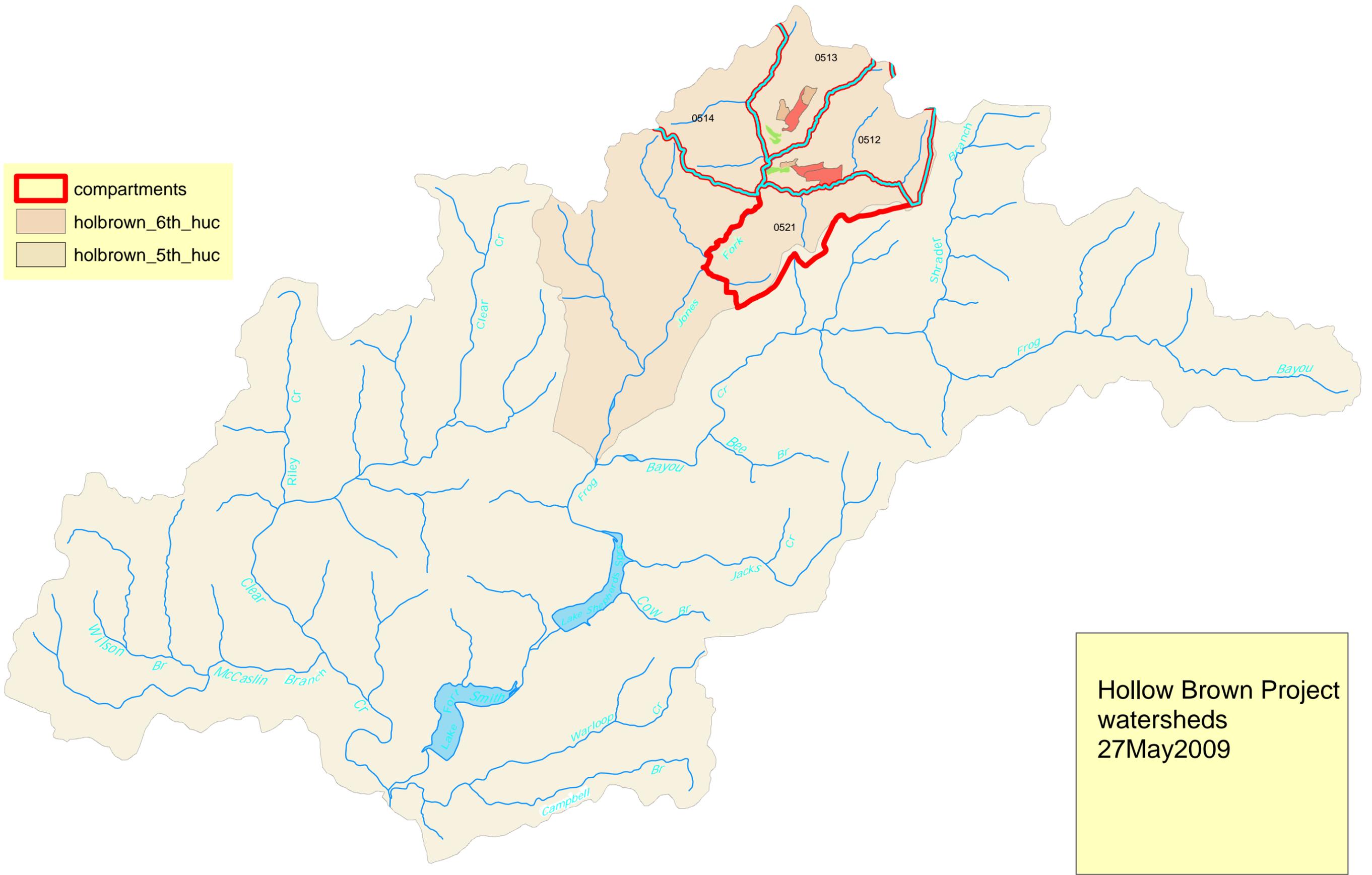
Boston Mountain Ranger District
1803 North 18th Street
Ozark, AR 72949
(479)-667-2191

10 June 2009 jab

Appendix A Proposed Treatments Map



Appendix B: Watersheds Associated with the Project Area



APPENDIX C: TIERED DOCUMENTS AND REFERENCES

Tiered Documents

U.S. Department of Agriculture, Forest Service. 2005. Revised Land and Resources Management Plan; Ozark-St. Francis National Forests. Russellville, AR; U.S. Department of Agriculture, Southern Region.

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GLOSSARY

age class- An age grouping of trees according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1-20 years or 21-40 years.

ASQ (allowable sale quantity)- The amount of timber that may be sold within a certain time period from an area of suitable land. The suitability of the land and the time period are specified in the Forest Plan.

Best Management Practices (BMP) - Procedures or controls typically issued by states to prevent or reduce pollution of surface water (includes runoff control, spill prevention, and operating procedures).

board foot- A measurement term for lumber or timber. It is the amount of wood **Browse** – That part of leaf and twig growth of shrubs, woody vines, and trees on which browsing animals can feed.

browse- Twigs, leaves, and young shoots of trees and shrubs that animals eat. Browse is often used to refer to the shrubs eaten by big game, such as elk and deer.

buffer- A land area that is designated to block or absorb unwanted impacts to the area beyond the buffer. Buffer strips along a trail could block views that may be undesirable. Buffers may be set aside next to wildlife habitat to reduce abrupt change to the habitat.

canopy- The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.

cover- Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders, or undercut streambanks. Animals use cover to escape from predators, rest, or feed.

cumulative effects - Effects on the environment that result from separate, individual actions that, collectively, become significant over time.

decommissioning –Refers to a specific type of road closure. Activities that result in the stabilization and restoration of unneeded roads to a more natural state (35 CFR 212.1), (FSM 7703).

desired future condition- Land or resource conditions that are expected to result if goals and objectives are fully achieved.

ecology - The study of the relationships between all living organisms and the environment, especially the totality or pattern of interactions; a view that includes all plant and animal species and their unique contributions to a particular habitat.

ecosystem - The interacting synergism of all living organisms in a particular environment; every plant, insect, aquatic animal, bird, or land species that forms a complex web of interdependency. An action taken at any level in the food chain, use of a pesticide for example, has a potential domino effect on every other occupant of that system.

endangered species- A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

environmental justice - The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no population should be forced to shoulder a disproportionate share of exposure to the negative effects of pollution due to lack of political or economic strength.

erosion- The wearing away of the land surface by wind or water.

FDA - U.S. Food and Drug Administration, which is involved in regulation of pesticides in the U.S., particularly enforcement of tolerances in food and feed products.

floodplain - Mostly level land along rivers and streams that may be submerged by floodwater. A 100-year floodplain is an area which can be expected to flood once in approximately every 100 years.

forb – Any herbaceous plant other than grass or grass-like plants.

ground water - Water found below the surface of the land, usually in porous rock formations. Ground water is the source of water found in wells and springs and is used frequently for drinking.

habitat – The natural environment of a plant or animal. An animal's habitat includes the total environmental conditions for food, cover, and water within its home range.

herbaceous – A plant that does not develop persistent woody tissue above the ground, but whose aerial portion naturally dies back to the ground at the end of a growing season.

Ineligible for the National Register of Historic Places- Site does not possess characteristics of integrity, association and/or content and offers little or no additional research potential.

Litter – The upper portion of the organic layer covering the soil, consisting of unaltered dead remains of plants and animals whose original form is still visible.

Maintenance Levels. The level of service provided by a specific road and the maintenance required for that road, consistent with road management objectives and maintenance criteria.

Maintenance Level 1: These roads are closed. Some intermittent use may be authorized. When closed, they must be physically closed with barricades, berms, gates, or other closure

Maintenance Level 2: Roads open for use by high-clearance vehicles. Passenger car traffic is discouraged. Traffic is minor administrative, permitted, or dispersed recreation. Non-traffic generated maintenance is minimal.

Maintenance Level 3: Roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Typically low speed, single lane with turnouts and native or aggregate surfacing.

Maintenance Level 4: Roads that provide a moderate degree of user comfort and convenience at moderate speeds. Most are double lane and aggregate surfaced. Some may be single lane. Some may be dust abated.

Maintenance Level 5: Roads that provide a high degree of user comfort and convenience. Normally are double lane, paved facilities, or aggregate surface with dust abatement. This is the highest standard of maintenance.

Municipal supply watershed Serves a public water system as defined in Public Law 93-523 (Safe Drinking Water Act) or as defined in state safe drinking water regulations.

National Forest System Road: A classified forest road under the jurisdiction of the Forest Service. The term “National Forest System Roads” is synonymous with the term “forest development roads” as used in 23 U.S.C. 205.

Off Highway Vehicle (OHV) – This term is used synonymously in this document with all terrain vehicles (ATVs).

Perennial stream – A stream that flows year-round (more than 90 percent of the time) with a scoured channel that is always below the water table.

Potentially Eligible for the National Register of Historic Places- Site possesses characteristics of integrity, association and/or content, which could offer additional research potential.

Road: A motor vehicle travelway over 50 inches wide, unless classified and managed as a trail. A road may be classified, unclassified, or temporary (36 CFR 212.1).

Sediment - Topsoil, sand, and minerals washed from the land into water, usually after rain or snow melt. Sediments collecting in rivers, reservoirs, and harbors can destroy fish and wildlife habitat and cloud the water so that sunlight cannot reach aquatic plants. Loss of topsoil from farming, mining, or building activities can be prevented through a variety of erosion-control techniques.

Turbidity –Disturbance of water due to the presence of suspended matter such as clay, silt, organic debris, plankton, various effluents, and others. Excessive turbidity reduces light penetration into water and therefore, reduces photosynthesis by photoplankton, algae, and submerged vegetation. Natural turbidities within watersheds are often due to spring runoff or flash floods.

Unclassified Roads- Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-highway vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization (36 CFR 212.1). The regulations at 36 CFR 223.37 require revegetation within 10 years.

Undetermined for the National Register of Historic Places- Site needs additional information gathered to determine if site possesses characteristics of integrity, association and/or content.

Watershed – Entire area that contributes water to a drainage system or stream.

Wetlands - Areas that are soaked or flooded by surface or ground water frequently enough or for sufficient duration to support plants, birds, animals, and aquatic life. Wetlands generally include swamps, marshes, bogs, estuaries, and other inland and coastal areas, and are federally protected. Wetlands are important wildlife habitats, breeding grounds, and nurseries because of their biodiversity. Wetlands are among the most fertile, natural ecosystems in the world since they produce great volumes of food (plant material).