Environmental Assessment

FOR

EAST FORK ECOSYSTEM MANAGEMENT UNIT COMPARTMENTS 264-269 SCOTT COUNTY, ARKANSAS

RESPONSIBLE OFFICIAL: DISTRICT RANGER, PO BOX 417, BOONEVILLE, AR 72927

JANUARY 2016

FIGURE 1: SNOW COVERED FRENCH MULBERRY - PHOTO BY DAVA BAUER, USFS

FOR FURTHER INFORMATION CONTACT: DONNA S. REAGAN

POTEAU-COLD SPRINGS RANGER DISTRICT, PO BOX 417, BOONEVILLE, AR 72927, 479-675-3233

This project is subject to subparts A and B of *36 CFR Part 218 Project-Level Predecisional Administrative Review Process* (objection process); it is not authorized under the Healthy Forest Restoration Act (HFRA).

USDA Non-Discrimination Policy Statement

DR 4300.003 USDA Equal Opportunity Public Notification Policy (June 2, 2015)

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

TABLE OF CONTENTS

CHAPTER 1 PURPOSE AND NEED

PROPOSED ACTION

The District Ranger on the Poteau-Cold Springs Ranger District, Ouachita National Forest, proposes to implement management activities in *East Fork* Ecological Management Unit (Compartments 264, 265, 266, 267, 268, and 269), henceforth referred to as *East Fork*. Activities proposed include timber harvesting, silvicultural treatments, wildlife treatments, and road system improvements. These activities should move this project area toward prevention of insect infestations, continued mast development for wildlife, and towards the design criteria for Management Area 14 (Ouachita Mountains, Habitat Diversity Emphasis) and Management Area 9 (Water and Riparian Communities) in the Revised Forest Plan *(USDA Forest Service. 2005a.)*. These activities should begin in 2016, if an action alternative is selected. *East Fork* **project area** contains 5,108 acres of national forest lands. This includes 3,749 acres suitable for timber production (see table below).

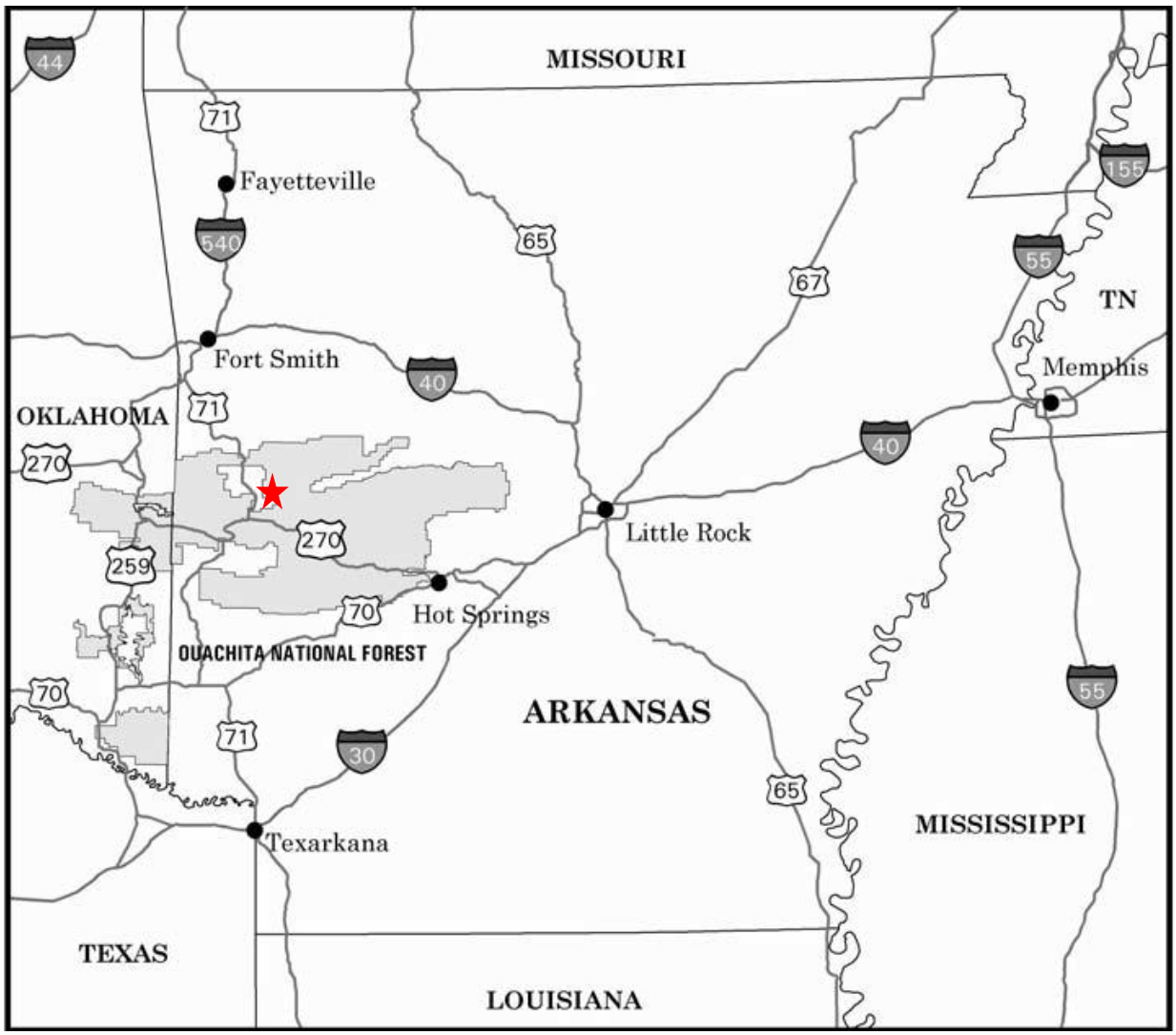


FIGURE 2: GENERAL LOCATION OF PROJECT AREA

(TABLE 1. 1a) Summary of existing National Forest lands, private ownership and total watershed acreage in the *East Fork* analysis area. These are ***approximate*** acres only based on field examinations, Geographical Information Systems (GIS), and Global Positioning Systems (GPS).

Land Designation	C- 264	C- 265	C- 266	C-267	C-268	C-269	Total
National Forest Management Areas							
MA 14 Suitable	563	845	475	849	507	510	**3749**
MA 14 Unsuitable and MA 9 Riparian	32	113	458	274	451	31	**1359**
Total Acres of National Forest (5,103 ac forested / 5 acres non forested-shale pit / progeny test site)	**595**	**958**	**933**	**1123**	**958**	**541**	**5108**
Private acres within boundary	162	50	2319	759	284	231	**3805**
Total Acres within project area (private and NF lands)	**757**	**1008**	**3252**	**1882**	**1242**	**772**	**8913**

LOCATION

East Fork is located in Township 3 North, Range 29 West, Section 36; Township 4 North, Range 28 West, Sections 31, 32, 33; Township 3 North, Range 28 West, Sections 1-6, 8-16; Township 3 North, Range 27 West, Sections 4-9, 17, 18. This project area is approximately 5 miles northeast of the community of Waldron, AR in Scott County. It is north of Waldron Ridge on Bee Mountain; the Poteau River headwaters are in this project area. State Highway 71 is less than five miles to the west of the East Fork project area.

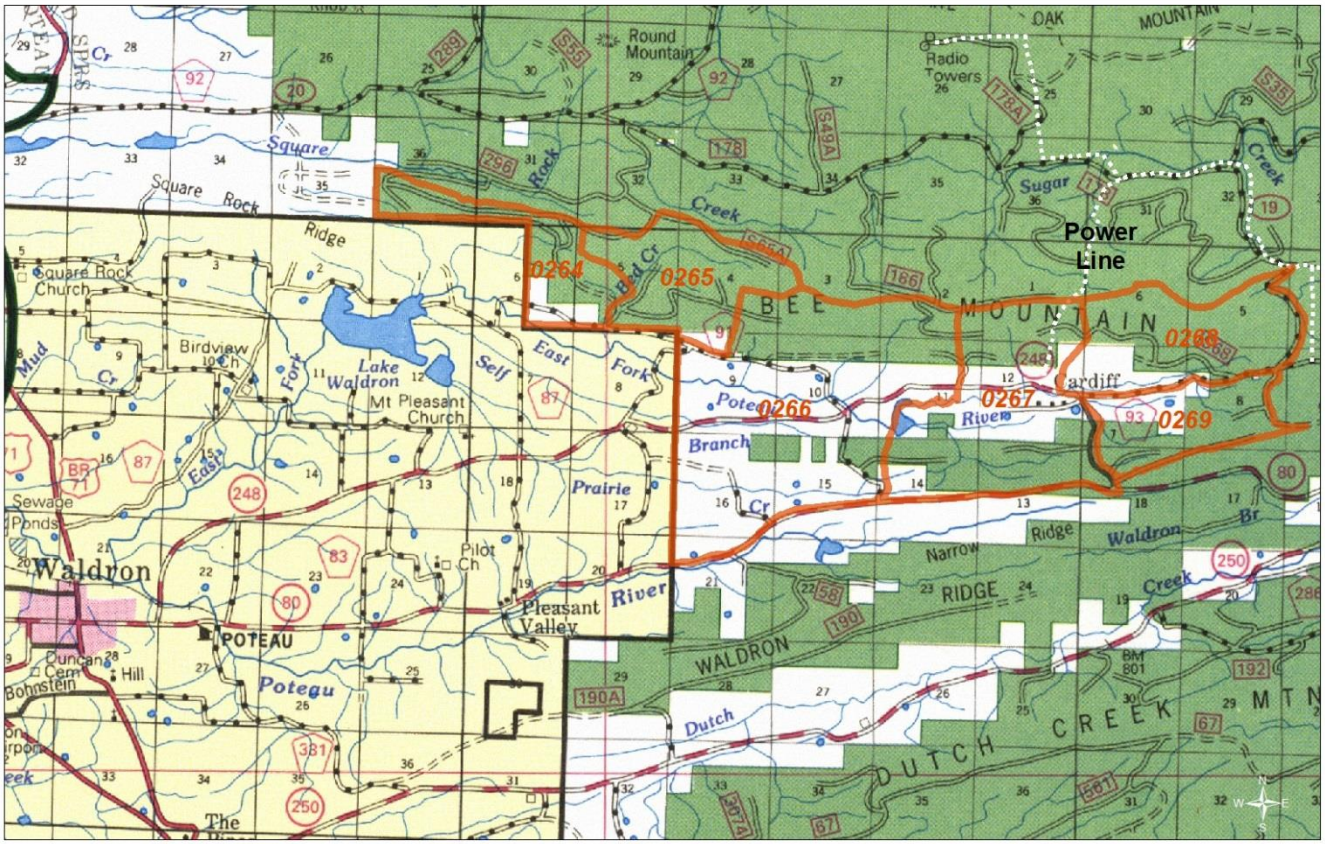


Figure 3: project area

A summary of the Proposed Action is listed below:

Stand management consists of managing the suitable stands in the project area by even-age management on approximately 3,749 acres.

Timber harvesting consists of harvesting shortleaf pine and/or hardwood products by commercial thinning to a target average basal area (BA) of 60 for pine on approximately 1,802 acres; approximately 516 acres by commercial thinning on a 20 ft. spacing; approximately 450 acres of seedtree harvest and approximately 40 acres of clearcut of an off-site species (loblolly pine). Stands would retain 10-30% of quality hardwood, where available. Remove all hardwoods within 50 feet of cavity trees. Maintain or develop a component of 10-30 percent of the total basal area in a hardwood trees (favoring oaks and hickories) in dominant or co-dominant crown classes within commercially thinned pine stands (Revised Forest Plan, pp 79 VM004). During the regeneration of pine stands retain large overstory hardwoods distributed throughout the stand at a rate of 5 square feet of basal area per acre, where available (Revised Forest Plan, pp 80 FR002).

Prescribed burning is proposed on approximately 5,103 acres on a 3-5 year rotation. If a wildfire occurs in this EMU, it may be allowed to burn in the project area for resource benefit.

Silvicultural Treatments consist of reforestation treatments and timber stand improvements.

Shortleaf pine seedtree stands (450 acres) – On proposed regeneration areas, mechanical scarification would occur along with hand tool site prep and burning. There would be an option to rip and plant, if necessary, with Shortleaf pine if the sites are not stocked with a minimum of 150 seedlings per acre within 5 years after harvest. The 40 acres of clearcut would be ripped and planted with shortleaf pine on 7' x 8" spacing or a rate of 778 trees per acre. Timber stand improvements with handtool release would occur on the 490 acres of proposed regeneration sites and 185 acres of existing regeneration sites with the option to use herbicides. Pre-commercial thin is proposed on 115 acres.

Wildlife activities proposed consist of 1,802 acres of midstory removal for wildlife stand improvements. This action would be site-specific and should result in little, if any, impact on non-target plant species. There would be 9 woodland ponds reconstructed and 23 new pond constructed. Nest structures (wood duck/squirrel boxes and bluebird boxes) would be installed, where appropriate.

Transportation system consists of proposing road closures, approximately 0 miles of road construction4.53 miles of road reconstruction, 10miles of temporary road construction, 22.01 miles of prehaul maintenance and a total of 0.20 miles of road obliteration.

Firelines would be constructed for approximately 10 miles and reconstructed on approximately 15 miles.

Other permits for firewood, shale, and rock collection could be issued to the forest user, where appropriate.

Herbicide treatments of invasive and non-native species – Treatment to stop or slow the infestation of invasive and non-native species such as mimosa, lespedeza, or any other species of these types encountered within this analysis area.

Landline Maintenance –Blaze and repaint line trees on boundary lines on approximately 19 miles.

Refer to the stand map in Appendix A.

Purpose and Need for the Actions

Please refer to this website for information as of 01/30/2016:
http://www.fs.usda.gov/detail/ouachita/landmanagement/planning/?cid=fsm9_039823.

Management Area 9. Water and Riparian Communities

Management Area 9 consists of Water and Riparian Communities, including streams, rivers, lakes and ponds, and Streamside Management Areas necessary to protect water quality and associated beneficial uses found within the Ouachita Mountains, Arkansas River Valley, and West Gulf Coastal Plain. Management Area 9 direction applies to streams, riparian areas, ponds, and lakes, except where even more stringent management requirements are in place, notably in Wilderness (MA 1). Included are flowing and non-flowing aquatic habitats; wetlands; woodland seeps and springs; portions of floodplains; variable distances (but at least 100 feet) from both edges of all perennial streams and from the shores of bodies of water equal to or greater than one-half acre; variable distances (but at least 30 feet) from both edges of other streams with defined stream channels and ponds less than one-half acre in size; and certain lands surrounding public water supplies, lakes, and streams. Management Area 9 is unsuitable for timber production, available for oil and gas exploration and leasing with no surface occupancy, and is suitable for livestock grazing. The riparian-associated vegetation community types that occur in this MA include Ouachita Mountain Forested Seep; Ouachita Riparian; South-Central Interior Large Floodplain; and West Gulf Coastal Plain Small Stream/River Forest.

Desired Condition

Riparian areas, lakes, and ponds have a relatively natural appearance. Permanent roads are minimized but may occur at designated crossings and designated access points. Water quality is good to excellent. Protection for public water sources will be provided. Aquatic ecosystems function properly and support aquatic biota commensurate with the associated ecoregion. Vegetation consists of native species. Suitable lakes and ponds sustain a diversity of sport fishing experiences. Developed recreation sites containing intensively managed lakes and ponds provide improved visitor access and sport fish populations provide sustained yield. Lakes and ponds managed for primitive use and fishing have limited access but support balanced sport fish populations. Movement of fish and other aquatic organisms in otherwise free-flowing perennial streams and other streams is not obstructed by road crossings, culverts, or other human-caused obstructions.

Management Area 14. Ouachita Mountains-Habitat Diversity Emphasis

Management Area 14 consists of extensive blocks of upland (non-riparian) forest located throughout the Ouachita Mountains. The primary community types, each of which also occurs in other MAs, are Ouachita Pine-Oak Forest; Ouachita Pine-Oak Woodland; and Ouachita Dry-Mesic Oak Forest. The Ouachita Mountains-Habitat Diversity Emphasis MA includes all National Forest System lands in the Ouachita Mountains not assigned to special areas. These lands are available for varied intensities of ecosystem management and roaded-natural recreational opportunities. Management Area 14 includes areas suitable and unsuitable for timber production, available for oil and gas exploration and leasing with standard stipulations, and suitable for livestock grazing.

Desired Condition

This Management Area is a mosaic of shortleaf pine-hardwood (including pine-dominated, hardwood-dominated, and evenly mixed forests and woodlands). Forest-wide desired conditions by structural class and community are presented in Part 1 for these communities. Within this MA, grass-forb and seedling-sapling conditions are well represented, particularly in the portions suitable for timber management, where they make up at least 6 percent of the landscape. These “early successional” conditions exist primarily under partial canopies of overstory pines and/or hardwood trees. Mid-successional and mature forests and woodlands are even more widespread, making up at least 70 percent of the landscape.

Adequate amounts of all forest conditions needed to sustain viable populations of many of the plant and animal species native to the Forest are available. The habitat needs of other native species with specialized habitat needs are met in other appropriate MAs. Deer and turkey habitat capability remain near 2004 levels; habitat capability for prairie warbler and northern bobwhite, among other indicator species, are higher than 2004 levels.

Visitors and managers have access to a moderately extensive transportation system. Visitors find non-motorized recreation opportunities available on a seasonal and shifting basis, depending on road closures and the scheduling of resource management activities. The main road system is well maintained, but visitors may see timber harvest equipment and encounter logging traffic. A portion of the road system is available for low clearance vehicle travel. Some portions are designated and available for OHV use. The remainder of the road system is closed seasonally or long-term.

Recently cut areas with logging slash, stumps, and some areas of disturbed soil are evident on a short-term and continuing basis, as are signs of prescribed burning and roadwork. Where such active management activities take place, appropriate scenery management techniques are practiced.

Field examinations and inventories of the *East Fork* project determined that the existing conditions do not meet the desired conditions as mentioned above. The Proposed Actions would move this project towards the desired conditions established by the Interdisciplinary Team and the design criteria in the Revised Forest Plan. Below is a table that summarizes the National Forest Management Act (NFMA) analysis that the ID Team prepared prior to developing any proposed actions.

Please see Appendix B for a detailed table of desired conditions, existing conditions, site specific needs, and possible management activities.

The following pages describe the purpose and need in more detail.

MANAGEMENT AND TIMBER HARVESTING OF SUITABLE STANDS

Even-age management is needed in *East Fork* to create early seral stage habitat that is currently lacking in the project area through seedtree harvests. Native shortleaf pine would replace offsite loblolly pine by clearcut harvest. Even-age management would contribute to healthier forest conditions by reducing the overstocked conditions (Objective OBJ10 – Reduce susceptibility to southern pine or Ips beetle outbreaks on at least 25,000 acres per year). Another benefit of even-age management is creating new age classes to contribute to a sustainable timber supply. These cuts are carried out according to the maximum size limits for areas to be cut in one harvest operation as required by 16 U.S.C. 1604 (g)(3)(F)(iv)).

Commercial thinning of shortleaf pine (2,316 acres) is needed to reduce competition for limited soil, water, nutrients, and sunlight in mature, pine stands where individual tree growth has slowed due to age and overstocked conditions. Currently, on many stands the understory, midstory and overstory are overstocked preventing sunlight from reaching the forest floor. Thinning would reduce vegetation that competes for limited soil nutrients, water, and sunlight (USDA Forest Service. 2005a, Priorities pg. 58 and Objective pg. 59). The current conditions exceed the recommended stocking rates for pine identified on page 84 Table 3.6 of Revised Forest Plan. The mature trees at these high stocking rates with heavily stocked understories and midstories are increasingly susceptible to southern pine beetle (primarily) and other insect and disease infestation. Thinning and releasing stands would improve and restore individual tree vigor, health, and resiliency of the *East Fork* analysis area. Commercial thinning would reduce approximately 1,802 acres to a target BA of 60. These stocking rates would reduce the chances of having southern pine beetle infestations spread out of the thinning stands into adjacent stands. Research has shown that Southern pine beetle (SPB) infestations in stands that have been thinned with 20-25 feet between trees will not spread to adjacent stands but will disburse (Managing Southern Forest To Reduce Southern Pine Beetle Impacts, May 1986, p19). A target BA of 60 would average at least 25 feet between trees in mature saw timber stands.

Approximately 516 acres of commercial thinning on 20 ft. spacing would improve and restore individual tree vigor and growth in the older pine plantations.

Modified Seedtree (450 acres) is needed to create early seral stage habitat (USDA Forest Service. 2005a, Pg. 7, 35, and Objective OBJ06, Pg.59). *East Fork* is lacking in early seral stage habitat. All of the 0-10 year age class has moved to the next age class. The objective is to have at least 6% and not more than 14% of the suitable stands of *East Fork* in this age class. Regeneration harvests (450 ac. seedtree and 40 ac. clearcut) would increase the 0-10 year age class by 490 acres (13%) of the suitable land class in order to meet Management Area 14 goals. Stands selected for even-age modified seedtree harvest are mature pine stands located at least 10 chains away from existing young stands still considered regeneration openings on National Forest system lands or on private lands. Regeneration openings are young stands that have not grown to 20% of the height of the adjacent stand.

Clearcut of loblolly pine (40 acres) is needed to remove an offsite species and replace it with shortleaf pine, a native species following direction from the Revised Forest Plan p.58 "restore the shortleaf pine-bluestem grass ecosystem…" p. 60, OBJ11 "…begin replacing off-site loblolly pine plantations with shortleaf pine and native hardwoods where such plantations were installed outside the natural range of loblolly pine". The loblolly will be removed from the drains where planted following the Forest Plan on page 104, "Management Activities Permitted or Prohibited within Streamside Management Zones (SMZs)."

PRESCRIBED BURNING

Prescribed burning on a 3 -5 year rotation is proposed on approximately 5,103 acres in the *East Fork* project area for fuel reduction, wildlife and site preparation. If a wildfire occurs in this EMU, it may be allowed to burn in the project area for resource benefit. There would be approximately 10 miles of fireline construction and 15 miles of fireline reconstruction.

SILVICULTURE TREATMENTS

Reforestation site preparation (490 acres) – This treatment would be by mechanical scarification, hand tool site prep, and burning with an option to use herbicides, if necessary. There would be an option for ripping and planting with Shortleaf pine if the sites are not stocked with a minimum of 150 seedlings per acre within 5 years after harvest. Clearcut area (40 ac.) would be ripped and planted approximately one year after harvest to reduce pales weevil infestations.

Timber stand improvements by hand tool release (490 acres) – This treatment is usually necessary to enable the young naturally established or hand planted seedlings to compete for growing space. Without the use of herbicide to control existing hardwood vegetation that is competing to occupy the site, the older hardwoods have well established root systems and quickly "overtop" small pine seedlings. When this occurs, the shading effect quickly kills young pine regeneration.

Timber stand improvements by pre-commercial thinning utilizing hand tools or mechanical methods (300 acres) – This treatment is needed to increase growth and improve the quality and vigor of the remaining trees.

WILDLIFE ACTIVITIES

Woodland pond construction (23) and reconstruction (9) sites in *East Fork* is needed to maintain adequate water sources according to the (Revised Forest Plan. Design Criteria WF010, Pg. 79). The Forest Plan suggests one water source for every 160 acres. *East Fork* needs twenty three additional water sources to meet these objectives but reconstruction of woodland ponds is needed because dams have encroaching woody vegetation, which can

result in water retention problems. This action would ensure that wildlife has sufficient water available on a year-round basis.

Wildlife stand improvements (1,802 midstory) treatments are needed to improve the habitat that currently exists. WSI will help produce a grass/forb understory and enhance hard mast production by residual hardwood crowns within the treated stands. WSI may be completed by the use of hand tools or mechanical equipment depending on terrain, species composition, and cost.

Nest structures are needed in a variety of habitats within the *East Fork* project area for a variety of species. Many snags and cavity trees were created in this area by the December 2000 ice storm and again in January 2014. This was a positive condition for many cavity dependent species. However, time is now causing a loss of these snags and cavity trees.

Wildlife openings – There is a lack of early seral stage habitat and temporary wildlife openings in *East Fork*. These openings are needed because several species need the early seral stage habitat that these openings would provide until the conditions in newly harvested areas provide the needed conditions (Revised Forest Plan. Design Criteria Pg. 78). These openings would be created from log landings, firelines and temporary roads. Existing openings will be maintained by prescribed burning, disking, seeding, planting, fertilizing, brush hogging, and/or bull dozing.

TRANSPORTATION SYSTEM

The current road system needs improvements (Revised Forest Plan. Design Criteria TR001, Pg. 90).

Road closures of new roads would move toward the Forest standard for open road density.

Road construction is NOT needed to access harvest units and provide a safe transportation system for logging activities.

Road reconstruction is needed on approximately 4.53 miles because the roads have surface and ditch erosion, rusted-out drains, and fish passage concerns.

Temporary roads, approximately 10 miles, are needed because they provide access to harvest units, but are not needed for long-term management of the natural resources.

Prehaul maintenance is needed on approximately 22.01 miles because roads have some surface and ditch erosion, rusted-out drains, and need some spot rocking.

Road obliteration is needed on 0.20 miles because these roads are no longer needed and cross streams at undesirable locations.

OTHER

Firewood permits are needed to supply firewood areas to the local community (Revised Forest Plan. Design Criteria FW001, Pg. 97) and would allow the forest user access to resources from this project area. Currently, there are no firewood areas in *East Fork.*

Rock Permits are needed to supply rocks to the local community. Currently there are no rock permits for *East Fork.* Permits would be offered to the public for collection of rocks by private individuals within road construction and reconstruction corridors. That is, rocks can be collected within areas of disturbance associated with road construction and reconstruction.

Herbicide treatments of invasive and non-native species – This treatment is necessary to stop or slow the infestation of invasive and non-native species such as mimosa, lespedeza, or any other species of these types encountered within this analysis area.

Landline Maintenance – This action is needed to refurbish marked trees by "blazing and repainting line trees on boundary lines. Periodic maintenance is required and scheduled when watersheds are entered for management needs. This is expected on approximately 19 miles.

Shale pit – There would be continued use of an existing shale pit in Compartment 265 Stand 18.

Scope of this Environmental Analysis

The team's ecosystem analysis is incorporated by reference and included in the project file. The scope of this decision does not include other actions that would be planned in the compartments in the unforeseeable future. All of the actions associated with this analysis are foreseeable, and would be included in the analysis of effects since they may contribute to direct, indirect or cumulative effects on the environment.

Public Involvement

Public involvement began March 16, 2015. A detailed description of the Proposed Actions along with existing and desired conditions was mailed hardcopy to 5 individuals through the postal service and emailed to 29 individuals; 1 through direct email and 27 through GovDelivery to those who have shown interest on the project's webpage http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=44964. Comments were received from this public involvement from Bradley Jones, Arkansas Department of Health (wants to be notified when herbicides are used); Jim Parma, East Fiber Manager with Bell Timber (wants use of all forest products); John Fox with Osage Tribe (clarifications); and Dick Artley (herbicide use and road construction concerns; wants to be notified concerning project). The 30-day comment period began 6/18/15. One response was received from Dick Artley.

Relevant Planning Documents

The following documents directly helped develop the Proposed Action by setting the "side boards" to reach desired future conditions:

- Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005 (USDA Forest Service, 2005a).
- Final Environmental Impact Statement (FEIS), Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005 (USDA Forest Service, 2005b).
- Programmatic Biological Opinion of the Revised Land and Resource Management Plan on the American Burying beetle (USDI FWS September 2005).
- Biological Evaluation (September 10, 2015).
- Travel Analysis Process – *East Fork* March 2015).
- Human Health and Ecological Risk Assessment Final Reports for glyphosate and triclopyr herbicides, March 1 and 15, 2011. Syracuse Environmental Research Associates, Inc.
- Forest Service Heritage Resource Report, Report # 449, June 2015.
- Biological Assessment for the Revised Land and Resource Management Plan.
- Aquatic Cumulative Effects Fish Report, July 2013

RESOURCES THAT WILL HAVE FURTHER STUDY

Air Quality
Currently, this project area meets the National Ambient Air Quality Standards (NAAQS) under the Clean Air Act, but this resource will be analyzed for effects because of the prescribed burning being analyzed for cumulative effects.

Soils
There are no proposed actions concerning sensitive soils, but there are mitigations that would occur because some soils in this watershed have pockets of soil scattered throughout the project area with a moderate-high, high, and severe compaction hazard rating. Therefore, this resource will be analyzed for effects.

Water Resources and Quality
The water quality in this project area currently meets the provisions of the Clean Water Act and state water quality standards. *East Fork* has some floodplains and riparian areas, but no jurisdictional wetlands or municipal watersheds. Because of the multiple activities proposed, this resource will be analyzed for effects.

Wildfire Hazards &/or Fuels
This resource will be analyzed for effects because there are wildfire hazards and a fuels buildup on the forest floor in *East Fork*.

Transportation and Infrastructure
The transportation system in *East Fork* is not adequate. There are erosion problems on closed roads, and pipe failure. The current open road density for *East Fork* (including private land) is 0.73 miles per square mile, which is below the Revised Forest Plan design criteria of 0.75 mile per square mile (Revised Forest Plan. Design Criteria TR006, Pg. 91). This resource will be analyzed for effects.

Vegetation
Because of the types of activities proposed, such as timber harvesting, stand improvements, and prescribed burning, this resource will be analyzed for effects.

Wildlife, Habitat and Fisheries
East Fork contains diverse forest types and streams and other sources of water. These are important for use by both humans and wild creatures. These resources will be analyzed for effects in an effort to improve the value of these resources for all users including the native species of plants and animals.

Proposed, Threatened, Endangered, and Sensitive species
The Ouachita National Forest hosts numerous species of plants and animals that are rare or unusual for a variety of reasons including a bald eagle nesting within the project area. These resources will be identified and analyzed in order to protect and potentially improve habitat conditions for these species, and provide any necessary mitigation of management practices to protect PETS species.

Insects/Disease
Two important changes are constantly occurring on the Ouachita and within the *East Fork* analysis area. Stands are becoming more densely stocked and they are getting older. These constant changes in forest resource characteristics mean more food, habitat, and favorable conditions for insect and disease infestations. These conditions put the forest under stress because a larger number of less vigorously growing trees are competing for the same nutrients and water. Many of the overstory trees are mature (80 years and older) but not near the end of their lives. Pines, white oaks, and red oaks are capable of living hundreds of years but because of the intense competitions many trees are vulnerable and die before their time. Therefore, this will be analyzed for effects.

Local or County Economy (Project Financial or Economic Efficiency)
The economic base of Scott County is National Forest land, i.e. 62% of the land base (Economic Profile System-Human Dimensions Toolkit EPS-HDT, 2014). The local timber industry depends on National Forest land for a source of raw material. Private timber employment in Scott County from growing and harvesting, sawmills and paper mills, and wood product manufacturing, totaled 258 jobs or 12% in 2012 (EPS-HDT, 2014). Many local residents depend on firewood from timber and wildlife activities on the district such as regeneration harvest, site preparation, and wildlife midstory reduction. Therefore, this will be analyzed for effects.

Public Health and Safety
This will be analyzed for effects because of the hazardous fuels, the prescribed burning (proposed from another decision) and the proposed optional use of herbicide for treatment of non-native species.

Heritage Resources
In accordance with the National Historic Preservation Act (NHPA) of 1966, as amended 1992, and 36 CFR 800 regulations with respect to inventory survey adequacy, National Register of Historic Places (NRHP) eligibility of archeological sites and the expected effects of the actions proposed with Project alternatives on cultural resources, cultural resource inventories were conducted to identify historic properties. Historic properties are defined at 36 CFR 800.16(l) as cultural resource sites that may be eligible for listing in the National Register of Historic Places. The findings of the house report were submitted to the Arkansas State Historic Preservation Officer (SHPO), Arkansas Archeological Survey, the Quapaw and Caddo Tribes, and the Choctaw, and Osage Nations of Oklahoma for review and comment on June 3, 2015. This resource will be analyzed for effects.

Recreation Resources
Recreation use consists of dispersed camping, hunting, all-terrain vehicle use, berry picking, and bird watching. Therefore, recreation will be analyzed for effects.

Visual Resources
East Fork is visible from numerous heavily traveled county and Forest Service roads; therefore, visual resources will be analyzed for effects.

RESOURCES ELIMINATED FROM FURTHER STUDY

Civil Rights, Consumers, Minority Groups, and Women
Impacts from the proposed actions are not anticipated on civil rights. Actions would impact consumers, minority groups, and women in the same manner as all other groups. Therefore, this topic is eliminated from further study.

Federal, State or Local Laws
There is no known Federal, State, or Local Laws that are being violated in the project area from the actions of the Forest Service. Therefore, this topic is eliminated from further study.

ISSUES TO BE ANALYZED IN DEPTH

Issues drive the formulation of alternatives. Issues may develop because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict. The Proposed Action was designed to meet the design criteria *documented* in "The Purpose and Need for Actions" section of Chapter 1.

Issue #1: *Herbicide use is considered an "issue to be analyzed in depth" because of the intensity of interest that will require the formulation of a "non-herbicide" alternative. Herbicide use is proposed to achieve the desired conditions to establish native forest cover where needed. This would be to remove nonnative species such as mimosa or privet.*

Issue #2: *Road construction is considered an "issue to be analyzed in depth" because of the intensity of interest that will require the formulation of a "no road construction" alternative. Road construction is proposed to access forest stands proposed for harvest.*

DECISIONS TO BE MADE

The deciding officer, District Ranger for the Poteau/Cold Springs Ranger District, Ouachita National Forest, must make two decisions: decide which alternative or the Proposed Action to implement, and decide if those actions would constitute a major federal action and result in significant impacts on the human environment (FONSI or Finding of No Significant Impact.).

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

The alternatives including the Proposed Action are the heart of this environmental assessment. This chapter describes in detail the activities of the Proposed Action, No Action (Alternative I), No Herbicide Use (Alternative II), and No Road Construction (Alternative III). One action alternative was considered but eliminated from detailed study. Then, based on the descriptions of the relevant resources, the predicted effects on the quality of the human environment disclosed in Chapter 3, and the predicted attainment of project objectives, the alternatives are compared in tabular form, providing a clear basis for choice for the decision maker.

ALTERNATIVE DESIGN AND EVALUATION CRITERIA

The District Ranger, working with the interdisciplinary team, identified the alternative design and evaluation criteria. The criteria consist of objectives for Management Areas 9 and 14.

FOREST PLAN MITIGATIONS

The Forest-wide Design Criteria for Management Areas 9 and 14 are incorporated by reference as mitigating measures into the Proposed Action by smart design and are located on the website (as of 11/24/2014) at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_039613.pdf.

TECHNICAL REQUIREMENTS

The FEIS was prepared to analyze and select the preferred mix and projected levels of vegetation management methods and tools needed to achieve the goals and objectives identified in the Revised Forest Plan. The FEIS identifies management requirements and mitigation measures (USDA FS, 2005b, Chapter 3 – pg. 23 – 283) to be applied to all methods of vegetation management. The proposed actions would adhere to all applicable management requirements and mitigation measures in the FEIS, which are incorporated in this document by reference. The alternative proposing herbicide use has been analyzed additionally by utilizing the Human Health and Ecological Risk Assessment process developed by the Syracuse Environmental Research Associates.

PROJECT SPECIFIC PROTECTIVE MEASURES

Soils

Harvesting Operating Seasons for Compaction			
Moderate-High (High) Rating of Soils Limited April through November		Severe Rating of Soils Limited July through November	
COMPARTMENT	STAND	COMPARTMENT	STAND
268	2, 17, 18, 27	264	7, 8
		265	12, 16
		267	14, 15
		269	10, 12

Herbicide Use

- Waldron Waterworks and the Arkansas Department of Health (Engineering section) will be notified prior to herbicide application.
- HU001 – Herbicides will be used only where necessary to achieve the desired condition in the treatment area, and then only when site specific analysis shows no unacceptable negative effects to human or wildlife health or the ecosystem as defined in HU002.
- HU002 – Herbicides will be applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health. Site-specific risk assessments are required prior to herbicide application and must be calculated using the procedure developed by Syracuse Environmental Research Associates (SERA).
- HU003 – To minimize potential effects of herbicide use, whenever possible, use individual stem treatments and directed spraying.
- HU004 – Herbicides that are not soil-active will be used in preference to soil-active ones when the vegetation management objectives can be met.
- HU006 – Clearly marked buffers will protect streamside zones, private land and public water supplies.
- HU010 – The use of herbicides is prohibited in the immediate vicinity of Proposed, Endangered, or Threatened plants.
- HU011 – Within a 300-foot buffer from any source waters (public water supply), do not apply herbicide treatments unless a site-specific analysis supports use within the designated buffer to prevent more serious environmental damage than is predicted if pesticides are used.
- HU012 – No herbicide mixing, loading, or cleaning areas will occur within a 300-foot buffer of private land, open water, source waters (public water supply), wells, or other sensitive areas.
- HU018 – A certified pesticide applicator will administer all pesticide application contracts and will supervise any Forest Service personnel involved with the application of pesticides on the Forest.

Heritage

The following measures only apply to cultural resource sites that are unevaluated, eligible for listing, or listed in the National Register of Historic Places.

HP1: Site Avoidance During Project Implementation

Avoidance of historic properties (HP) will require the protection from effects resulting from the undertaking. Effects will be avoided by (1) establishing clearly defined site boundaries and buffers around archeological sites where activities that might result in an adverse effect. Buffers will be of sufficient size to ensure that integrity of the characteristics and values which contribute to, or potentially contribute to, the properties' significance will not be affected, and (2) routing proposed new roads, temporary roads, log landings and skid trails away from historic properties;

HP2: Site Protection During Prescribed Burns

- *Firelines.* Historic properties located along existing non-maintained woods roads used as fire lines will be protected by hand-clearing those sections that cross the sites. Although these roads are generally cleared of combustible debris using a small dozer, those sections crossing archeological sites will be cleared using leaf blowers and/or leaf rakes. There will be neither removal of soil, nor disturbance below the ground surface, during fireline preparation. Historic properties and features located along proposed routes of mechanically-constructed firelines, where firelines do not now exist, will be avoided by routing fireline construction around historic properties. Sites that lie along previously constructed dozer lines from past burns where the firelines will be used again as firelines, will be protected during future burns by hand clearing sections of line that cross the site, rather than re-clearing using heavy equipment. Where these activities will take place outside stands not already surveyed, cultural resources surveys and regulatory

consultation will be completed prior to project implementation. Protection measures, HP1, HP3, and HP4, will be applied prior to project implementation to protect historic properties.

- *Burn Unit Interior.* Combustible elements at historic properties in burn unit interiors will be protected from damage during burns by removing excessive fuels from the feature vicinity and, as necessary, by burning out around the feature prior to igniting the main burn, creating a fuel-free zone. Burn out is accomplished by constructing a set of two hand lines around the feature, approximately 30 to 50 feet. apart, and then burning the area between the two lines while the burn is carefully monitored. Combustible features located in a burn unit will also be documented with digital photographs and/or field drawings prior to the burn. Historic properties containing above ground, non-combustible cultural features and exposed artifacts will be protected by removing fuel concentrations dense enough to significantly alter the characteristics of those cultural resources. No additional measures are proposed for any sites in the burn interior that have been previously burned or that do not contain combustible elements or other above ground features and exposed artifacts as proposed prescribed burns will not be sufficiently intense to cause adverse effects to these features.
- *Post-Burn Monitoring.* Post-burn monitoring may be conducted at selected sites to assess actual and indirect effects of the burns on the sites against the expected effects. SHPO consultation will be carried out with respect to necessary mitigation for any sites that suffer unexpected damage during the burn or from indirect effects following the burn.

HP3: Other Protection Measures

If it is not feasible or desirable to avoid an historic property that may be harmed by a project activity (HP1), then the following steps will be taken: (1) In consultation with the Arkansas SHPO, the site(s) will be evaluated against NRHP significance criteria (36 CFR 60.4) to determine eligibility for the NRHP. The evaluation may require subsurface site testing; (2) In consultation with the Arkansas SHPO, tribes and nations, and with the ACHP if required, mitigation measures will be developed to minimize the adverse effects on the site, so that a finding of No Adverse Effect results; (3) The agreed-upon mitigation measures will be implemented prior to initiation of activities having the potential to affect the site.

HP4: Discovery of Cultural Resources during Project Implementation

Although cultural resources surveys were designed to locate all NRHP eligible archeological sites and components, these may go undetected for a variety of reasons. Should unrecorded cultural resources be discovered, activities that may be affecting that resource will halt immediately; the resource will be evaluated by an archaeologist, and consultation will be initiated with the SHPO, tribes and nations, and the ACHP, to determine appropriate actions for protecting the resource and mitigating adverse effects. Project activities at that locale will not resume until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval.

MONITORING

The Revised Forest Plan lists monitoring activities for the Ouachita National Forest. The Forest's monitoring program is designed to evaluate the environmental effects of actions similar to those proposed in this project, and also serves to assess the effectiveness of treatments. In order to ensure that the appropriate design criteria protecting soil stability, water quality, and other resources are followed, trained contract administrators and inspectors would be on-site during the implementation phase of the project. For those activities that include the use of herbicides, surveillance monitoring to ensure that herbicide label instructions are being followed would be conducted as part of the contract administration. Form R8-FS-2100-1, Herbicide Treatment and Evaluation Record, would be used to monitor work involving herbicides. Stream samples would also be taken to monitor for offsite movement. East Fork would be monitored before and after the Proposed Actions including timber harvesting, reforestation, and wildlife activities. A pre-sale stream survey was completed on 7/12/13 on Poteau River East by Natural Resources Manager Charity Jade Ryles, Arkansas State University Wildlife Doctoral Candidate Bob

Vernocy, and Research Assistant Neil Gleason. Location was at Cardiff Highway 248 and SC93 on private land near National Forest Service land boundary and FS Road 19.

PROJECT OBJECTIVE REQUIREMENTS

Activities proposed would follow the objective requirements for Management Areas Management Area 14 (Ouachita Mountains, Habitat Diversity Emphasis) and Management Area 9 (Water and Riparian Communities). The complete descriptions of these management areas are located in the Revised Forest Plan (*USDA Forest Service. 2005a*).

Project objectives are listed below and summarized by alternative later in this chapter.

- To create a healthy forest condition.
- To create early seral stage habitat (even-age only).
- To remove off-site species (loblolly).
- To reduce competing vegetation for nutrients, water, and sun.
- To site prep a bed for seed fall after the regeneration harvests.
- To provide new growth for wildlife to eat.
- To reduce heavily stocked understories and midstories primarily due to lack of fire as part of the ecosystem.
- To reduce fuel loading.
- To create a suitable seedbed in regeneration sites after initial prescribed burning.
- To increase growth rate and quality of desired trees by reducing competition for nutrients and water among species.
- To ensure survival of desired trees by releasing suppressed trees from competing tree species.
- To create water sources for wildlife.
- To reduce midstory and allow development of grasses and forbs on the forest floor.
- To move toward the open road density objective.
- To access harvest units and provide safe road system.
- To repair or maintain road surfaces, ditch erosion, and repair or replace rusted-out pipes.
- To provide short-term access to harvest units.
- To reduce the impacts to streams and get rid of roads not needed in the future.
- To supply firewood areas to the local community.
- To supply rock permits to the local community.
- To stop or slow the infestation of invasive and non-native species such as mimosa, lespedeza, privet, or any other species of these types encountered within this analysis area.
- To ensure landlines are maintained.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

There were no unresolved conflicts to drive additional alternatives, but the interdisciplinary team considered the following:

No Harvest Alternative

This alternative was considered by the Interdisciplinary Team but eliminated from detailed analysis because the Team felt the No Action Alternative adequately addressed the overall effects of a no harvest alternative.

PROPOSED ACTION

Summary of Proposed Activities - These are approximate acres only based on field examinations, GIS, and GPS.

PROPOSED MANAGEMENT ACTIVITIES	C-264	C-265	C-266	C-267	C-268	C-269	Total
TIMBER HARVESTS							
Commercial Thinning 60 BA pine 10 BA hardwood	206	320	110	530	302	334	**1802**
Commercial Thinning on 20' spacing (pole stands)	0	304	17	0	59	136	**516**
Subtotal of Commercial Thinning Harvests	**206**	**624**	**127**	**530**	**361**	**470**	**2318**
Clearcut Loblolly (Regeneration stands)	0	0	0	0	40	0	**40**
Modified Seedtree (Regeneration stands)	80	75	114	141	0	40	**450**
Subtotal of Regeneration Harvests	**80**	**75**	**114**	**141**	**40**	**40**	**490**
TOTAL HARVEST	**286**	**699**	**241**	**671**	**401**	**510**	**2808**
SILVICULTURE – no herbicides							
Prescribed Burning (3-5 year rotation)	591	957	933	1123	958	541	**5103**
Reforestation and Timber Stand Improvements (TSI) of proposed regeneration stands	80	75	114	141	40	40	**490**
Pre-Commercial Thinning of previous regeneration stands	0	81	0	34	0	0	**115**
TSI (hand tool release/pre-commercial thinning) of previous regeneration stands	0	0	185	0	0	0	**185**
WILDLIFE							
Wildlife Stand Improvements (WSI) on Commercially Thinned stands proposed to 60 basal areas	206	320	110	530	302	334	**1802**
Ponds Reconstruction	2	0	2	2	2	1	**9**
Pond Construction	0	7	5	5	4	2	**23**
ROADS							
Roads: Construction							**0**
Roads: Reconstruction							**4.53**
Roads: Pre Haul Maintenance							**22.01**
Roads: Obliteration							**0.20**
Roads: Temporary							**10.0**
Other							
NNIS Treatment (**with herbicide**)							**Yes**
Permits (firewood, shale, rock)							**Yes**
Landline Maintenance (approx. miles)							**19**
Continuing Usage of Existing Shale Pit (yes/no)							**Yes**
Fireline Construction (approx. miles)							**10**
Fireline Reconstruction (approx. miles)							**15**

Refer to Appendix C for a detailed description of the Proposed Action.

NO ACTION ALTERNATIVE I

Deferred Management Activities

Under the No Action Alternative neither the Proposed Action nor any action alternative would be implemented. Management activities would be deferred until a later entry. However, ongoing Forest Service approved activities would continue in the project area. The following is a list of activities that would continue under this alternative. This list is not all-inclusive. Actions would continue associated with other Management Areas within this project area that would not normally need a decision.

- **Fire suppression:** Human and natural caused fires would be suppressed.
- **Hunting:** Game hunting would continue under Arkansas Game and Fish Commission regulation.
- **Public vehicle access:** All existing roads that are currently open would remain open. All currently closed roads would remain closed.
- **Road maintenance:** Normal and emergency road maintenance would continue.
- **Dispersed camping:** Dispersed camping would continue under the rules of the Ouachita National Forest.
- **Salvage Actions:** There would continue to be salvage operations, when necessary.
- **Prescribed Burning:** Approved by a previous Decision Memo

NO HERBICIDE ALTERNATIVE II

This alternative is exactly the same as the Proposed Action EXCEPT the use of herbicide for treatment is **not** proposed.

NO ROAD CONSTRUCTION ALTERNATIVE III

Under this alternative, there would be no road construction (temporary or system); only proposed timber harvest (and dependent management actions) accessible by the current transportation system would occur.

Summary of Proposed Activities - These are approximate acres only based on field examinations, GIS, and GPS.

PROPOSED MANAGEMENT ACTIVITIES	C-264	C-265	C-266	C-267	C-268	C-269	Total
TIMBER HARVESTS							
Commercial Thinning 60 BA pine 10 BA hardwood	206	136	39	330	148	244	**1103**
Commercial Thinning on 20' spacing (pole stands)	0	220	0	0	59	136	**415**
Subtotal of Commercial Thinning Harvests	**206**	**356**	**39**	**330**	**207**	**380**	**1518**
Clearcut Loblolly (Regeneration stands)	0	0	0	0	0	0	**0**
Modified Seedtree (Regeneration stands)	80	75	78	33	0	0	**266**
Subtotal of Regeneration Harvests	**80**	**75**	**78**	**33**	**0**	**0**	**266**
TOTAL HARVEST	**286**	**431**	**117**	**363**	**207**	**380**	**1784**
SILVICULTURE – no herbicides							
Prescribed Burning (3-5 year rotation)	591	957	933	1123	958	541	**5103**
Reforestation and Timber Stand Improvements (TSI) of proposed regeneration stands ***	80	75	78	33	0	0	**266**
Pre-Commercial Thinning of previous regeneration stands	0	81	0	34	0	0	**115**
TSI (hand tool release/pre-commercial thinning) of previous regeneration stands	0	0	185	0	0	0	**185**
WILDLIFE							
Wildlife Stand Improvements (WSI) on Commercially Thinned stands proposed to 60 basal areas	206	136	39	330	148	244	**1103**
Ponds Reconstruction	2	0	2	2	2	1	**9**
Pond Construction	0	4	4	4	2	2	**16**
ROADS							
Roads: Construction							**0**
Roads: Reconstruction							**4.18**
Roads: Pre Haul Maintenance							**21.71**
Roads: Obliteration							**0.20**
Roads: Temporary							**0**
Other							
NNIS Treatment (**with herbicide**)							**Yes**
Permits (firewood, shale, rock)							**Yes**
Landline Maintenance (approx. miles)							**19**
Continuing Usage of Existing Shale Pit (yes/no)							**Yes**
Fireline Construction (approx. miles)							**6**
Fireline Reconstruction (approx. miles)							**15**

Refer to Appendix D for a detailed description of this alternative.

Other Past, Present, and Reasonably Foreseeable Future Actions

In the past, the project area was part of an area hit by the southern pine beetle epidemic of 1995. Salvage sales were conducted within these compartments to remove some dead or dying pine trees.

Presently, oak decline is occurring in scattered pockets throughout the project area. There are still falling dead and dying trees in the project area as a result of past weather events. Private land is mostly pastureland or grazed woodlands. There is very little commercial timber.

There is a reasonable expectation that salvage sales would be conducted if an infestation or natural disaster occurs. There is a reasonably foreseeable opportunity for this project area to have a prescribed burn prior to implementation of the proposed actions analyzed in this document, because there was a Decision Memo signed authorizing a prescribed burn in the project area separate from this analysis.

There are no other known past, present, and reasonably foreseeable future activities other than what is identified here what is proposed in this environmental assessment.

SUMMARY COMPARISON OF ALL ALTERNATIVES

Comparison of Primary Objectives by Alternative (approximates only)

Primary Objectives	Proposed Activity	Units of Measure	Proposed Action	No Herbicide Alt. II	No Road Construction Alt III	No Action Alt. I
To create a healthy forest condition.	Timber Harvest	Acres	2,806	2,806	1,784	0
To create early seral stage habitat (even-age only).	Modified Seedtree, Clearcut	Acres	450 40	450 40	266 0	0 0
To remove off-site species (loblolly)	Clearcut	Acres	40	40	0	0
To reduce competing vegetation for nutrients, water, and sun.	Commercial Thinning	Acres	2,318	2.318	1,518	0
To site prep a bed for seed fall after the regeneration harvests. To provide new growth for wildlife to eat. To reduce heavily stocked understories and midstories primarily due to lack of fire as part of the ecosystem. To reduce fuel loading.	Prescribed Burning	Acres	5,103 3-5 yr rotation	5,103 3-5 yr rotation	5,103 3-5 yr rotation	*5,103 Per a previous Decision Memo*
To create a suitable seedbed in regeneration sites after initial prescribed burning	Site Prep	Acres	490	490	266	0
To increase growth rate and quality of desired trees by reducing competition for nutrients and water among species	Pre-commercial thinning TSI	Acres	115 185	115 185	115 185	0
To insure survival of desired trees by releasing suppressed trees from competing tree species.	Hand Tool Release	Acres	490	490	266	0
To create water sources for wildlife.	Pond Rehabilitation New Pond	# Ponds	9 23	9 23	9 16	0
To reduce midstory and allow development of grasses and forbs on the forest floor.	Wildlife Stand Improvements	Acres	1,802	1,802	1,103	0
To move toward the open road density objective.	Road Closures	1 mi/sq/mi	0.79	0.79	0.79	0.81
To access harvest units and provide safe road system.	Road Construction	Miles	0.0	0.0	0.0	0
To repair or replace rusted-out pipes and road surface and ditch erosion.	Road Reconstruction Prehaul Maintenance	Miles	4.53 22.01	4.53 22.01	4.18 21.71	0
To provide short-term access to harvest units.	Temporary Roads	Miles	10.0	10.0	0	0
To reduce the impacts to streams and get rid of roads that are not needed in the future	Road Obliteration	Miles	0.20	0.20	0.20	0
To supply firewood areas to the local community.	Firewood Permits	Yes/No	Yes	Yes	Yes	No
To supply rock permits to the local community.	Rock Permits	Yes/No	Yes	Yes	Yes	No
To control non-native invasive species	Herbicides	Yes/No	Yes	No	Yes	No
To maintain landlines	Paint/Blaze	Miles	19	19	19	0
To prevent spread of wildfire or prescribed burning	Fireline Construction Fireline Reconstruction	Miles	10 15	10 15	6 15	0

Summary Comparison of Environmental Effects by Alternative

Environmental Effect	Measure	Proposed Action	No Herbicide Alternative II	No Road Construction Alternative III	No Action Alternative I
Impacts to Water Quality Subwatershed **111101050101**	Risk to Aquatic Beneficial Uses	High	High	High	High
Resulting Early Seral Habitat	Percent 6-14%	450 ac. (seedtree) + 40 ac. (clearcut) + 0 ac. (existing regen) = 490 acres (**13%**)	450 ac. (seedtree) + 40 ac. (clearcut) + 0 ac. (existing regen) = 490 acres (**13%**)	266 ac. (seedtree) + 0 ac. (clearcut) + 0 ac. (existing regen) = 266 acres (**7%**)	0 acres 0-10 age class **0%**
Volume Harvested	(ccf)	25,000	25,000	15,000	0
Air Quality meets National Ambient Air Quality Standards	Below concentration limits for atmospheric pollutants	Yes	Yes	Yes	Yes
Impacts to Wildlife	(Habitat Capability Meets Minimum Viable Populations for all MIS Species - Baseline (Yes/No)	Yes	Yes	Yes	No
Resulting Road Density	(miles per square mile—goal is 1.0 mile per square mile)	0.79	0.79	0.79	0.81
Impacts on Society and Economy	(Special Use permits provided - Yes/No)	Yes	Yes	Yes	No
Hardwood/Pine and Hardwood in watershed	(acres/%)	Pine 4,747 acres 93% Hardwood 359 ac. 7%	Pine 4,747 acres 93% Hardwood 359 ac. 7%	Pine 4,747 acres 93% Hardwood 359 ac. 7%	Pine 4,747 acres 93% Hardwood 359 ac. 7%
Revenue Cost Ratio	<1.0 below cost >=1.0 is above cost	1.39	1.39	1.11	NA

Issues Comparison

Issue	Measure	Proposed Action	No Herbicide Alternative II	No Road Construction Alternative III	No Action Alternative I
Herbicide Use option (if needed only)	Yes/No	Yes	No	Yes	No
Road Construction	Miles	0 System 10 Temporary	0 System 10 Temporary	0	0

CHAPTER 3 ENVIRONMENTAL DISCLOSURES

INTRODUCTION

The actions described by the Proposed Action are typical of those projected for implementation in the Revised Land and Resource Management Plan and for which the environmental effects are disclosed in the Final Environmental Impact Statement (FEIS). This environmental assessment tiers to the FEIS.

The following inventories and sources of information were used in the analysis:

- → Silvicultural field examinations for *East Fork* were conducted in 2013. Information collected in this inventory is maintained in Forest Service Vegetation database (FSVEG). A summary of this information is located in the project file at the district office and is incorporated by reference.
- → District compartment records of previous management activities.
- → Soil Resource Inventory for the Ouachita National Forest updated.
- → SMS –Scenery Management System by Ouachita National Forest Recreation Staff.
- → Heritage resource surveys by Certified Heritage Resource Technicians and District Archeologist
- → Sensitive, threatened or endangered species database from the Arkansas Natural Heritage Commission.
- → Sensitive plant survey by Vernon Bates, Botanist under contract to the ONF and Arkansas Nature Conservancy.
- → Regional Forester's Sensitive Species List.
- → U.S. Fish and Wildlife Service list of Endangered Species.
- → American burying beetle (ABB) surveys
- → Field examination for the Biological Evaluation by the District Wildlife Biologist.
- → Geographic Information System (GIS) data files.
- → Travel Analysis Process – *East Fork* (March 2015).
- → Stream survey on East Fork Branch in the **East Fork-Poteau River Watershed 111101050101** (June 2013).

AIR QUALITY

Present Conditions

Air pollution is the presence in the atmosphere of one or more contaminants of a nature, concentration, and duration to be hazardous to human health or welfare. Air quality is a measure of the presence of air pollution. Ambient air quality is defined by the Clean Air Act as the air quality anywhere people have access, outside of industrial site boundaries. National ambient air quality standards (NAAQS) are standards of air quality designed to protect human health or welfare and are applied to six criteria pollutants. Although the proposed project includes several different activities, not all proposed activities result in air emissions. Thus, this air analysis will only focus on the one proposed activity, prescribed burning, that results in an increase in air emissions.

Emissions from wildland fire include carbon dioxide, water, carbon monoxide, particulate matter, hydrocarbons or volatile organic compounds, and nitrogen oxides. Carbon monoxide is the most abundant pollutant emitted from wildland fire. It is of concern to human health, because it binds to hemoglobin in place of oxygen and leads to oxygen deprivation and all of the associated symptoms, from diminished work capacity to nausea, headaches, and loss of mental acuity. Carbon monoxide concentrations can be quite high adjacent to the burn unit, but they decrease rapidly away from the burn unit toward cleaner air. Carbon monoxide exposure can be significant for those working the line on a prescribed fire, but due to rapid dilution, carbon monoxide is not a concern to urban and rural areas even a short distance downwind. Nitrogen oxide emissions from wildland fires are very small, and hydrocarbon emissions are moderate. Alone they are not very important to human health, but they are precursors to the criteria pollutant, ozone. Ozone is formed in the atmosphere when nitrogen oxides and hydrocarbons combine in the presence of sunlight. Fire-related NOx and hydrocarbon emissions become more important to ozone levels only when other persistent and much larger pollution sources already present a substantial base load of precursors. The most important pollutant from wildland fire emissions is fine particulate matter ($PM_{2.5}$) due to the amount emitted and the effects on human health and visibility (Hardy et al. 2001). The term fine particulate refers to particulate matter 2.5 microns or less in diameter.

Under the Clean Air Act, the Environmental Protection Agency (EPA) establishes air quality standards to protect public health, including the health of "sensitive" populations such as people with asthma, children, and older adults. EPA also sets limits to protect public welfare. This includes protecting ecosystems, including plants and animals, from harm, as well as protecting against decreased visibility and damage to crops, vegetation, and buildings. EPA has set national air quality standards for six common air pollutants (also called the criteria pollutants):

- ozone (O3),
- particulate matter (PM),
- carbon monoxide (CO),
- nitrogen dioxide (NO2),
- sulfur dioxide (SO2), and
- lead (Pb)

If the air quality in a geographic area meets or is cleaner than the national standard, it is called an attainment area; areas that don't meet the national standard are called nonattainment areas. If an area is designated as nonattainment, it signifies that the air in the area is unhealthy to breathe.

The criteria pollutants of most concern on the Ouachita National Forest are particulate matter and ozone. Fine particulate matter is the leading cause of regional haze (also known as visibility impairment), while ozone can harm sensitive vegetation within the forest. Additionally, at elevated concentrations these two pollutants can impair the health of both employees of and visitors to the National Forest. Arkansas and Oklahoma state air regulators monitor

ozone and fine particulate matter at several locations near the proposed project. Specifically, ozone monitoring is conducted in Polk County in Arkansas, and in McCurtain County, Oklahoma. Fine particulate matter monitoring is conducted in Polk County, Arkansas. None of these monitors have measured values greater than the air quality standards (NAAQS) set by EPA. Additionally, it should be noted that none of the counties where this project is proposed are designated nonattainment for any criteria pollutants, including ozone and particulate matter.

OZONE

Meeting ozone standards provides important public and environmental health benefits. EPA has worked closely with states and tribes to identify areas in the country that meet the standards and those that need to take steps to reduce ozone pollution. EPAs final designations are based on air quality monitoring data, recommendations submitted by the states and tribes, and other technical information. Most of Arkansas is listed as **Unclassifiable / Attainment**. Scott County, Arkansas, falls within this category. See the adjacent map. (Environmental Protection Agency / 2008 Ground-level Ozone Standards as required by the Clean Air Act Region 6 Final Designations, April 2012)

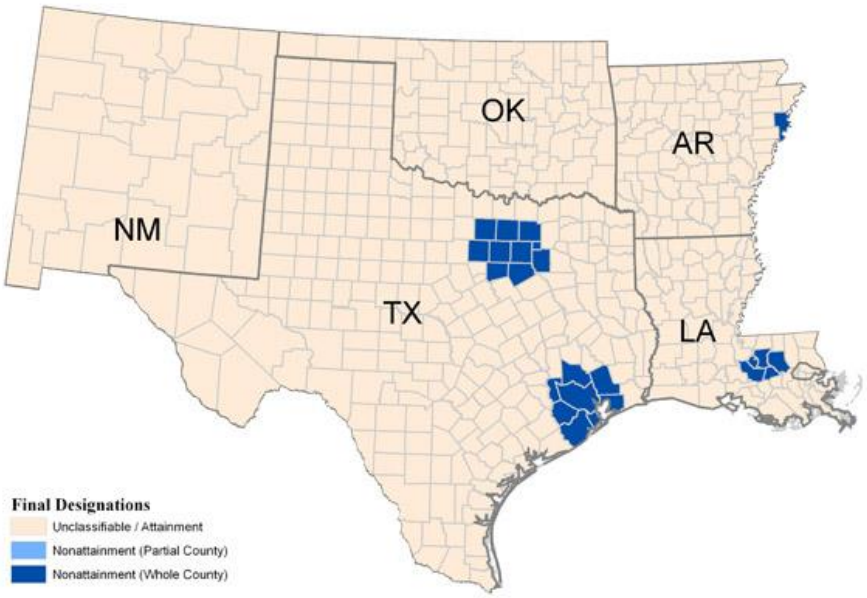


FIGURE 4: MAP OF FINAL DESIGNATIONS - EPA REGION 6

http://www.epa.gov/ozonedesignations/2008standards/final/region6f.htm (as of 12/23/2014)

While air quality monitoring describes ambient pollution levels, emissions inventories provide information on the contribution of various pollution sources to total emissions for specific geographic areas. Emissions from prescribed fires are unlikely to be a significant contributor to ozone. In much of the rural South, ozone formation tends to be NOx-limited and prescribed fires are usually not a major NOx source when compared to others, such as vehicles. Also, the amount of NOx and VOC coming from forestry activities is small compared to other sources. And most importantly, weather and climate conditions in this area tend to preclude prescribed burning from becoming a significant contributor to ozone formation. Most ozone events occur in mid-spring through late summer when hot temperatures and high-pressure air masses may stagnate over an area, and pollution is not dispersed. Prescribed burning is not typically conducted under these types of weather conditions because of the smoke dispersion issues.

PARTICULATE MATTER (PM 2.5)

The project area is located in Scott County, Arkansas and is listed as **Unclassifiable / Attainment** per a letter to Ron Curry, Regional Administrator, U.S. Environmental Protection Agency, Region VI, from Governor Mike Beebe dated December 5, 2013. All monitored counties in Arkansas currently meet the existing primary and secondary PM2.5 standards, and no counties are designated nonattainment.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION

PROJECT DESIGN FEATURES AND MITIGATION MEASURES

Fine particulate matter is emitted from prescribed fires and is a contributor to ambient levels of this pollutant. Within the county where burning is proposed, prescribed fire emissions currently account for nearly 84% percent of all fine particulate emissions (1,236 tons/year from fires compared to 1,474 tons/year total emissions). In the state of Arkansas, prescribed fire emissions account for 50.6% of all fine particulate matter emissions (72,256 tons/year from fires compared to 142,824 tons/year total emissions). Other sources of fine particulate emissions include fuel combustion and operations at industrial facilities, waste disposal and recycling operations, construction, and agricultural activities. The source for the above data is EPA's National Emissions Inventory for 2011, available online at ftp://ftp.epa.gov/EmisInventory/2011/2011neiv1_eventfire_countyscc_caphap.zip and http://www.epa.gov/ttnchie1/trends/.

The proposed prescribed burning is compatible with the Forest Plan, the desired conditions, and the standards within each management prescription that falls within the project area. The following effects are based on the prescribed fires being implemented in compliance with the USDA Forest Service Southern Region's Smoke Management Guidelines, dated September 2010. The smoke management objectives set forth in the guidelines are as follows:

- Minimize the amount and concentration of smoke entering populated areas;
- Prevent / minimize public health and safety hazards, including
- Impacts to sensitive sites (schools, hospitals, etc.), and
- Visual impairment on highways, airports, etc. (both day and night);
- Avoid exceedances of the National Ambient Air Quality Standards (NAAQS); and
- Protect visibility in Class I Areas.

Additionally, the guidelines require that burn plans be prepared to ensure that the smoke management objectives meet USDA policy that prescribed fires may not cause or contribute to an exceedance of a National Ambient Air Quality Standards. Burn planning will include the appropriate analysis procedures to evaluate downwind smoke concentrations to ensure protection of public health and safety.

DIRECT AND INDIRECT EFFECTS

The primary concerns when managing smoke from prescribed burns are impacting surrounding areas. Prescribed fire emissions have a direct, short-term effect on air quality in the project area. These impacts last less than twenty-four hours. Once the smoke has dissipated, all impacts are gone. All prescribed burns on the Ouachita National Forest are conducted in accordance with the Region 8 Smoke Management Guidelines in order to minimize impacts. The purposes of smoke management programs and guidelines are to mitigate the nuisance (such as impacts on air quality below the level of ambient standards) and public safety hazards (such as visibility on roads and airports) posed by smoke intrusions into populated areas; to prevent significant deterioration of air quality of Class I areas, and to insure that National Ambient Air Quality Standards (NAAQS) are met. Potential smoke emissions from the

prescribed burns will be evaluated using the Fire Emissions Production Simulator (FEPS) and the dispersion models VSMOKE and HYSPLIT to estimate direction of smoke dispersion and downwind concentrations prior to implementing the burns. These requirements and guidelines are the best practices available to avoid and minimize impacts to public health and visibility impairment on highways (safety).

Prescribed fire emissions from the proposed action would have a direct, short-term effect on air quality in the project area. Once the smoke has dispersed, the impact is gone. The amount of smoke and how it is dispersed depend on the size of the burn, the amount of fuel and the meteorological conditions at the time of the burn. In general, smoke from prescribed burning disperses into the atmosphere and combines with other existing pollutants. The wind transports the smoke and pollutants to areas many miles away where they are added to and possibly react with other gases/pollutants present in the atmosphere. The fate of emissions from prescribed fires is twofold. Most of the emissions are "lifted" by convection into the atmosphere where they are dissipated by horizontal and downward dispersion from the fire. The balance of the emissions remains in intermittent contact with the ground. Ground level smoke does not have enough heat to rise into the atmosphere. It stays in intermittent contact with the human environment and turbulent surface winds move it erratically. Human exposure to ground level smoke can be more intense, relatively brief (hours rather than days) and limited to a smaller area than exposure from smoke aloft. Smoke aloft is already dispersed before it returns to the human environment while ground level smoke must dissipate within that environment. Ground level smoke is dissipated through dispersion and deposition of smoke particles on vegetation, soil and other objects.

The direct effects of smoke include human health and safety issues. Fine particulates, including those found in wildland fire smoke, affect human health through the respiratory system, although eye irritation is also common. Individuals with cardiopulmonary diseases are especially susceptible. Residents near the burn unit might have some respiratory discomfort from ground level smoke, however it is expected that most impacts would be in the form of nuisance smoke and/or smell. For example, ash fallout can soil personal property and people may complain about the odors from the smoke. These impacts can be minimized by implementing the burn under weather conditions that are good for dilution and dispersion of the smoke away from smoke sensitive targets.

Fine particulates can also reduce visibility at scenic views by scattering and adsorbing light. A sufficient concentration can result in a reduction in how far a person can see a distant object, and how well a person can see the color and texture of a distant object. Surveys indicate that viewing scenery is an important reason of why people visit National Forests. The visibility impairment caused by the proposed prescribed fires is likely to be short term (less than 24 hours) in duration, and reductions in visibility (distance, color and texture) are likely to decrease as a person moves away from the prescribed fire.

Visibility on roads can be reduced by ground level smoke, causing a safety issue. This can be particularly of concern if smoke continues into the night when emissions are likely to be trapped near the ground and slowly transported from the burned area. The smoke will follow the drainages and collect in low lying areas. In a humid atmosphere the fine particles along with the water vapor released from the fuels can be a primary contributor to the formation of fog, which can become very dense. A person operating a vehicle in the vicinity of the prescribed fire may first experience good visibility conditions and then suddenly have visibility reduced significantly when they drive into the fog formed by the smoldering emissions. Conditions like this can significantly increase the likelihood of highway accidents; however, the likelihood of traffic accidents can be reduced by assisting vehicles driving through the fog or directing the traffic along a different route away from the fog.

The indirect effects of smoke are similar to the direct effects, but are experienced at greater distances from the burn. These effects are usually the result of the “lifted” portion of the smoke. Prescribed fires are managed to disperse and dilute smoke to avoid the negative effects of emissions, especially downwind of the burn. However, mass ignition techniques (such as aerial ignition from helicopters) that have become more commonly employed in order to treat more acres over a shorter time period can also put more particulate matter into the atmosphere over

a relatively short time. Indirect effects last less than twenty-four hours. Once dispersion and dilution occurs, the effects are alleviated.

CUMULATIVE EFFECTS

In addition to using prescribed fire as is proposed, the Forest may also conduct controlled burns in one of the other units or in nearby areas. Depending on the timing of the burns, the NAAQS for fine particulate could be affected. Cumulative impacts will be discussed as they relate to these standards.

Past Actions

Smoke from individual prescribed fires usually disperses quickly (in hours rather than days) and once the smoke has cleared the effect is over. Therefore, prescribed burning from several days prior to the current burn event does not contribute to a cumulative effect.

Present Actions

Multiple prescribed fires could occur on the same day within the analysis area if burning conditions are favorable, and equipment and staffing are available. Multiple burns, occurring at the same time, could cumulatively increase particulate levels. These short-term impacts are best assessed through smoke dispersion modeling to determine how plumes intersect, the resulting particulate concentrations and the likelihood of exceeding a 24-hour NAAQS. However, at this stage of planning, combinations of burn units that might be treated on the same day are not known and therefore modeling the cumulative impact on the 24 hour NAAQS is not an option. Communication between prescribed fire managers is essential to minimize the chances of smoke from multiple burns merging, whether they are ignited on the same or consecutive days.

Reasonably Foreseeable Actions

No additional impacts from reasonably foreseeable actions are anticipated.

The direct, indirect, and cumulative effects to air quality of the proposed prescribed burning would be of short duration at most (less than 24-hours). As a result of the pre-planning and effective smoke management as required throughout the burns, the overall magnitude of effects are well within the standards set to protect public health and safety. No significant cumulative effects would result from implementation of the proposed action.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

There would be no **direct effects** to air quality with this alternative. **Indirectly**, large wildfires could occur with the natural accumulation of fuels. This alternative does not include prescribed burning and therefore would have negligible potential for affecting air quality other than that which may occur under a wildfire situation. Smoke hazards from a reduced visibility and nuisance perspective have the potential to be increased due to the accumulation build-up of unburned fuels.

NO HERBICIDE ALTERNATIVE II

The effects on air quality would be the same as the Proposed Action. The only difference between the Proposed Action and this alternative is that herbicide use is not proposed in this alternative.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects on air quality would be the same as the Proposed Action.

SOILS

Geographic Boundary and Analysis Tools Used

The geographic boundary for the effects on soil quality would be the boundary of all compartments within *Feast Fork.* Timelines for measuring the effects on soils would be 15 to 25 years between re-entry periods. The Universal Soil Loss Equation (USLE) model was used to calculate potential erosion. Soils Resource Reports were also prepared by Forest Soil Scientist, Jeff Olson, August 2014.

Present Conditions

Soil maps and mapping unit descriptions and interpretations are based upon the fact that different soil types result from different combinations of geology, geomorphology, topography, vegetation and climate which influence land use activities, capabilities, and various interpretations for management. The nature, patterns and extent of these soils give each mapping unit its own set of interpretations for use and management. The Soil Resource Report for the East Fork Project Area has identified and described **20** soil mapping units the project area. Soil properties and associated management implications/precautions of these soil units were analyzed with respect to the proposed practices within each alternative. See project file for the Soil Mapping Unit Legend, Soil Mapping Unit Descriptions, and Soil Map.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION AND NO HERBICIDE ALTERNATIVE

Erosion. Erosion is the detachment and transport of individual soil particles by wind, water, or gravity. Soils are considered detrimentally eroded when soil loss exceeds soil loss tolerance (Forested T-factor) values. Ground disturbing management practices influence erosion principally because they remove vegetative ground cover and often concentrate and channel runoff water. Forested T-factors and the soils susceptibility to erosion vary by soil and mapping unit. Soils with higher K-factor values and those soil map units with severe erosion hazard ratings require more intensive management efforts to reduce the potential for accelerated erosion both during and after the soil disturbing activity. Erosion can best be managed to stay within the Forested T-factor values by leaving sufficient amounts of the forest floor, slash and other onsite woody debris material which typically dominates an effective surface cover, not overly compacting soils which would reduce water infiltration rates and result in increased overland flow rates, and not allowing water to concentrate and channel on roads, skid trails and landings.

The Revised Forest Plan Forest-wide design criteria identify maximum allowable soil loss thresholds (USDA Forest Service. 2005a, pg. 74-75, Criteria SW003). In order to determine whether the proposed actions meet these criteria, the Universal Soil Loss Equation (USLE) was used to calculate soil loss resulting from proposed treatments. For this analysis, since no activities are proposed on areas with severe erosion hazard, the worst case-modeling scenarios were analyzed for soil map units with a moderate erosion hazard potential, which would be impacted by the most intensive soil disturbing management actions.

The total calculated soil loss for the proposed management activities and the maximum allowable soil loss for three-year recovery period are displayed in the table below. These values are based on adequate implementation of erosion control treatment of log decks, temporary roads and primary skid trails (scarification, waterbar and seed).

Table1. Comparison of Proposed Action and Allowable Soil Loss

Soil Map Unit#	Compartment/ Stand	Treatment	Soil Loss (tons/acre)	
			Proposed Action	Allowable
74	265/8	Modified Seedtree	7.12	9.15
74	265/15	Commercial Thinning	5.11	9.15
48	264/10	Modified Seedtree	7.07	7.95

These worst-case scenarios meet the Forest criteria of staying within the allowable soil loss Forested T-factor. These treatment units, along with other proposed treatment units of less intense soil disturbing management actions, would remain within acceptable limits over the entire project area when erosion control measures are adequately implemented.

The wildlife ponds to be developed in the watershed would be approximately ¼ to ½ acre in size. The resultant soil exposure would be temporary. The ponds would be constructed on gently sloping sites and, after construction, would act as a barrier to downstream movement of sediment. Planting grasses, clover, and other herbaceous vegetation would reduce the time required for pond site stabilization to less than four months. The ponds would not be constructed in any riparian areas, and would be located away from any perennial stream channels. These measures would limit potential soil erosion and sedimentation to within acceptable levels.

During prescribed burning actions sufficient amounts of unburned material will be left intact to minimize erosion. Burns would be prescribed and implemented such that not more than 20% bare soil will be exposed on units receiving fuels reduction or wildlife enhancement burns, and not more than 30% bare soil will be exposed on units receiving site prep burns. Only the upper forest floor litter layer consisting of non-decomposed or semi-decomposed pine needles, leaves and small twigs would be expected to be consumed. This will leave the underlying forest floor layer, which consists of more decomposed needles, leaves and twigs, to protect the mineral soil. This remaining organic layer, along with the trees and other living vegetation on the site, should prevent or minimize most soil movement. After prescribe burning operations, all firelines will be water barred, seeded, and fertilized.

Compaction. Compaction increases soil bulk density and decreases porosity as a result of the application of forces such as weight and vibration. Compaction can detrimentally impact both soil productivity and watershed condition by causing increased overland flow during storm events and reduced plant growth due to a combination of factors including reduced amounts of water entering the soil and its reduced availability to plant growth, a restricted root zone, and reduced soil aeration. It is generally acknowledged that all soils are susceptible to soil compaction or decrease soil porosity. The soils in this planning area are most susceptible to compaction when wet.

The soil resource inventory identified soils in the analysis area have compaction hazard ratings ranging from slight to severe. Most, however, are in the slight to moderate range (74% of the project area). Soils with a moderate-high rating (5% of the project area) will be treated as having a high rating. There are several stands with very small areas of mod-high to high ratings (8% of the project area) that also have timber harvests proposed. The moderate-high rating will be treated as having a high hazard rating, since in this analysis area these soils have low proportions of rock content in the top 6-inches of soil. This situation, when combined with heavy equipment operation on wet soils, can result in unacceptable levels of compaction. To ensure that compaction effects are kept within acceptable levels, additional mitigation would be implemented. On soils with a moderate-high or high compaction hazard rating, logging would be limited to the drier periods of the year, namely April through November. On soils with a severe compaction hazard rating, logging would be limited to a July through November operating season. (Stands proposed for limited operating seasons are listed in Chapter 2, technical requirements). Even during these drier periods, extra care would be taken to monitor soil conditions and suspend operations when soils become wet. Given this mitigation, soil compaction would be limited and is not expected to impair soil productivity.

Fire effects on soil. Prescribed fire may affect soils positively or negatively. Positive effects include enhancement of nutrient availability and phosphorus cycling and reduction of soil acidity. Negative effects include excessive soil heating that can kill soil biota, alteration of soil structure, destruction of organic matter, and loss of site nutrients through excessive volatilization. Soil erosion and additional nutrient loss through leaching may occur later during rainstorms. Any long-term negative effects to the soil would be related to high severity burns or very short (less than three years) frequency of the burns. Typical burn severity would be limited by established burning parameters and mitigation measures designed to protect soils and overstory trees and to minimize risk of escape. These parameters result in retention of enough leaf litter to protect soil from the negative effects listed above in most cases. Underburn frequencies would be three-years or greater, which would allow recovery of forest floors and soil biota and would not deplete soil nutrients.

Effects of Herbicides on Soil. Herbicides do not physically disturb the soil; therefore, treated areas have intact litter and duff. Herbicides could affect soil productivity through biotic impacts, soil erosion, and nutrient leaching. Depending on the application rate soil environment, herbicides can stimulate or inhibit soil organisms. Adverse effects can occur when herbicides are applied at higher rates than the label rate. Use of herbicides at the lowest effective rate required by mitigation measures does not reduce activity of soil biota (Fletcher and Friedman 1986). Litter and duff serve to minimize erosion and nutrient loss from leaching. Forest standards have been developed to ensure that herbicides are applied correctly and pose no greater risk to soils and soils biota and do not accidentally contaminate surface waters. No herbicide will be mixed or used within 100 feet of perennial streams, lakes, or ponds, or within 30 feet of other streams with defined channels. Herbicides, carefully directed and foliar sprayed during late spring to summer at the minimum recommended application rate, should result in no detrimental effects to long-term soil productivity or impact water quality. With plan standards in effect, the proposed action shows acceptably low risk with respect to potential herbicide use (USDA Forest Service 2005b, pp.47).

Floodplains, Riparian Areas, Jurisdictional Wetlands and Municipal Watersheds

There are no actions proposed specifically for floodplains and riparian areas. The project area (East Fork) has some floodplains and riparian areas, but no jurisdictional wetlands or municipal watersheds. Current Forest Plan monitoring notes these areas are protected by the Revised Forest Plan (Forest Wide Design Criteria SW001-SW009, Pg. 74-76 and Standards for MA 9, 9.01-9.27, Pg. 103-108).

Parklands, Prime Farmlands, and Rangeland

No parklands, roadless areas, wild and scenic rivers, ecologically critical areas, or scenic or other unique areas are within or adjacent to the project area. However, there are some small acreages of Prime Farmland near and within the project area, some of which are on private ownership. The Prime Farmland includes three soil types (Map units #2, #98, and #104) but none of them are subject to any practices associated with the Proposed Action.

CUMULATIVE EFFECTS

Cumulative effects. Effects from past actions are no longer impacting the soil resource. There are no present actions impacting the soil resource. There is always the potential for a wind or insect/disease event that would result in salvage or sanitation harvests within the same areas proposed for harvest under this project. Because salvage or sanitation harvests in response to these natural events would also follow the Revised Forest Plan guidance designed to protect the soil resource, any additive effect would be minimal.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

Only the undisturbed natural erosion would be expected to continue. Natural erosion from undisturbed forest soils is very low. There would be no management activities conducted on forest soils; no compaction would occur. No

cumulative effects would occur because no management activities would be conducted under the No Action Alternative; there would be no additive effect.

NO HERBICIDE ALTERNATIVE II

The effects of this alternative would be the same as the Proposed Action.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as those described resulting from the Proposed Action, except fewer acres of soil would be impacted.

WATER RESOURCES AND QUALITY

Present Conditions

The East Fork Project area is in one 6th level watershed, East Fork-Poteau River Watershed 111101050101-High Risk (17,668 acres). See map in Appendix E. The headwaters of the Poteau River are in this watershed and project area. Streams within the East Fork project area include Big Bed Creek in C-264 and C-265, East Fork Branch, and unnamed tributaries. There are no impaired waterbodies (ADEQ 303(d) listing), or designated ground sources (wells) for public drinking water. Lake Waldron, the public water supply for Waldron Waterworks, is located approximately one mile from proposed activities. The primary beneficial use for the streams and tributaries in the East Fork Project Area is recreation, which provides for the protection and propagation of aquatic life.

Also contained within the project area are 9 existing ponds (¼ to ½ acre in size). The primary beneficial use of the ponds is water supply for wildlife. Twenty-six (26) stream crossings within this project area inhibit movement of fish and other aquatic organisms.

ENVIRONMENTAL EFFECTS

Proposed Action

Direct effects of management activities would result from logging equipment and vehicles traversing stream crossings, fireline and road construction through streams, etc. These activities could place pollutants directly into a watercourse. While it is impractical to eliminate all soil from entering a stream, it is possible to limit the amount that directly enters streams by designing and implementing Best Management Practices (BMPs) found within the Revised Forest Plan (USDA Forest Service. 2005a) and Arkansas Forester's BMPs (Arkansas Forestry Commission. 2002). When herbicides are transported, mixed, and applied, there is a risk that the herbicide could be spilled. Herbicides may enter streams, ponds, and lakes during treatment by direct application or drift.

Indirect effects to water quality are those occurring at a later time or distance from the triggering management activity. Indirect effects are from management activities that do not have a direct connection to a stream course.

Timber harvest and fire can increase nutrients released to streams, with potentially positive or negative effects. Research studies in the Ouachita Mountains have shown increases in concentrations of some nutrients following timber harvest, but increases are generally small and short-lived, particularly where partial harvests are implemented. Small increases in nutrient concentrations may have a beneficial effect on these typically nutrient-poor stream systems. Van Lear and others (1985) examined soil and nutrient export in ephemeral streamflow after three low-intensity prescribed fires prior to harvest in the Upper Piedmont of South Carolina. Minor increases in stormflow and sediment concentrations in the water were identified after low-intensity prescribed fires. It was suggested that erosion and sedimentation from plowed fire lines accounted for the majority of sediment from all watersheds.

Road maintenance and/or construction, fireline construction and reconstruction and timber management activities such as construction of skid trails, temporary roads and log landings could result in increases in erosion and sedimentation. Roads contribute more sediment to streams than any other land management practice (Lugo & Gucinski, 2000).

Increases in water yield are generally proportional to decreases in vegetative cover. Because vegetative cover would to some extent decrease, water yield increases are expected to be minor (Oklahoma Cooperative Extension Service, 1994). Stream channels in the area are capable of withstanding small increases in flow.

Forest monitoring has demonstrated that indirect effects from vegetation manipulation from harvest or stand improvement with buffers did not have a significant effect on water quality (Clingenpeel, 1989). Beasley et al. (1987) showed a statistically significant increase in nutrient concentrations of orthophosphorus, potassium and calcium for only the first year after clearcutting. There was no effect from selection harvesting. Because of the short period of increases (one year) and the dilution of untreated areas, there was no meaningful impact to water quality.

The Proposed Action includes the use of herbicides for site preparation, release and for the control of non-native invasive species. When herbicides are applied, there is a risk that the chemical could move offsite, possibly entering streams, ponds, lakes, or infiltrate ground water by vertical seepage into aquifers. The Forest Service has specific regulations for the use and application of herbicides, and the Ouachita NF adheres to additional design criteria for herbicide application in the RLRMP. When all BMPs or regulations are implemented, there should be little movement of herbicide offsite. The introduction of herbicides into the water is treated as an indirect effect since standards and guidelines (BMPs) do not permit direct application for silvicultural purposes.

Herbicides are only proposed for the treatment of non-native invasive species in this project, not for silviculture treatments. The Proposed Action proposes herbicide application with glyphosate (Round-up®, Accord® or equivalent products), or triclopyr (Garlon 4®, 3A or equivalent products) as backup treatments for hard to kill non-native species. Application would be by cut surface application, tree injection, and foliar or basal spray application method. The amount treated would be very small on individual species when found, however the following still applies.

Direct effects could occur from herbicide application for aquatic non-native invasive species and indirect effects when treating terrestrial invasive plant species within SMAs, but effects would be minimal due to approximately 99% of invasive species treatments occurring outside streamside management area protection buffers (aquatic habitats) and following RFP protections and conservation measures:

The RFP only allows herbicide use within MA 9 for control of vegetation on dams or for control of invasive and/or exotic species. Application would be approved by the Forest Supervisor following site-specific analysis and a monitoring plan (design criteria 9.13). Only a non-soil active herbicide with appropriately labeled formulation for both aquatic and terrestrial site use would be used. Application of herbicide specimen label rates for each chemical would be followed and applied rates would be at or below the recommended application rate.

Herbicide monitoring across the Forest has found only trace amounts of herbicide have ever been detected in streams. Herbicide applications were monitored for effectiveness in protecting water quality over a five-year period on the Ouachita NF. The objective was to determine if herbicides are present in water in high enough quantities to pose a threat to human health or aquatic organisms. From 1989 through 1993, 168 sites and 348 water samples were analyzed for the presence of herbicides. The application of triclopyr for site preparation and release was included in the analysis. Of those samples, 69 had detectable levels of herbicide. No concentrations were detected that would pose a significant threat to beneficial uses. Based on this evaluation, the BMPs used in the transportation, mixing, application and disposal were determined to be effective at protecting beneficial uses.

No cumulative effects are anticipated due to RFP standards, BMP and the small amount of area potentially impacted.

No Herbicide

The effects of management activities would be the same as those described above except the listed effects from herbicide would not occur.

No Road Construction

The effects of management activities would be the same as those described above except the listed effects from road construction would not occur.

No Action

Although proposed soil disturbing activities resulting in stream sedimentation would not occur, watershed improvement activities, such as road decommissioning and fish passage restoration improvements would also not take place.

Cumulative Effects

The Aquatic Cumulative Effects (ACE) model was used to determine the watershed condition of the 12-digit HUC 6th level subwatershed, as well as assess proposed project impacts. Watershed Condition Ranking (WCR) is a risk ranking integrated in the model that returns a High, Moderate, or Low ranking based on predicted sediment delivery to streams and effects on fish community diversity and abundance. The primary variables driving ACE, and subsequently the WCR, are road density, urban areas, pasture lands and project treatments.

Local research has shown that the effects of increased sediment as a result of timber harvests are identifiable for up to 3 years (Beasley, Miller, & Lawson, 1987). The timeframe of this model is bound by three years prior and one year following implementation. This captures the effects of other management activities that may still affect the project area. This is consistent with most project level environmental analyses that have an operability of five years. Proposed actions are constrained to a single year. This expresses the maximum possible effect that could occur. Past activities that have a lasting effect (such as roads and changes in land use) are captured by modeling the sediment increase from an undisturbed condition. The predicted sediment delivery and risk level for the subwatershed is displayed in the table below.

Table 3.3. Sediment Delivery by Alternative

Subwatershed *6th level HUC ID#*	**Alternative**	**Sediment Delivery**		**Risk Level**
		Additional Tons Per Year	**% Increase***	
East Fork-Poteau River *111101050101*	*Current Condition*		3,438	High
	No Action	242	3,540	High
	Proposed Action & No Herbicide	1,339	4,003	High
	No New Road Construction	1,068	3,889	High

*Percent increase over sediment delivery from an undisturbed condition

The risk level to aquatic beneficial uses remains high for all alternatives. Environmental effects would persist and could change the hydrologic system with observable changes for as long as the causing actions persist. Effects can threaten exceedance of environmental thresholds for periods of time (years). If causative actions persist over time, permanent adjustments can occur to the hydrologic system.

Fish population monitoring was conducted on a third order stream within the East Fork-Poteau River watershed in 2013. Species data collected during fish population monitoring was used to determine an Index of Biotic Integrity for the watershed. Results showed a Fair integrity class, which indicates signs of loss of intolerant species, a species richness below expectation, and skewed trophic structure. Findings may be highly affected by the general lack of

available suitable habitat in the watershed as few perennial headwater streams exist in this area.

To reduce predicted sediment, the Ace Cumulative Effects (ACE) Output Analysis Protocol offers alternative analysis methods by dispersing project impacts and spreading implementation over multiple years, rather than model all treatments to occur in one year which more accurately models implementation. The protocol states that if predicted sediment does not exceed 2% increase over the current condition, then it is not considered to be a measurable change (Moser, 2014). In the East Fork-Poteau River subwatershed, prescribed burning and harvest activities were modeled to occur in years one through five. This dispersal of treatments resulted in a predicted sediment increase of 3% over the current condition for each year. Land cover in East Fork-Poteau River watershed is comprised of 72% private lands. When analyzing the smaller subwatershed impacted by the proposed actions on Forest service lands the impacts are dispersed. Future fish population surveys may be conducted to assess potential impacts of proposed activities and surrounding land management practices.

WILDFIRE HAZARDS AND/OR FUELS

Present Conditions

Fuel loads in *East Fork* continue to accumulate from normal events and processes such as storms, insects and disease, needle cast, and leaf litter, which can increase wildfire hazards in the project area. Fuels can increase from 4-6 tons per acre to 8-10 tons per acre after years without prescribed burning. Prescribed burning conducted on the Ouachita National Forest typically reduces fuel loading on a unit by one to three tons per acre. Most of this area has not been burned in recent years (see map below).

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on wildfire hazards and fuels would be the entire *East Fork* and the immediate forested areas surrounding *East Fork*. Timelines for measuring the effects are current fuel and future fuel buildup for the next 10 to 15 year period. The analysis method would be by field observations and monitoring of fuels after burns.

PROPOSED ACTION, ALTERNATIVE II, ALTERNATIVE III AND THE NO ACTION ALTERNATIVE

There are approximately 5,103 acres of prescribed burning proposed in the Proposed Action and Alternative II on a 3-5 year rotation for this project. With repeated burns, fuel loading in a burn unit can be maintained at approximately three to four tons per acre. Prescribed burning would significantly reduce hazardous fuels in this project area. Approximately 10 miles of new firelines and 15 miles of reconstructed firelines are proposed in the project area in the Proposed Action. Alternative III proposes approximately 6 miles of new fireline construction and 15 miles of reconstruction.

Fuel management is implemented through normal program planning. Other resource areas such as timber and wildlife may initiate projects that also benefit fire management through fuel modification by use of prescribed fire. Burn plans would be developed to provide protection for soil and water while achieving the resource management objectives. Prescription elements would include such factors as fire weather, expected fire behavior, slope, aspect, soil moisture, fuel moisture, relative humidity, mixing heights, wind speed and direction, fuel loads, and any other indicator that may influence fire intensity.

A direct effect would be logging slash added to an already increased load from normal fuel accumulations. Even though this would add to the normal fuel loads in *East Fork*, a direct effect of a prescribed burn executed under controlled conditions would reduce this load down to near normal amounts reducing the chance of a hot wildfire that could kill live standing timber and remove the soil protecting litter layers that a prescribed burn would leave intact (indirect effect).

CUMULATIVE EFFECTS

Cumulatively, with each successive prescribed burn, less intense fires would resemble natural fire events that were common before fire suppression activities were begun. With each prescribed burn, less fuel would be available to burn and native species would increase that benefit from periodic fire. Eventually stand replacing wildfire would become less likely, easier to control or manage, and burn under moderate conditions.

TRANSPORTATION AND INFRASTRUCTURE

Present Conditions

There are 5,108 acres of NF and 3,805 acres of private land resulting in approximately 7.98 sq. miles. There are 25.97 miles of total existing roads (both open and closed). Of these roads, 6.50 miles are currently opened. Open road density is 0.81 mi./sq. mile. Current road system meets the 2005 Revised Land and Resource Management Plan criteria of miles per square mile. There are some culverts that may need replaced or maintained. See maps at the end of this section.

ROADS THAT PROVIDE DIRECT ACCESS TO THE PROJECT AREA.

Arkansas State Highway 248 and 80 provide the main access to the East Fork EMU project area. AR Highway 248 and 80 run East and West through the southern portion of the East Fork EMU. A combination of County and Forest Service Roads provide access to this EMU.

ROADS WITHIN THE PROJECT AREA. (SEGMENT MAP)

Forest Service Road 296A – This is also a single lane, ditched and piped road under Forest Service jurisdiction and Forest service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have some rusted out pipe and a slab that needs some riprap on the downstream side. This road is seasonally open per the Motorized Vehicle Use Map, (MVUM).

FIGURE 5: BROKEN GATE ON SC91 IN C-267 - PHOTO BY DAVA BAUER, USFS

Forest Service Road S65 - This is a single lane, ditched, and piped road under Forest Service jurisdiction, and Forest Service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but has rusted out pipe and very little surfacing. This road is closed per the MVUM.

Forest Service Road S65A – This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have brush growing up in the ditches. This road is closed year round per the MVUM.

Forest Service Road S65C – This is a single lane, out sloped and dipped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, and forest administration. This road is in good condition except for brush growing p in the ditches and has very little surfacing. This road is closed per the MVUM.

Forest Service Road S64A -- This is a single lane, out sloped road with dips under Forest Service jurisdiction and maintenance. The variety of users includes hunters, and forest administration. This road is in poor condition with lots of erosion. This road is closed per the MVUM.

Forest Service Road *S64B* -This is a single lane, out sloped road with dips, under Forest Service jurisdiction and Forest Service maintenance. The variety of users includes hunters, and forest administration. This road is in fair condition, but does have brush growing up in the ditches and some large mud holes. This road is closed per the MVUM.

Forest Service Road S66 – This is a single lane, piped and ditched, road under Forest Service jurisdiction and Forest Service maintenance. The variety of users includes hunters, and forest administration. This road is in poor condition with lots of erosion and rusted out pipe. This road is closed per the MVUM.

Forest Service Road S66A – This is a single lane, piped and ditched road, under Forest Service jurisdiction and Forest Service maintenance. The variety of users includes forest administration. This road is in good condition and is closed per the MVUM.

Forest Service Road S66B – This is a single lane, piped and ditched road under Forest Service jurisdiction and maintenance. The variety of users includes forest administration. This road is in good condition except for brush growing up in the ditches. This road is closed per the MVUM.

Forest Service Road S66C – This is a single lane, piped and ditched road under Forest Service jurisdiction and Forest Service maintenance. The variety of users includes hunters, recreation, private land owners and forest administration. This road is in good condition except for rusted out pipe. Currently this road is open per the MVUM.

Forest Service Road S66D – This is a single lane, piped and ditched road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, private land owners and forest administration. This road is in good condition. Road is closed per the MVUM. Only the first 0.10 mile of this road is currently on Forest Service land because the back tracks of land have been traded off.

Forest Service Road S67 – This is a single lane road that is both out sloped with dips and ditched and piped under Forest Service jurisdiction and maintenance. The variety of users includes hunters and forest administration. This road is in fair condition with some brush growing in the ditches and erosion. This road is closed per the MVUM.

Forest Service Road S67A – This is a single lane, ditched and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters and forest administration. This road is in good condition but does have some erosion and brush issues. This road is closed per the MVUM.

Forest Service Road S67B – This is a single lane, out sloped and dipped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters and forest administration. This road is in good condition except for some erosion and brush issues. This road is closed per the MVUM.

Forest Service Road S68 – This is a single lane, ditched and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters and forest administration. This road is in poor condition due to lots of rusted out pipe. This road is closed per the MVUM,

Forest Service Road S69 – This is a single lane road that is both out sloped with dips and ditched and piped under Forest Service jurisdiction and maintenance. Users include forest administration. This road is in fair condition with some brush growing in the ditches and erosion and rusted out pipe. This road is closed per the MVUM.

Forest Service Road S69A – This is a single lane road that is ditched and piped under Forest Service jurisdiction and maintenance. Users include forest administration. This road is in fair condition with lots of brush growing in the ditches. This road is closed per the MVUM.

Forest Service Road S69B – This is a single lane road that is ditched and piped under Forest Service jurisdiction and maintenance. Users include forest administration. This road is in fair condition with lots of brush growing in the ditches. This road is closed per the MVUM.

Forest Service Road S89A – This is a single lane road that is out sloped and dipped under Forest Service jurisdiction and maintenance. Users include hunters and forest administration. This road is in good condition because it has been used several times over the last few years. This road is closed per the MVUM.

Forest Service Road 19 – The county maintenance portion of this road is a one and two lane road that is piped and ditched. The Forest Service maintenance portion of this road is a single lane road that is piped and ditched. This is one of the main through roads on the Cold Springs Ranger District. Users include private residence, hunters, recreation and forest administration. This road is in good condition. And Forest Service portion is open per the MVUM.

Forest Service Road 186 – This is a single lane road that is ditched and piped under Forest Service jurisdiction and maintenance. Users include hunters, recreation and forest administration. This road is in good condition. This road is seasonally open per the MVUM.

Forest Service Road 186A – This is a single lane road that is ditched and piped under Forest Service jurisdiction and maintenance. Users include hunters, recreation and forest administration. This road is in good condition. This road is closed per the MVUM.

Forest Service Road 814 – This is a single lane road that is ditched and piped under Forest Service jurisdiction and maintenance. Users include hunters, recreation and forest administration. This road is in good condition. This road is seasonally open per the MVUM.

Scott County Road SC93 – This road is called the Cold springs Road. It is a double lane paved road under County Jurisdiction and Maintenance.

Arkansas Highway 80 – This is a double lane paved highway that is under the Arkansas State Highway jurisdiction.

Scott County SC91 -- This is a single lane piped and ditched County Road under County Jurisdiction and maintenance. This road is in good condition but has very little surfacing.

ROADS OUTSIDE THE ANALYSIS AREA

See matrix of existing roads outside East Fork in Appendix F.

Forest Service Road 296A – This is also a single lane, ditched and graveled road under Forest Service jurisdiction and Forest service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have some rusted out pipe and a slab that needs some riprap on the downstream side. This road is seasonally open per the Motorized Vehicle Use Map, (MVUM).

Scott County Road 186 – This is a single lane road that is ditched and piped under Forest Service jurisdiction and maintenance. Users include hunters, recreation and forest administration. This road is in good condition. This road is seasonally open per the MVUM.

Forest Service Road 296 -- This is also a single lane, ditched and graveled road under Forest Service jurisdiction and Forest service maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have some rusted out pipe and a slab that needs some riprap on the downstream side. This road is seasonally open per the Motorized Vehicle Use Map, (MVUM).

Forest Service Road 178 – This is a single lane ditched and piped road under Forest Service jurisdiction and maintenance. This is one of the Cold Springs Ranger Districts main through roads. Users include hunter, recreation, private land owners and forest administration. This road is in good condition except for surfacing which has worn thin. This road is open per the MVUM.

Forest Service Road 20 – This is a single lane ditched and piped road under Forest Service jurisdiction and maintenance. This is one of the Cold Springs Ranger Districts main through roads. Users include hunter, recreation, private land owners and forest administration. This road is in good condition except for surfacing which has worn thin. This road is open per the MVUM.

Forest Service Road S65A – This is a single lane, ditched, piped and graveled road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have brush growing up in the ditches. This road is seasonally open per the MVUM.

Forest Service Road S65B -- This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have brush growing up in the ditches. This road is seasonally open per the MVUM.

Forest Service Road S65D -- This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have brush growing up in the ditches. This road is closed per the MVUM.

Forest Service Road 186A -- This is a single lane, ditched and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have brush growing up in the ditches. This road is closed per the MVUM.

Scott County SC91 -- This is a single lane piped and ditched County Road under County Jurisdiction and maintenance. This road is in good condition but has very little surfacing.

Forest Service Road S63 -- This is a single lane, ditched, and piped road under Forest Service jurisdiction and maintenance. The variety of users includes hunters, recreation, and forest administration. This road is in good condition but does have brush growing up in the ditches. This road is closed per the MVUM.

FISH PASSAGE CROSSINGS

The road analysis inventory showed 26 fish passage crossings, (20 culverts and 6 slabs). Out of these stream crossings the data showed that several have a fish passage problem. All fish passage culverts to be replaced will be designed to meet fish passage guidelines.

FIGURE 6: WASHED OUT PIPE ON ROAD SC91 IN C-267 - PHOTO BY DAVA BAUER, USFS

ROADS DECOMMISSIONED BY NATURE

Road Number	INFRA Mileage
S64A	0.20

See matrix of existing roads and of open road density **within** East Fork in Appendix G.

ENVIRONMENTAL EFFECTS

The geographic bounds for this project include the transportation system within *East Fork* and portions of roads outside of the project area. Timelines for measuring the effects would be until all activities proposed are completed. The method of analysis for the transportation system in this project area is the Travel Analysis Process – East Fork that was completed in March 2015, utilizing GPS data.

PROPOSED ACTION

The Proposed Action would include approximately 4.53 miles of road reconstruction, 0 miles of TSL-D new construction, 22.01 miles of prehaul maintenance, 10 miles of temporary road construction, and 0.2 miles of road obliteration. Normal and emergency road maintenance would be done on existing open roads. All stream crossings with culverts being replaced would be engineered with adequate fish passage structures. After obliterating road S64A, there would be 6.30 miles of open roads remaining resulting in the open road density to be 0.79 miles per section. Revised Forest Plan guideline is 1.0 miles per square mile meeting the objectives of the plan. This alternative would reduce the distance between culverts and replace nonfunctioning culverts, which would have an indirect effect by reducing sediment from roads in the watershed. The proposed transportation work would allow for timber harvesting, prescribed burning, silvicultural treatments, wildlife work as well as safe public access.

CUMULATIVE EFFECTS

These activities would have a cumulative effect of improving forest health, wildlife habitat, forest recreational opportunities and safety.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

The direct effect of this alternative is that no roadwork would be done on many interior roads. Normal and emergency road maintenance would be done on existing open roads. The indirect effects would include the continued deterioration of roads, washed out stream crossings, rusted out culverts, and long distances between cross drains. Sediment from the road would eventually increase.

CUMULATIVE EFFECTS

Cumulative effects would be a road system that does not meet Forest Service standards, which provides safe access and reduces erosion and sediment problems.

NO HERBICIDE ALTERNATIVE II

The effects on the transportation system would be the same as those in the Proposed Action since proposed treatments are the same, minus the effects of herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

This alternative would include approximately 4.18 miles of road reconstruction, 0 miles of TSL-D new construction, 21.71 miles of prehaul maintenance, 0 miles of temporary road construction, and 0.2 miles of road obliteration. Normal and emergency road maintenance would be done on existing open roads. All stream crossings with culverts being replaced would be engineered with adequate fish passage structures. After obliterating road S64A, there would be 6.30 miles of open roads remaining resulting in the open road density to be 0.79 miles per section. Revised Forest Plan guideline is 1.0 miles per square mile meeting the objectives of the plan. This alternative would reduce the distance between culverts and replace nonfunctioning culverts, which would have an indirect effect by reducing sediment from roads in the watershed. The proposed transportation work would allow for most timber harvesting, prescribed burning, silvicultural treatments, wildlife work as well as safe public access. There are no other past, present, or reasonably foreseeable future actions affecting transportation or infrastructure; no cumulative effects would result from implementation of this alternative.

See Appendix H for transportation maps.

VEGETATION

Present Conditions

(TABLE 1. 1a) Summary of existing National Forest lands, private ownership and total watershed acreage in the *East Fork* analysis area. These are ***approximate*** acres only based on field examinations, Geographical Information Systems (GIS), and Global Positioning Systems (GPS).

Land Designation	C- 264	C- 265	C- 266	C-267	C-268	C-269	Total
National Forest Management Areas							
MA 14 Suitable	563	845	475	849	507	510	**3749**
MA 14 Unsuitable and MA 9 Riparian	32	113	458	274	451	31	**1359**
Total Acres of National Forest (5,103 ac forested / 5 acres non forested-shale pit / progeny test site)	**595**	**958**	**933**	**1123**	**958**	**541**	**5108**
Private acres within boundary	162	50	2319	759	284	231	**3805**
Total Acres within project area (private and NF lands)	**757**	**1008**	**3252**	**1882**	**1242**	**772**	**8913**

- 4,747 acres (93%) Pine forest type (forested area)
- 2,948 acres (58%) Mature growth pine (forested area)
- 359 acres (7%) Hardwood forest type (forested area)
- 127 acres (2%) Mature growth hardwood (forested area); (within 5 years, 103 more acres will move into mature growth age class to 4.5% meeting the forest plan objective)

East Fork contains a distribution of pine and pine/hardwood (4,747 acres or approximately 93%) and hardwood and hardwood/pine (359 acres or approximately 7%) forest types that cover rolling hills, steep, and moderately steep side slopes. There are approximately 5,108 acres of National Forest system land in the project area.

There is a wide distribution of age classes from 14 years of age to 106 years of age in pine and from 38 years old to 100 years old for hardwood species. Currently the 0-10 year age class has 0 acres of the suitable land on National Forest System land within *East Fork*. Total mature pine and pine/hardwood acres (at least 70 years old and older) are 3,106 (approximately 61%) of the forested area. Approximately 2,945 acres (58% of the forested area) of these are *mature growth* pine 80 years old and older. There are 126 acres (2.5%) of *mature growth* hardwood or hardwood/pine (100 years old) present. However by the end of the next 5-year period there will be approximately 103 acres (4.5%) of *mature growth* hardwood/hardwood pine. These conditions would meet Forest Wide Design Criteria WF006 of the Revised Forest Plan.

Tree species common in these stands include various white oaks and red oaks, hickories, blackgum, sweetgum, and shortleaf pine with some encroachment of invader and offsite type species such as cedar and red maple. There is some red oak decline present but not as prevalent in *East Fork* as in other parts of the district. The factors that contribute to oak mortality around the district are present here. These are hardwoods exceeding 70 years, high stem densities, and marginal site indexes (50 to 60). Drought has played a role in the amount of mortality and decline district wide. Dry years in 1998, 2000, 2001, 2002, August, September, October of 2004, October – December of 2005, January thru March of 2006 and the summer of 2011 are still affecting the tree species on the district and forest. *East Fork* has had a history of southern pine beetle and Ips beetle infestations. Because of the advanced age and stocking rates of the mature pine stands these pine stands remain susceptible to insect infestations. The older hardwood stands also become less resistant to insect and disease infestations with age.

Age Class Distribution for All Forested Land By Forest Type Projected For 2015

	(Acres)						
Age Class	**SLP**	**Lob**	**Pine/Hwd**	**Hwd/Pine**	**Hardwood**	**Acres**	**Percent**
0 – 10							
11 – 20	168					168	3.3
21 – 30	785					785	15.4
31 – 40	606	40			26	672	13.2
41 – 50	42					42	0.8
51 – 60							
61 – 70							
71 – 80	161					161	3.2
81 – 90	677			73	31	781	15.3
91 – 100	1,281		86	85	18	1,470	28.8
101 – 110	901			83	43	1,027	20.1
111 – 120							
121+							
Acres	4,621	40	86	241	118	5,106	
Percent	90.5	0.8	1.7	4.7	2.3		100

(Percentages in table are GIS acres.) *when individual stands are rounded off the total is 5,108 acres. Includes 5 acres of non-forest (shale pit and progeny test site) in the project area (see "Detailed Proposed Actions table").

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on vegetation would be the boundary of all of the compartments within the *East Fork* Ecosystem Management Unit boundary. Timelines for measuring the effects on vegetation would be a 10-15 year timeline from 2015 to 2025-2030, or from this entry to the next. Methods of analysis include interpreting the field data collected throughout the project area to establish existing and desired conditions. The proposed actions developed to meet the desired conditions are analyzed to determine what the direct effect of these actions would be and what the cumulative effects would be to the vegetation in the overstory, midstory, and understories.

PROPOSED ACTION

The proposed harvests are consistent with the Revised Forest Plan's direction to emphasize forest vigor and timber growing potential and sustainability in Management Area 14. It would also provide wildlife habitat diversity for various other wildlife species. The older stands in the unsuitable areas would also represent old growth conditions, a major ecological community of the Ouachita Mountains and the Arkansas Valley of Arkansas and Oklahoma.

Timber harvesting proposed in the Proposed Action consists of 1,802 acres of commercial thinning in shortleaf pine stands to a target average BA of 60; 516 commercial thinning on a 20' spacing; 450 acres of modified seedtree, and 40 acres of loblolly clearcut.

BAs of stands proposed for commercial thinning are from Table 3.6 (Revised Forest Plan, pg. 84) that lists thinning guidelines to be used for timber management. The stands to be thinned would be carried beyond the 70 year rotation period making them more susceptible to southern pine beetle infestations. These BAs would reduce the chance that southern pine beetle infestations would spread to adjacent stands. Research has shown that trees spaced at least 20 to 25 feet apart would still get southern pine beetle infestations but the beetles would soon disperse and the spot would not spread. Average diameter of the pine sawtimber to be thinned is 12 to 13 inches. Reducing them down to a target 60 and 70 BA would leave at least approximately 20'between trees. These reduced BAs would eventually reduce the fuel loadings and temporarily create additional early stage habitat needed by various wildlife species.

Where various harvests are proposed there are portions that would not be thinned or harvested because of some type of topographic feature making them unsuitable such as rock outcrops or short steep slopes, or varying widths in riparian zones. The exact acres deducted from these stands would be determined in the field when the timber is marked if the Proposed Action is selected.

A **direct effect** of the Proposed Action seedtree harvests and the clearcuts would create 490 acres of early seral stage habitat (14% of the suitable and 10% of the overall forested area). A direct effect of the commercial thinning would be a reduced number of trees in the overstory taking the low quality trees and trees that are more susceptible to insect infestations first with the remaining being the best shaped and healthiest trees in the stands.

Mature growth pine and pine hardwood 80 years old or older would be reduced by 450 acres to 2,445 acres but increase to 2,656 acres by the next entry. Mature growth hardwood and hardwood/pine would eventually increase to 103 in 5 years. Both would meet and exceed Forest Plan Design Criteria WF006 **"Retain or develop mature growth pine habitats (80 years or greater) and mature growth hardwood habitats (100 years old or greater) at a rate of five percent of each broad cover type within each project analysis area".**

There would be reduced understory and midstory numbers (hardwood stems) throughout *East Fork* where prescribed burning, harvesting activities, timber stand improvement work, and wildlife stand improvement work would be conducted. The prescribed burning would reduce competing woody vegetation and make some nutrients tied up in the duff layers available for root uptake of remaining overstory, midstory, and understory plants. There would also be an increase of grass and forbs numbers and species composition. Scorch would be visible throughout the area burned. Some needle loss from scorch would occur but as long as the buds are not injured the pine can survive even severe needle loss. Hardwood species most resistant to fire in the project area and most likely to survive are white oaks, post oaks, red oaks, and black oaks. Hickories, red maple, and cedar are less resistant. Hardwood resistance increases with tree diameter due to bark thickness and fire intensity. However some hardwood have the ability to resprout, in fact fire increases basal sprouting of hardwood species like the oaks, cherry, red maple, dogwood, blackgum, and basswood. This ability decreases with age and size. Season also can determine the amount of mortality from fire. Growing season burns injure or kill pine and hardwood species, depending on the type of fire and intensity.

The modified seedtree harvests, commercial thinning, loblolly clearcut, wildlife stand improvements, prescribed burning, and scarification if needed, would create growing conditions favorable to shade intolerant and fire tolerant plant species. The mature *growth* pine component would initially decrease from the proposed modified seedtree harvests then increase throughout, as the *mature saw timber* component ages into a *mature growth* condition. The mature growth hardwood component would also increase and respond with more hard and soft mast production providing improved habitat for plant and animal species that require it. The understory throughout the project area would show an increased growth response after removing part of the overstory and midstory with the commercial thinning. The overstory would also respond with more vigor making them more resistant to insect and disease infestations.

As an **indirect effect** of removing part of the overstory and midstory, the understory would be a rapid response due to increased sunlight that would improve growing conditions for shortleaf pine, some hardwoods, and many species of non-woody plants. A combination of the proposed actions and continued prescribed burning program would eventually result in the restoration of an old growth conditions in the unsuitable stands and healthy, sustainable timber stands where timber activities are suitable.

Implementing the Proposed Action in the long-term would result in crown closure occurring first in the stands where the pines would be thinned to 60 BA. Crown closure would not affect the established pine saplings in a shelterwood condition. The growth response of the mature pine and hardwood would not be as vigorous as in younger stands since many of the trees retained are mature sawtimber trees that have slowed in growth. However, even though the growth response would be less when compared to younger pine and hardwood stands the reduction of the

number of trees per acre by harvesting creating more access to sunlight, water, and nutrients would still result in some improved stand vigor and would reduce the chance of disease or insect infestation in the remaining trees. The 359 acres of hardwood and hardwood/pine stands would be managed to maintain and enhance mast-producing hardwoods.

CUMULATIVE EFFECTS

Cumulatively, the overall stand vigor and health of *East Fork* would be improved with the implementation of the Proposed Action. Reduced competition for water, sunlight, and nutrients would create an improved growing environment for the residual pine, and hardwood species including the red oaks and make them more resistant to various disease and insect infestations.

Other cumulative effects of the Proposed Action would be enhanced growth of remaining shade intolerant trees including cone production in shortleaf pine and hard and soft mast production in various shade intolerant hardwood species. The prescribed burning would resemble the natural fire events that helped develop the overstory, midstory, and understory types that probably existed before European settlement. An overall cumulative effect would be an increase in diversity of fire tolerant plant species.

Other than the **direct, indirect, and cumulative** impacts mentioned above from the proposed harvest activities, and from past, present committed, or reasonably foreseeable future activities there should not be any adverse effects expected to the various forms of vegetation in this analysis area from these actions nor as an accumulation of impacts from other harvest conducted in adjacent compartments or on private land within this watershed

Effects of Herbicide Application (only for non-native invasive species)

Herbicides are proposed for non-native species only with in *East Fork*. Foliar spray, by injection, or by application to cut stems makes it possible to leave desirable species in groups or individual stems. **Direct effects**, as with a manual treatment, vegetative diversity will not be compromised. By reducing species in general, only actual numbers of species on an area will be affected. **Cumulatively**, the native pine and hardwood species, grasses and forbs would retain their natural distribution throughout the area. The non-native species would be set back or replaced by native species.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

If this alternative is implemented, the existing early seral stage habitat, an ecologically important part of the overall forest health would eventually disappear as a **direct effect**. There would be no open stands or developed wildlife openings, or burning program to provide some type of early seral stage structure needed by various wildlife species. There would be no improvement in stand health because all the conditions that make the pine and red oaks vulnerable now would continue to exist. The understory and midstory would remain dense with fire intolerant species and invader type of species like cedar and red maple that normally do not occupy sites where fire plays a natural role in stand development. Heavy fuel loadings from natural accumulation of fuel buildup would make the *East Fork* project area susceptible to a hot crown killing wildfire.

An **indirect effect** could lead to the condition similar to western states where there would be old, dense, and insect killed trees, causing unnaturally high fuel loading. If a wild fire should occur it would become more difficult and dangerous to control. Dense stands of timbers that have been susceptible to southern pine beetle infestations and red oak decline would become increasingly vulnerable due to the continued deteriorating conditions that make them vulnerable now. In 1995 and 1996, several Southern pine beetle (SPB) spots were detected and treated in *East Fork*. In the summer of 2011 the Ips population began to increase throughout the forest and the district as a result of the extremely dry summer. With the No Action alternative, SPB and Ips infestations would potentially be more frequent and more difficult to control.

CUMULATIVE EFFECTS

A **cumulative effect** would be that shade intolerant species such as shortleaf pine, northern and southern red oaks, and black cherry would decline in numbers and eventually be replaced by shade tolerant species like maple, hickory, black gum, and cedar that are already in the understory and midstory. This is currently happening where red oak decline is present on some of the ridge tops. Some red oaks on these ridges are dying from a combination of drought, hypoxylon canker, overstocking, low site indexes, and various borers although not as bad here as in other parts of the district at this time. There would be some mature growth pine and hardwood scattered in pockets throughout the area growing under stressed conditions. Lack of water and nutrients caused by overcrowding in the overstory, midstory, and understory would contribute to individual trees inability to withstand any insect or disease infestations that develop. Native grasses and other shade intolerant species would decline and be replaced by invader type species such as cedar and red maple. Growth in existing young pine stands would slow, eventually reducing tree vigor, quality, and stocking in favor of more shade intolerant species. Fuel load accumulations from natural events have increased from 4 to 6 tons per acre to as much as 8-10 tons and more, with many larger branches and tree boles on the ground. This is creating a situation where any wildfire could potentially become a hard to control, crown killing fire. A wildfire occurring in this fuel type can cause erratic fire behavior with spotting potential. Fires of this intensity have the potential to damage forest resources and endanger the life and property of firefighters and the public.

NO HERBICIDE ALTERNATIVE II

The effects would be the same as the Proposed Action. The only difference between the Proposed Action and Alternative II is herbicide use is not proposed in this alternative.

CUMULATIVE EFFECTS

Without the use of herbicides, several manual methods would be required to control the non-native, off-site species. These species would continue to send up sprouts until the reserves stored in the root system could no longer sustain the plant.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except for those associated with fewer harvest acres and connected action acres. Seedtree harvests would create 226 acres of early seral stage habitat (7% of the suitable acres). Commercial thinning would reduce the number of trees in the overstory taking the low quality trees and trees that are more susceptible to insect infestations first with the remaining being the best shaped and healthiest trees in the stands.

Mature growth pine and pine hardwood 80 years old or older would be reduced by 266 acres to 2,629 acres but increase to 2,840 acres by the next entry. Mature growth hardwood and hardwood/pine would eventually increase to 103 in 5 years. Both would meet and exceed Forest Plan Design Criteria WF006 **"Retain or develop mature growth pine habitats (80 years or greater) and mature growth hardwood habitats (100 years old or greater) at a rate of five percent of each broad cover type within each project analysis area".**

WILDLIFE, HABITAT, AND FISHERIES

Present Conditions

East Fork Mountain Ecological Management Unit totals 5,108 acres of National Forest land, most of which is allocated to Management Area 14.

For this EMU some of the existing conditions concerning wildlife, fish and T&E species and their habitats, which were considered when developing the Proposed Action for the project area are as follows:

- East Fork EMU is influenced by private land centrally located in the EMU, and on the South-Western border.
- There are currently 0 acres in the 0-10 year-old age class on National Forest land in the project area making this EMU poor habitat for early seral stage species such as Prairie warblers and Northern bobwhites.
- Many mature forest stands have dense midstories, which limit development of a herbaceous, non-woody understories.
- Prescribed burning has needs to be regularly used to maintain wildlife habitat conditions within this EMU.
- Current open road density is .81 miles per square mile in the project area, This meets the desired one mile/square mile Forest Plan objective.

The EMU contains 9 existing ponds, which are not uniformly distributed throughout the EMU. The Forest Plan guidelines suggest at least 32 water sources in the project area. Existing ponds need to be reconstructed to assure sufficient, reliable water sources. 23 additional ponds need to be constructed to optimize the forest plan objective of one water source per 160 acres.

There are not adequate numbers of nest structures in the project area. Nest boxes originally provisioned in the project area have deteriorated or disappeared, so need to be replaced. Forest midstories are too dense to allow development of an abundant grass/forb component. Due to overcrowding of hardwood stems, hardwood crowns cannot develop or expand to produce reliable hard mast crops.

Revised Forest Plan (RFP) Design Criteria WF001: *On a project-by-project basis, provide grass-forb or shrub-seedling habitats (include regeneration areas 0-10 years in age, areas of recent heavy storm or insect damage, and woodland conditions) at a rate of:*

A minimum of 6 percent of the suitable acres in MA 14, (Ouachita Mountains Habitat Diversity Emphasis)
To meet these criteria in *East Fork* EMU an additional 224 acres of early seral stage habit needs to be created. This is calculated using the following equation:

- For MA14: 3,749 suitable acres x 0.06 = 224 acres.

RFP Design Criteria WF002: *Limit even-age regeneration cutting in each project area to no more than 14 percent of the suitable acres managed under even-aged prescriptions, per 10-year entry except for the following:*

In *East Fork* EMU no more than 524 acres of 0-10 age-class needs to be created by the proposed action. This is calculated using the following equation:

- For MA14: 3,749 suitable acres x 0.14 = 524 acres to create.

RFP Design Criteria WF003: *Provide for and designate areas for mast production at the approximate rate of 20 percent of each project area. Hardwood and hardwood-pine forest types, age 50 and older, comprise this component.*

The hardwood component, which is over 50 years old, is currently about 6.5% (334 acres) total of forested land. This project area does not currently meet this Revised Forest Plan Design Criteria.

RFP Design Criteria WF006: *Retain or develop mature growth pine habitats (80 years old or greater) and mature growth hardwood habitats (100 years old or greater) at a rate of five percent of each broad cover type within each project analysis area.*

For *East Fork* EMU this would be at least 237 acres (5% of 4747 acres) of mature growth pine and 18 acres (5% of 360 acres) of mature growth hardwood. There are currently 127 acres (35%) of mature growth hardwood stands 100 years old or older within the project area. There are also 2,945 acres (62%) of pine considered mature growth pine 80 years old or older.

RFP Design Criteria WF09: *Provide nest structures where suitable natural cavities do not occur and are needed to accomplish wildlife objectives.*

Many snags and cavity trees were created in this area by past ice storms. This was a positive condition for many cavity dependent species. However, cavity trees are still considered a limiting factor in some portions of the EMU.

RFP Design Criteria WF010: *Where there is no existing water source, provide at least one wildlife pond per 160 acres where needed to accomplish wildlife objectives*.

- Total wildlife ponds needed (5108/160=32)

Currently, *East Fork* EMU contains several woodland ponds. The existing waterholes (9) need to be reconstructed. Reconstruction is necessary to make these existing ponds reliable as year-round water sources. 23 additional water sources are needed to meet RFP design criteria WF010.

RFP Design Criteria WF012: *Where possible, seasonally close roads during critical periods for wildlife (March–August).*

The current open road density for *East Fork* EMU is .81 miles per square mile.

Effects of Management Activities on Wildlife

PROPOSED ACTION and Alternative II

The RFP Design Criteria was used to develop the Proposed Action and Alternative II for *East Fork* EMU. These criteria are in place to protect and expand populations of endangered species and maintain viable populations of all native wildlife species on the forest. Actions proposed in this environmental assessment would begin with a timber sale (and associated road work) that could not be sold until late 2015 or later. This sale(s) would probably take 3-5 years to log all stands treated with timber harvests. Other activities would occur after the timber sale is completed.

Road work would include pre-haul maintenance of 22.01 miles, reconstruction of 4.53 miles of existing roads, no new construction, creating temporary roads (10 miles), and log decks within stands to be thinned or regenerated. Reconstruction/maintenance includes brushing back right-of-ways, replacing rusted-out culverts, and adding surface gravel where necessary along the timber sale haul routes. Road reconstruction would decrease the

possibility of increased erosion and sedimentation in the local streams. Road obliteration of .20 miles will also be completed after the timber sale is completed. No new road construction is proposed in this project area.

RFP Design Criteria WF012: The Proposed Action and Alternative II would lower the open road density to .79 miles per square mile. Temporary roads and log decks are seeded after they are no longer utilized. These temporary roads and log decks, as well as firelines, would then become temporary wildlife openings. The objective of an opening is to provide a supplemental food source to sustain wildlife populations in areas of poor habitat, or to supplement food shortages on a seasonal or temporary basis. These openings also provide nesting and brood habitat for game and non-game birds.

Wildlife stand improvement (midstory reduction) of 1802 acres of pine stands would further open these stands to allow sunlight to the forest floor and encourage grass/forb development in the understory. Remaining hardwoods would have more space and less competition, so would be able to develop healthier crowns- thus increasing mast production. The WSI would also encourage re-sprouting of many oaks and other hardwoods. These re-sprouts could be used as browse by various wildlife species such as white-tailed deer.

Wildlife waterhole reconstruction (9) and new construction (23) would provide year around, permanent water sources, which could be utilized by many wildlife species. Depending upon site specific suitability, these woodland ponds may or may not be stocked with native species of fish. Those not suitable for fish stocking would provide secure and suitable habitats for increased amphibian reproduction. RFP Design Criteria WF010 *(water developments)* will be met by the Proposed Action or Alternative II.

Nest box placement would provide supplemental cavities for species such as wood ducks and many bat species at waterhole locations, and bluebirds in regeneration areas. Many snags and cavity trees were created in this area by past ice storms. This was a positive condition for many cavity dependent species. However, some areas still need additional nesting habitat. Placing nest structures at ponds and in regeneration areas will help meet this need.

Timber harvest, particularly even-age regeneration cutting, is often referred to by the public as deforestation. This is not the case in the project area. In *East Fork* EMU the forested area stays forested, but becomes a different age with differing vertical and horizontal structure. The harvest cuts mimic natural occurrences such as wind storms or stand replacement wildfires. True deforestation occurs when forested land is permanently cleared and then used for other non-forest uses such as housing developments.

Regeneration cutting (modified seedtree) of 450 acres of shortleaf pine, and clearcutting of 40 acres of off-site loblolly pine would produce enough early seral stage habitats to meet habitat capability requirements for viable populations of species dependent upon that habitat type, while not exceeding standards which protect sustainability of other wildlife and plant species in the forest. Both RFP Design Criteria WF001 and WF002 are met by the Proposed Action and Alternative II.

Reforestation treatments (even-age/seedtree and clearcut harvested stands) would occur on 490 acres of new regeneration units. These treatments would be accomplished utilizing hand tools and mechanical scarification. The intent of mechanical scarification is to disturb the duff layer while exposing the minimum amount of soil needed and achieving an 8 ft. seedling spacing on contour throughout the seed tree stands. These treatments would create early seral stage habitat such as grasses, forbs, and woody re-sprouts for wildlife use.

In the Proposed Action ONLY, herbicide application would be used if needed for non-native invasive species. The herbicide of choice would employ glyphosate as an active ingredient and triclopyr. The herbicides would have no detrimental effect on wildlife (Syracuse Environmental Research Associates (SERA) for Glyphosate and Triclopyr, 2011).

Commercial thinning would occur on 1802 acres of pine forest to achieve basal areas of 60 square feet of pine per acre, and commercial thinning on 20-foot spacing would occur on 516 acres. This would develop the crowns of existing hardwoods and remaining pines in these pine stands. Thinning would increase sunlight to the forest floor, increase the understory species, and further develop hard and soft mast capabilities for this project area.

RFP Design Criteria WF003 (*Provide for and designate areas for mast production at the approximate rate of 20 percent of each project area). East Fork* EMU does not currently meet this RFP Design Criteria. Only about 6.5% (334 acres) of the EMU can be considered suitable for mast production. There are 26 acres of hardwood stands within *East Fork* EMU that will meet the mast producing age in 11 years bringing the total to (360 acres 7%). This EMU will fall short of meeting the 20 % mark and will not meet it in the foreseeable future. When looking at mast production on a forest-wide scale, the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types. The Proposed Action or Alternative II does not negatively alter this design criterion for this EMU.

RFP Design Criteria WF006 (*Retain or develop mature growth…) East Fork* currently far exceeds this criteria for pine with over 62% of the pine stands currently in a mature growth condition. The project area also meets this criterion for hardwood with 35% of the hardwood stands in a mature growth condition. The Proposed Action or Alternative II does not negatively alter this design criterion for this EMU.

Prescribed burning totaling 5,103 acres would first occur after timber harvest is completed in *East Fork*. Multiple objectives, such as wildlife habitat improvement, control of understory plant species, and fuel reduction, would be met by prescribed burning. These burns (every 3-5 years) could top-kill some hardwoods if they are less than 2" at the root collar, but re-sprouting of these hardwood stems would occur. While some ground cover would be temporarily reduced with a prescribed burn, there would be an overall increase in grasses and forbs, and this type of herbaceous cover would quickly replace what vegetative cover may have been initially lost. In the long term prescribed burning will increase the amount and palatability of browse utilized by various wildlife species such as white-tailed deer.

Timber stand improvements (185 ac.) *[some of these are repeated acres]* in the Proposed Action and Alternative II would open these stands for more use by early seral stage wildlife species. The dense vegetative conditions now present that do not allow for ground story vegetation development in these stands would be reduced. The re-sprouting of hardwoods after the hand tool treatments would also produce new browse utilized by various wildlife species such as white-tailed deer.

NO ROAD CONSTRUCTION ALTERNATIVE III

Road work would include pre-haul maintenance of 22.01 miles, reconstruction of 4.53 miles of existing roads, no system road construction, no temporary road construction, and log decks within stands to be thinned or regenerated. Reconstruction/maintenance includes brushing back right-of-ways, replacing rusted-out culverts, and adding surface gravel where necessary along the timber sale haul routes. Road reconstruction would decrease the possibility of increased erosion and sedimentation in the local streams. Road obliteration of 0.20 miles would also be completed after the timber sale is completed. No new road construction (system or temporary) is proposed in this project area.

RFP Design Criteria WF012: This alternative would lower the open road density to 0.79 miles per square mile. Log decks would be seeded after they are no longer utilized. These log decks, as well as firelines, would then become temporary wildlife openings. The objective of an opening is to provide a supplemental food source to sustain wildlife populations in areas of poor habitat, or to supplement food shortages on a seasonal or temporary basis. These openings also provide nesting and brood habitat for game and non-game birds.

Wildlife stand improvement (midstory reduction) of 1,103 acres of pine stands would further open these stands to allow sunlight to the forest floor and encourage grass/forb development in the understory. Remaining hardwoods

would have more space and less competition, so would be able to develop healthier crowns- thus increasing mast production. The WSI would also encourage re-sprouting of many oaks and other hardwoods. These re-sprouts could be used as browse by various wildlife species such as white-tailed deer.

Wildlife waterhole reconstruction (9) and new construction (16) would provide year around, permanent water sources, which could be utilized by many wildlife species. Depending upon site specific suitability, these woodland ponds may or may not be stocked with native species of fish. Those not suitable for fish stocking would provide secure and suitable habitats for increased amphibian reproduction. RFP Design Criteria WF010 *(water developments)* the no Road Construction Alternative III would move East Fork in the right direction from 9 existing waterholes to 25, but not meet the criteria of 1 waterhole per 160 acres (32).

Nest box placement would provide supplemental cavities for species such as wood ducks and many bat species at waterhole locations, and bluebirds in regeneration areas. Many snags and cavity trees were created in this area by past ice storms. This was a positive condition for many cavity dependent species. However, some areas still need additional nesting habitat. Placing nest structures at ponds and in regeneration areas will help meet this need.

Timber harvest, particularly even-age regeneration cutting, is often referred to by the public as deforestation. This is not the case in the project area. In *East Fork* EMU the forested area stays forested, but becomes a different age with differing vertical and horizontal structure. The harvest cuts mimic natural occurrences such as wind storms or stand replacement wildfires. True deforestation occurs when forested land is permanently cleared and then used for other non-forest uses such as housing developments.

Regeneration cutting (modified seedtree) of 266 acres of shortleaf pine would produce enough early seral stage habitat to meet habitat capability requirements for viable populations of species dependent upon that habitat type, while not exceeding standards which protect sustainability of other wildlife and plant species in the forest. Both RFP Design Criteria WF001 and WF002 are met by this alternative.

Reforestation treatments (even-age/seedtree harvested stands) would occur on 266 acres of new regeneration units. These treatments would be accomplished utilizing hand tools and mechanical scarification. The intent of mechanical scarification is to disturb the duff layer while exposing the minimum amount of soil needed and achieving an 8 ft. seedling spacing on contour throughout the seed tree stands. These treatments would create early seral stage habitat such as grasses, forbs, and woody re-sprouts for wildlife use.

Herbicide application would be used if needed for non-native invasive species. The herbicide of choice would employ glyphosate as an active ingredient and triclopyr. The herbicides would have no detrimental effect on wildlife (Syracuse Environmental Research Associates (SERA) for Glyphosate and Triclopyr, 2011).

Commercial thinning would occur on 1,103 acres of pine forest to achieve basal areas of 60 square feet of pine per acre, and commercial thinning on 20-foot spacing would occur on 415 acres. This would develop the crowns of existing hardwoods and remaining pines in these pine stands. Thinning would increase sunlight to the forest floor, increase the understory species, and further develop hard and soft mast capabilities for this project area.

RFP Design Criteria WF003 (*Provide for and designate areas for mast production at the approximate rate of 20 percent of each project area). East Fork* EMU does not currently meet this RFP Design Criteria. Only about 6.5% (334 acres) of the EMU can be considered suitable for mast production. There are 26 acres of hardwood stands within *East Fork* EMU that will meet the mast producing age in 11 years bringing the total to (360 acres 7%). This EMU will fall short of meeting the 20 % mark and will not meet it in the foreseeable future. When looking at mast production on a forest-wide scale, the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types. This alternative does not negatively alter this design criterion for this EMU.

RFP Design Criteria WF006 (*Retain or develop mature growth…) East Fork* currently far exceeds this criteria for pine with over 62% of the pine stands currently in a mature growth condition. The project area also meets this criterion for hardwood with 35% of the hardwood stands in a mature growth condition. This alternative does not negatively alter this design criterion for this EMU.

Prescribed burning totaling 5,103 acres would first occur after timber harvest is completed in *East Fork*. Multiple objectives, such as wildlife habitat improvement, control of understory plant species, and fuel reduction, would be met by prescribed burning. These burns (every 3-5 years) could top-kill some hardwoods if they are less than 2" at the root collar, but re-sprouting of these hardwood stems would occur. While some ground cover would be temporarily reduced with a prescribed burn, there would be an overall increase in grasses and forbs, and this type of herbaceous cover would quickly replace what vegetative cover may have been initially lost. In the long term prescribed burning will increase the amount and palatability of browse utilized by various wildlife species such as white-tailed deer.

Timber stand improvements (185 ac.) *[some of these are repeated acres]* would open these stands for more use by early seral stage wildlife species. The dense vegetative conditions now present that do not allow for ground story vegetation development in these stands would be reduced. The re-sprouting of hardwoods after the hand tool treatments would also produce new browse utilized by various wildlife species such as white-tailed deer.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

The effects of selecting the No Action alternative for *East Fork* are many. Directly, the forest stands would continue to age and mature. Leaf litter would continue to build on the forest floor in mature and maturing stands of pine and hardwoods. Understory plant species would begin to decline in terms of species diversity and abundance. Early seral stage habitats and browse would continue to decline. Open-road density would remain at its current level. Some waterholes would become ephemeral. Dense plantations would continue to be dense and relatively inaccessible to many wildlife species. Indirectly, species of wildlife requiring open habitats such as Northern bobwhite, Bachman's sparrow, and Eastern bluebird, and species requiring a mosaic of forest age classes such as deer, wild turkey, and black bear would tend to avoid or vacate portions of the project area. There would be no cumulative effects.

EFFECTS ON MANAGEMENT INDICATOR SPECIES (MIS)

The Forest Service Manual (FSM) defines MIS as, "any species, or group of species, or species habitat element selected to focus management attention for the purpose of resource production, population recovery, maintenance of population viability, or ecosystem diversity."

Land managers are directed to select management indicators for a Forest Plan or project that best represent the issues, concerns, and opportunities to support recovery of Federally-listed species, provide continued viability of sensitive species, and enhance management of wildlife and fish for commercial, recreational, scientific, subsistence, or aesthetic values or uses. "Management indicators representing overall objectives for wildlife, fish, and plants may include species, groups of species with similar habitat relationships, or habitats that are of high concern".

The current list of MIS (with associated purpose or habitat categories) is shown in the table below.

Management Indicator Species (MIS) and Associated Purposes

Life form	Scientific name	Common name	Selected for this project? (YES/NO)
DEMAND SPECIES			
Bird	*Colinus virginianus*	Northern Bobwhite	**YES**
Bird	*Meleagris gallopavo*	Eastern wild turkey	**YES**
Fish	*Micropterus dolomieui*	Smallmouth bass	**YES**
Mammal	*Odocoileus virginianus*	White-tailed deer	**YES**
VIABILITY CONCERN SPECIES – ADDRESSED IN T&E SECTION OF THIS EA			
Bird	*Picoides borealis*	Red-cockaded woodpecker	**NO**
ADEQUATE EARLY FOREST STAGE COVER			
Bird	*Colinus virginianus*	Northern Bobwhite	**YES**
Bird	*Dendroica discolor*	Prairie warbler	**YES**
ADEQUATE MATURE PINE FOREST COVER			
Bird	*Dryocopus pileatus*	Pileated woodpecker	**YES**
Bird	*Picoides borealis*	Red-cockaded woodpecker (MA 22)	**NO**
Bird	*Piranga olivacea*	Scarlet tanager	**YES**
ADEQUATE MATURE HARDWOOD FOREST COVER			
Bird	*Dryocopus pileatus*	Pileated woodpecker	**YES**
Bird	*Piranga olivacea*	Scarlet tanager	**YES**
RECREATIONAL FISHING QUALITY (LAKES AND PONDS)			
Fish	*Lepomis macrochirus*	Bluegill	**NO**
Fish	*Lepomis microlophus*	Redear sunfish	**NO**
Fish	*Micropterus salmoides*	Largemouth bass	**NO**
HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY HABITAT CATEGORY			
Fish	*Ameiurus natalis*	Yellow bullhead	**YES**
Fish	*Campostoma anomalum*	Central stoneroller	**YES**
Fish	*Etheostoma whipplei*	Redfin darter	**YES**
Fish	*Lepomis cyanellus*	Green sunfish	**YES**
Fish	*Lepomis megalotis*	Longear sunfish	**YES**
HABITAT QUALITY OF STREAMS: GULF COASTAL PLAIN -- HABITAT CATEGORY NOT IN EASTFORK			
Fish	*Aphredoderus sayanus*	Pirate perch	**NO**
Fish	*Campostoma anomalum*	Central stoneroller	**NO**
Fish	*Erimyzon oblongus*	Creek chubsucker	**NO**
Fish	*Lepomis cyanellus*	Green sunfish	**NO**

Life form	Scientific name	Common name	Selected for this project? (YES/NO)
Fish	*Lepomis megalotis*	Longear sunfish	**NO**
HABITAT QUALITY OF STREAMS: OUACHITA MOUNTAINS -- HABITAT CATEGORY NOT IN EASTFORK			
Fish	*Campostoma anomalum*	Central stoneroller	**NO**
Fish	*Etheostoma nigrum*	Johnny darter (w/in leopard darter range only)	**NO**
Fish	*Etheostoma radiosum*	Orangebelly darter	**NO**
Fish	*Etheostoma whipplei*	Redfin darter	**NO**
Fish	*Fundulus catenatus*	Northern studfish	**NO**
Fish	*Hypentilium nigricans*	Northern hog sucker	**NO**
Fish	*Lepomis cyanellus*	Green sunfish	**NO**
Fish	*Lepomis megalotis*	Longear sunfish	**NO**
Fish	*Luxilus chrysocephalus*	Striped shiner	**NO**
Fish	*Micropterus dolomieui*	Smallmouth bass	**NO**
Fish	*Percina copelandi*	Channel darter (w/in leopard darter range only)	**NO**

Note that several MIS appear under more than one habitat or purpose category.

MIS selected for this project - The Ouachita National Forest MIS list was reviewed and a subset of categories and associated MIS was selected for this project. The right column in the table above indicates which MIS were selected for this project. The following MIS categories and their associated MIS were eliminated from further consideration because they do not occur on National Forest land in this project area: Habitat Quality of Streams (Gulf Coastal Plain, Ouachita Mountains) and Recreational Fishing Quality (Lakes and Ponds). The remaining categories are represented in the project area and summarized in the table below.

Management Indicator Species (MIS)

	COMMON NAME	PURPOSE OF SELECTION
1.	Bobwhite quail	Demand Species and Adequate Early Forest Stage Cover
2.	Eastern wild turkey	Demand Species
3.	White-tailed deer	Demand Species
4.	Prairie warbler	Adequate Early Forest Stage Cover
5.	Pileated woodpecker	Adequate Mature Pine Forest Cover /Adequate Mature Hardwood Forest Cover
6.	Scarlet tanager	Adequate Mature Pine Forest Cover /Adequate Mature Hardwood Forest Cover
7.	**Habitat Quality of Streams: Arkansas River Valley**	
7a.	Yellow bullhead	*HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY*
7b.	Central stoneroller	*HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY*
7c.	Redfin darter	*HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY*
7d.	Green sunfish	*HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY*
7e.	Longear sunfish	*HABITAT QUALITY OF STREAMS: ARKANSAS RIVER VALLEY*
8.	Small mouth Bass	*DEMAND SPECIES*

Effects on project MIS - Six terrestrial animal MIS (1-6 above) were modeled to compare habitat capabilities within the project area for the No Action alternative and the Proposed Action/Alternative II (table above).

It should be noted that this model assumes that all treatments occur within the same year, when in fact treatments may occur over the course of the 10 year planning period. Therefore, actual habitat capability will differ somewhat from the projections presented here.

Response of Selected MIS to Alternative by Decade of Implementation (Habitat Capability Model – numbers are rounded to closest whole number)

	MANAGEMENT INDICATOR SPECIES (MIS)					
	Quail (1)	Turkey (2)	Deer (3)	Prairie Warbler (4)	Pileated Woodpecker (5)	Scarlet Tanager (6)
	INDIVIDUALS PER SQUARE MILE					
NO ACTION						
Baseline	12.56	4.67	11.88	4.42	28.85	28.17
After 10 Years	12.35	4.79	12.06	0	30.85	19.31
PROPOSED ACTION & ALTERNATIVE II						
After Initial treatments	151.12	9.53	43.33	160.81	13.54	25.97
After 10 Years	41.70	4.46	19.40	25.87	28.06	18.56
NO ROAD CONSTRUCTION ALTERNATIVE III						
After Initial treatments	112.10	9.15	31.62	135.73	14.49	25.15
After 10 Years	28.35	4.6	16.06	14.10	29.25	28.87

Model coefficients are not available for the other MIS (7 -8), which were selected for this project, but direct, indirect, and cumulative effects on their populations are discussed below.

PROPOSED ACTION & ALTERNATIVE II

The Proposed Action would produce 490 acres of early seral stage habitat through tree harvesting and site preparation activities. Under the Proposed Action and Alternative II, habitat availability for each terrestrial vertebrate MIS would be sufficient to achieve all of the minimum population objectives, and in several cases meet or exceed the optimum levels.

Quail: Habitat availability and population trend for quail, a Demand Species that also represents Adequate Early Forest Stage Cover, would increase almost 15-fold after initial treatments of timber harvest, TSI, WSI, and prescribed burning. Directly, some nests could be disturbed by logging equipment, if treatments are performed during nesting season. Indirectly, the Proposed Action and Alternative II would produce more preferred habitat for quail by producing enhanced nesting cover, an abundance of food, and reliable water sources. These activities should result in a positive population trend.

Deer and Turkeys: Two MIS species representing Demand Species, deer and turkeys, would generally both fare better under the Proposed Action or Alternative II than under the No Action alternative. There would be no direct effect on deer, but some turkey nests could be disturbed if cultural treatments occur during nesting season. Indirectly, the habitat that both of these species prefer would be improved by an action alternative. Indirectly, both species would benefit from the overall effects of the Proposed Action or Alternative II by the enhancement of food, cover, and water availability.

Prairie Warbler: Prairie Warbler is an MIS for Adequate Early Forest Stage Cover. Its requirements can be met by forest stands under the age of 20 and by prescribed burning in open pine stands. Treatments in the Proposed Action and Alternative II lead to impressive population levels following treatments. There would be no appreciable

direct effect on the prairie warbler population, though some nest disturbance could occur. Indirectly, with implementation of an action alternative, which enhances nesting cover and increases the availability and abundance of food and water, more preferred prairie warbler habitat would be produced. This would result in a positive population trend.

Pileated Woodpecker and Scarlet Tanager: For these MIS representing mature forest types, habitat capabilities are projected to be lowered slightly by the proposed treatments. The amount of Adequate Mature Forest Cover exceeds the optimum needs for Pileated Woodpecker and Scarlet Tanager for both pine and hardwood. There would be no appreciable direct effect on the populations of these species, though some nest disturbance could occur. Indirectly, Ideal habitat will be reduced due to mature forest being regenerated. No cumulative effects are anticipated for these species with the implementation of the Proposed Action or Alternative II.

This Proposed Action or Alternative II would perpetuate habitat capabilities for each of the selected terrestrial vertebrate MIS. The Proposed Action and Alternative II meets most of the wildlife associated Revised Forest Plan (2005) Design Criteria mentioned above in this wildlife section- with the exception of WF003. The Proposed Action or Alternative II does not negatively alter RFP Design criteria WF003. When looking at mast production on a forest-wide scale, the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types.

Habitat Quality of Streams: Arkansas River Valley MIS (MIS species 7a.–7e.) and Smallmouth Bass: The Proposed Action, Alternative II and the No Action alternative would have no appreciable direct, indirect, or cumulative effects on stream habitats and the associated aquatic MIS. All streams would be protected from the direct effects of logging, wildlife habitat improvement activities, and prescribed burning. Cumulatively, the proposed action would have no effect on stream habitats in *East Fork* or on stream-associated MIS. This project would have no effect on forest-wide trends of these MIS.

NO ROAD CONSTRUCTION ALTERNATIVE III

The No Road Construction Alternative would produce 266 acres of early seral stage habitat through tree harvesting and site preparation activities. Under this alternative, habitat availability for each terrestrial vertebrate MIS would be sufficient to achieve all of the minimum population objectives, and in several cases meet or exceed the optimum levels.

Quail: Habitat availability and population trend for quail, a Demand Species that also represents Adequate Early Forest Stage Cover, would increase almost 6-fold after initial treatments of timber harvest, TSI, WSI, and prescribed burning. Directly, some nests could be disturbed by logging equipment, if treatments are performed during nesting season. Indirectly, the No Road Construction Alternative III would produce more preferred habitat for quail by producing enhanced nesting cover, an abundance of food, and reliable water sources. These activities should result in a positive population trend.

Deer and Turkeys: Two MIS species representing Demand Species, deer and turkeys, would generally both fare better under the No Road Construction Alternative III than under the No Action alternative. There would be no direct effect on deer, but some turkey nests could be disturbed if cultural treatments occur during nesting season. Indirectly, the habitat that both of these species prefer would be improved by an action alternative. Indirectly, both species would benefit from the overall effects of the No Road Construction Alternative III by the enhancement of food, cover, and water availability.

Prairie Warbler: Prairie Warbler is an MIS for Adequate Early Forest Stage Cover. Its requirements can be met by forest stands under the age of 20 and by prescribed burning in open pine stands. Treatments in the Proposed Action and Alternative II lead to impressive population levels following treatments. There would be no appreciable direct effect on the prairie warbler population, though some nest disturbance could occur. Indirectly, with implementation of an action alternative, which enhances nesting cover and increases the availability and abundance

of food and water, more preferred prairie warbler habitat would be produced. This would result in a positive population trend.

Pileated Woodpecker and Scarlet Tanager: For these MIS representing mature forest types, habitat capabilities are projected to be lowered slightly by the proposed treatments. The amount of Adequate Mature Forest Cover exceeds the optimum needs for Pileated Woodpecker and Scarlet Tanager for both pine and hardwood. There would be no appreciable direct effect on the populations of these species, though some nest disturbance could occur. Indirectly, Ideal habitat will be reduced due to mature forest being regenerated. No cumulative effects are anticipated for these species with the implementation of the No Road Construction Alternative III.

The No Road Construction Alternative III would perpetuate habitat capabilities for each of the selected terrestrial vertebrate MIS. The No Road Construction Alternative III meets most of the wildlife associated Revised Forest Plan (2005) Design Criteria mentioned above in this wildlife section- with the exception of WF010, and WF003. This Alternative moves *East Fork* closer to WF010, but does not meet the (at least one waterhole per 160 acre) goal. The No Road Construction Alternative III does not negatively alter RFP Design criteria WF003. When looking at mast production on a forest-wide scale, the shortfall of this EMU will be offset by other EMUs that are primarily hardwood forest types

Habitat Quality of Streams: Arkansas River Valley MIS (MIS species 7a.–7e.) and Smallmouth Bass: This alternative would have no appreciable direct, indirect, or cumulative effects on stream habitats and the associated aquatic MIS. All streams would be protected from the direct effects of logging, wildlife habitat improvement activities, and prescribed burning. Cumulatively, this alternative would have no effect on stream habitats in *East Fork* or on stream-associated MIS. This alternative would have no effect on forest-wide trends of these MIS.

NO ACTION ALTERNATIVE

Quail and Prairie Warbler: The No Action Alternative would have no direct effect on these species and produce no new early seral stage habitat (MIS category: Adequate Early Forest Stage Cover). This alternative would result in not meeting the minimum amount of early seral stage conditions in the project area. Habitat availability for prairie warblers would become insufficient to meet the projected minimum available habitat in this area through time. Cumulatively, this alternative would perpetuate conditions that keep quail and Prairie Warbler numbers low in the forest.

Pileated Woodpecker, Turkey, Scarlet Tanager and White-tailed Deer: There would be no direct effect on these species. Habitat availability for the other terrestrial vertebrate MIS would change little over the first 10 years (indirect and cumulative effect). The No Action Alternative meets forest plan objectives for adequate mature forest cover for pine and hardwood forest types (same as the Proposed Action and Alternative II). Forest plan objectives will also be met for two of the three MIS representing Demand Species (deer and turkeys, but not quail). Forest plan objectives for Northern bobwhite will not be met by the no action alternative, due to no early seral habitat existing or being created in this EMU.

Stream Habitats and Associated MIS: The No Action Alternative would have no appreciable direct or indirect effects on stream habitats or the associated MIS (Habitat Quality of Streams: Arkansas River Valley) due to the lack of active management. These are considered species (7a.-7e and 8.), as listed in the **Management Indicator Species (MIS).**

.

EFFECTS ON MIS IN THE CONTEXT OF FOREST-WIDE TRENDS (USDA FOREST SERVICE, SEPTEMBER 2011)

The Northern bobwhite has experienced population declines across Arkansas due to decreases in early seral stage habitats. Northern bobwhite Breeding Bird Census data indicates a decreasing quail population since 1997, while estimated habitat capability for the species reflects a modest increase since FY 2006. However, habitat capability is still far from reaching the projected FY 2015 desired forest-wide capability of 101,748 based on the 2005 Forest Plan. Habitat capability for the Forest should improve with the implementation of the Revised Forest Plan, which prescribes an increase in the number of acres of early seral stage habitat. Habitat capability for Northern bobwhites, as estimated by ComPATS, has increased slightly since 2005. Although the creation of early successional habitat is showing a slight upward trend, this habitat enhancement has not yet reached the Plan objective of 5,500 acres per year. This modest but increasing population trend for the Forest could be due to habitat improvements, which have resulted from aggressive prescribed burning and thinning programs elsewhere on the ranger district. The Proposed Action, Alternative II and Alternative III would result in improved habitat conditions and increased habitat availability for this species. The No Action alternative would not result in any additional habitat improvements.

The Eastern wild turkey population has fluctuated over the years. Over the past several years (1990 – 2007), the number of turkey poults per hen has varied from a low of 1.4 poults per hen in 2011 to a high of 1.9 poults per hen in 2006. Since 2006, decreasing trends in habitat capability, harvest levels, poults per hen, and the number of turkeys detected on the Landbird Monitoring Survey have occurred. This does not negate the long term positive trend, but does suggest potential problems that need to be monitored. The habitat capability remains above the level set in the RLRMP and this sustained high level would indicate that turkey population problems could be due to factors other than habitat related. The treatments of the Proposed Action, Alternative II and Alternative III would result in improved habitat conditions and increases in habitat availability for this species; the No Action Alternative would not result in any additional habitat benefits.

The habitat capability for White-tailed deer shows a decreasing trend since 2006. However, deer harvest records indicate an upward trend with an increase of 12% from 2010-2011. The forest wide white-tailed deer habitat capability objective is 38,105 deer. Current habitat capability for white-tailed deer still exceeds Forest Plan objectives for deer per square mile. The Proposed Action, Alternative II and Alternative III would contribute positively to deer by improving habitat conditions and increasing habitat availability. The No Action alternative would not.

Landbird Monitoring Survey data for Prairie warbler indicates a slightly increasing population trend for the time period of 2006-2011. However, habitat capability for the Prairie warbler on the Ouachita National Forest continues to show a downward trend, which is consistent with range wide trends. This decline is considered directly related to the decline in the acres of early seral habitat. The Proposed Action, Alternative II and Alternative III would result in improved habitat conditions and an increase in habitat availability for this species; the No Action Alternative would not result in any additional habitat benefits.

The Pileated woodpecker has a stable to slightly decreasing population trend on the Ouachita National Forest based on landbird data. Habitat capability data suggest that this species' primary habitat, mature hardwood forest, is increasing. CompPATS estimates of habitat capability using all forest types, indicates a decreasing trend. These data are for pine, pine-hardwood, hardwood, and hardwood-pine stands with the greatest value being for stands greater than or equal to 41 years old. As these stands age, the habitat capability to support the pileated woodpecker should continue to improve. The Proposed Action, Alternative II and Alternative III would probably result in a temporary reduction of habitat for this species due to continued disturbance. However, over 1/2 of *East Fork* is suitable habitat for pileated woodpecker. The No Action Alternative would probably result in no reduction in habitat for this species.

Forest Landbird point data for Scarlet tanager supports an overall stable to increasing trend for the Scarlet tanager. Hardwood and hardwood/pine forest types greater than 41 years old will continue to mature improving habitat for the Scarlet tanager. In 2011 the Ouachita National Forest had 568,851acres of late seral habitat. The continued long-term viability of this species is not in question. The Proposed Action, Alternative II and Alternative III would result in a temporary reduction of habitat for this species due to disturbance. The No Action Alternative would result in no reduction in habitat for this species.

The Proposed Action, Alternative II, Alternative III and the No Action alternative would have no appreciable direct, indirect, or cumulative effects on stream habitats and the associated aquatic MIS. All streams would be protected from the direct effects of logging, soil disturbing wildlife habitat improvement activities, and soil disturbing prescribed fire activities. Cumulatively, the proposed action would have no effect on stream habitats in *East Fork* or on stream-associated MIS. This project would have no effect on Forest-wide trends of these MIS.

PROPOSED, ENDANGERED, AND THREATENED AND SENSITIVE (PETS) SPECIES

Introduction

East Fork has the potential to be habitat for 15 species listed on the Ouachita PETS List. The Ouachita PETS List is attached to the Biological Evaluation for this Project. The BE is incorporated by reference (Garrett and Stephens. July 2015).

PETS Species Evaluated

Number of Species for this BE	Scientific Name	Common Name
T&E SPECIES requiring FWS Concurrence (1-2)		
1	*Nicrophorus americanus*	American Burying Beetle
2	*Myotis Septentrionalis*	Northern Long-eared Bat
SENSITIVE SPECIES		
TERRESTRIAL ANIMAL SPECIES (3-6)		
3	*Myotis leibii*	Eastern Small-footed myotis
4	*Haliaeetus leucocephalus*	Bald Eagle
5	*Aimophila aestivalis*	Bachman's Sparrow
6	*Speyeria diana*	Diana fritillary
AQUATIC ANIMAL SPECIES (7-10)		
7	*Notropis ortenburgeri*	Kiamichi shiner
8	*Lampsilis hydiana*	Louisiana fatmucket
9	*Toxolasma lividus*	Purple Lilliput Mussel
10	*Obovaria Arkansensis*	Southern hickorynut
RIPARIAN PLANT SPECIES (11-13)		
11	*Amorpha ouachitensis*	Ouachita false indigo
12	*Vernonia lettermannii*	Narrowleaf ironweed
13	*Vitis rupestris*	Sand grape
TERRESTRIAL PLANT SPECIES (14-15)		
14	*Carex latebracteata*	Waterfall's sedge
15	*Castanea pumila var. ozarkensis*	Ozark chinquapin

The U.S. Fish and Wildlife Service will be consulted for concurrence of determinations on any Proposed, Endangered, or Threatened (PET) species if required.

The following pages include a brief description of the associated habitat and current status of each of the species listed in the table above. Detailed descriptions are in the Biological Evaluation (Garrett and Stephens. July 2015).

1. AMERICAN BURYING BEETLE

In the fall of 1992, the first American burying beetle was captured on the Cold Springs Ranger District in Logan County. Scott County was added as an occupied county the same year. In 1993 approximately 30,000 acres on the Ouachita NF were surveyed with only seven captures, primarily on the Cold Springs RD (USDI Fish & Wildlife Service 1994). Otherwise, the majority of ABB captured in Arkansas were taken on Fort Chaffee, south of Fort Smith, Arkansas (USDI Fish & Wildlife Service 1994). During the period 1992-1996, 73 ABBs were captured on the Cold Springs RD (Carlton and Rothwein 1998). ABB occurrences have been concentrated east of Highway 71N and north of Highway 80 on the Cold Springs RD (District survey monitoring records show sites where ABB survey lines are located). Additional surveys have been conducted every year since the first capture. ABB surveys from 1992 through the present continue to find ABB on an irregular basis. These captures have generally occurred close to private open pasture land or near recent regeneration cutting. No ABB's have been found inside the East Fork EMU, however a single ABB was captured in 1994 approximately 0.5 miles from the project area. Another ABB was captured in 1993 just south of the EMU.

The American burying beetle (ABB) was listed as an endangered species in July 1989 (Federal Register Vol. 54 (133): 29652-5). At that time, the only known occurrence of this species was Block Island, Rhode Island, and Latimer County, Oklahoma (Peck and Kaulbars 1987; Madge 1958). Results of 1992 - 2010 surveys in have increased the known occurrences to eight counties in Oklahoma, five counties in Arkansas, seven counties in Nebraska, two counties in South Dakota, and three counties in Kansas.

The ABB has been found in a variety of habitats, including grassland, upland forest, bottomland forest, edge, and regeneration areas. ABBs are considered habitat generalists and will forage in any habitat available (Lomolino et al. 1995). Breeding requirements are not so general, and it appears as if breeding sites may be more specialized.

Reproduction success depends upon the availability of vertebrate carrion of an appropriate size and weight (optimum weight is between 100 and 200 grams). It is possible that this species would most likely be found near dense breeding aggregations of optimally sized vertebrate species. The presence of a grass-forb understory, regardless of overstory type, is a major factor in the occurrence of the ABB. Forests with thick midstories have proven to be poor habitat due to limiting flight. Availability of prey and soil type also influences ABB occurrence.

The ABB is nocturnal and the western population is active from late April to late September. ABBs exhibit a high level of parental care to their young. At night, they are attracted by smell to carrion. Both adults will prepare the brood rearing chamber, and the female will remain in the nest until the young complete larval development. It is possible that adult ABBs can raise two broods per year. Presumably, young adult beetles burrow into the soil to over winter (USDI Fish & Wildlife Service 1994).

Presently, the cause for the decline of this species is undetermined.

The American burying beetle Conservation Plan set up a monitoring schedule for the Ouachita National Forest. Six (6) permanent locations, one of which is just west of this EMU, and 5 roving temporary locations looking for "best" habitat. The Proposed Action is designed to create "best" habitat for this species.

ENVIRONMENTAL EFFECTS

Proposed Action and Alternative II

Timber Harvest and WSI treatments: Commercial thinning and creating 490 acres of early seral habitat, and the connected actions such as log decks and temporary roads generally disturb 1/7 of the ground covered by the timber removal. WSI could be mechanical or hand-tools depending on ground conditions. There would be no **direct** effect to this species as the current condition of these stands (thick with dense midstories) makes them unsuitable for the ABB to be present. **Indirect** effects from timber removal would be positive as this habitat would temporarily become more open habitat for ABB prey species such as small mammals and turkey poults.

Control of non-native invasive species (NNIS): The use of herbicides to control NNIS plants will have no direct effect on the ABB as the ABB is a nocturnal species and should not be above ground during this limited herbicide use. **Indirect** and **cumulative** effects of controlling or eliminating NNIS plants would be positive, due to the restoration of native plants species and the associated influx of native animal species which is the ABB's food base.

Wildlife Treatments: Wildlife treatments include nest structures, and pond construction and reconstruction.

- *Pond Reconstruction:* No **direct, indirect or cumulative** effects are expected by pond work due to the small acreage associated with each site and existing ponds are not suitable ABB habitat.
- *Pond Construction:* No **direct, indirect or cumulative** effects are expected by pond work due to the small acreage associated with each site.
- *Nest structures:* No **direct, indirect or cumulative** effects from this activity due to the ABB not being present and the lack of ground disturbance even if they were in the vicinity.

Timber Stand improvement: Site prep would only be considered ground disturbance if done by mechanical scarification. If ABB were present, even then, only one stand would be done at a time and an entire stand probably cannot be completed in one day. *This equipment may adversely affect ABB by running over a beetle if they have moved into these stands between harvest and site-prep treatments.*

Release and pre-commercial thin would have no **direct** or **indirect** effect on the ABB because only tree species of a small size would be cut down using chainsaws. Release would occur in areas that are not proper habitat for this species, at this time. In time, the **cumulative** effect would be to bring these acres into a condition that would be more suitable habitat for the ABB.

Transportation System work including road reconstruction and pre-haul maintenance: No **direct, indirect, or cumulative** effects are expected by roadwork due to the fact that the acreage is already compacted and not suitable ABB habitat.

Special Use Permits: There would be no **direct, indirect**, or **cumulative** effect on the ABB by issuing rock and firewood special use permits in *East Fork EMU*.

No Road Construction Alternative III

The effects from this alternative would be the same as the other action alternatives except for the following:

Timber Harvest and WSI treatments: Although commercial thinning and creating 266 acres of early seral habitat, would result in ground disturbance, there would be no **direct** effect to this species as the current condition of these stands (thick with dense midstories) makes them unsuitable for the ABB to be present. **Indirect** effects from timber removal would be positive as this habitat would temporarily become more open habitat for ABB prey species such as small mammals and turkey poults.

No Action Alternative

The No Action alternative would have **no direct effect** on this species. The No Action Alternative would allow this project area to age and lose more habitat characteristics that the ABB prefers. The long-term indirect effects would be to lose habitat and the prey base.

2. NORTHERN LONG-EARED BAT

Northern Long-Eared Bat (Myotis septentrionalis) Threatened mammal species

Survey Information: The northern long-eared bat is thought to be a common species in the Ouachita National Forest (Perry and Thill, 2007), and has been documented in every county of the Ouachita Mountains (Sasse, pers. comm.). During the 2005 Bat Blitz held on the Ouachita NF the northern long-eared bat was found in good numbers and accounted for 24% of all bats captured. Preliminary results from acoustic surveys conducted in the summer of 2009 showed northern long-eared bats to be present on the Ouachita National Forest but was not detected in surveys conducted on the Poteau Cold Springs Ranger District. Additional surveys for northern long eared bat were not necessary to analyze and disclose effects because the species is known to occur in the project area.

Environmental Baseline: The northern long-eared bat has a large range that stretches over much of the Eastern United States and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. In the United States they are found from Maine to Florida and West to Oklahoma and Montana (USDI FWS 2013).
Northern long-eared bats use an assortment of habitats across its range including both hardwood and coniferous forest. This species is known to use a wide variety of roost sites including caves, man-made structures, as well as living trees and snags of both hardwoods and conifers. Preferred roosting habitat appears to vary from region to region within its range. Research conducted on the Ouachita National Forest documented a preference for shortleaf pine snags as roosting sites (Perry and Thill, 2007). Both male and female used managed and unmanaged timber stands. However, research result showed that females preferred to roost in managed pine stands with low pine BA while males preferred to roost in more dense stands (Perry and Thill, 2007).

The northern long-eared bat was listed as a Threatened species by the UFWS on May 4, 2015. The listing of this species is primarily due to a disease referred to as White-nosed syndrome (WNS) that has caused a decline of 99 percent in the northern long eared bat population in the Northeastern states and is expected to spread throughout the United States (USDI FWS 2013). White-nosed syndrome is named for the white fungus evident on the muzzles and wings of affected bats. The white fungus is identified as *Pseudogymnoascus destructans* and thrives in cold and humid conditions which are characteristic of the caves and mines used by bats during hibernation. Bats affected with WNS lose their fat reserves and often die from the disease.

For northern long-eared bats breeding begins in late summer or early fall when males begin swarming near hibernacula. After copulation, females store sperm during hibernation until spring, when they emerge from their hibernacula, ovulate, and the stored sperm fertilizes an egg. This strategy is called delayed fertilization (USDI FWS 2013). After fertilization, pregnant females migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies, with young, generally have 30 to 60 bats, although larger maternity colonies have been observed. Most females within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Adult northern long-eared bats can live up to 19 years (USDI FWS 2013).

Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation. This bat also feeds by gleaning motionless insects from vegetation and water surfaces (USDI FWS 2013).

ENVIRONMENTAL EFFECTS

Proposed Action, Alternative II and Alternative III

Timber, Silvicultural/Wildlife Stand Improvement Activities*:* Cutting trees for the various proposed timber treatments may result in death and injury to bats and their young during the maternity period, when pups are non-volant (Wisconsin DNR, 2013), and may also disrupt roosting and maternity behavior. NLEBs are highly mobile and are capable of fleeing to avoid danger during non-pup rearing times. The NLEB may be impacted indirectly by noises associated with timber, silvicultural, and wildlife stand improvement activities, such as the sound of saws and/or general human interaction (USDI Fish and Wildlife Service, 2013a). Canopy and midstory openings resulting from

the proposed action will increase the amount of sunlight reaching the forest floor. Increased sunlight will yield a more diverse understory allowing for a rise in the abundance of NLEB insect prey base.

Control of non-native invasive species (NNIS): It is highly unlikely that there would be any direct effect on the NLEB due to individuals coming into contact with recently sprayed vegetation. The NLEB emerges at dusk and any herbicides applied should be dried on the substrate they were sprayed on (Lacki, Hayes, & Kurta, 2007). Herbicides would be applied at the lowest effective rate in meeting project objectives in an attempt to reduce any potential negative effects to the environment. All label instructions and Forest Plan standards and guidelines will be followed.

Indirectly, herbicide application will decrease invasive vegetation and increase native vegetation, resulting in the overall enhancement of wildlife habitat (Guynn, Guynn, Wigley, & Miller, 2004). Further, the changes that result should provide a more abundant and diverse insect population, thus increasing foraging opportunities for the NLEB (Lacki, Hayes, & Kurta, 2007). Food ingested from herbicide treated areas immediately following treatment could result in harm to the NLEB. However, NNIS treatments would likely occur on extremely small acreages. Any food ingested from these areas would likely be minimal and likely below the LD50 for the NLEB.

Prescribed Fire: Prescribed Burning can occur during the Dormant Season or during the growing season. Prescribed burning during the dormant season would have no direct affects, as there are no known Hibernacula on the Poteau/Cold Springs Ranger District. A growing season burn during the pup season could have the direct effect of burning a snag with a non-volant juvenile roosting in the tree, or mortality due to toxic gases and the inability to fly out of burn area. Prescribed Fire due to its lower intensity is less likely to burn all snags, and would also cause less Toxic gas and radiant heat than a high intensity wildfire. Indirect effects would be positive due to creating snags, stimulating the growth of herbaceous vegetation, a more abundant prey base, and lowering the risk of a wildfire.

Wildlife Treatments: Wildlife treatments include nest structures, and pond construction and reconstruction.

- ✓ Pond Reconstruction: No direct, indirect or cumulative effects are expected by pond work due to the small acreage associated with each site, and existing ponds having only small trees, brush and grasses on them.

- ✓ Pond Construction: removal of an unknown roost tree could cause the death or injure a non-volant young, though unlikely due to small acreage associated with each site. indirect or cumulative effects would be positive due to creating areas where NLEB can forage for insects

- ✓ Nest structures: No direct, indirect or cumulative effects from this activity.

Transportation System: Individual bats may be injured or killed when roost trees are cut during the maternity season. These activities also have the potential to disrupt roosting and maternity behavior. Removal of trees along roads and/or skid trail corridors may result in a loss of roosting habitat. The decommissioning of roads will help decrease noise, while retaining the open areas used by NLEBs for foraging (Perry, Thill, & David Jr., 2008)

Special Use Permits: No direct, indirect or cumulative effects from this activity.

No Action Alternative

The retention of existing pine and hardwood forested conditions without human-caused disturbance would continue to offer roosting and nesting habitat. Diversity of foraging conditions would decline as succession continued. Without the creation of early successional habitat, insect diversity and abundance would likely decline, resulting in a loss of foraging opportunities for the Northern long-eared bat.

No other projects are taking place within this EMU thus no cumulative effects are anticipated with implementation of this project.

3. EASTERN SMALL-FOOTED BAT

In Arkansas the Eastern small-footed bat is known in small numbers from only a few caves in the Ozarks and has been documented on Mt. Magazine in Logan County. Preliminary results from acoustic surveys preformed on the Ouachita National Forest in August and September of 2009 indicated that this species is present in low numbers in Scott and Montgomery Counties. Prior to this survey this species was not known from the caveless region of western Arkansas.

ENVIRONMENTAL EFFECTS

Proposed Action, Alternative II and Alternative III

Eastern small-footed bats are highly mobile during the active season and it is unlikely that an adult would be **directly** harmed during The Proposed Action (logging, prescribed burning, control of NNIS, pond reconstruction, road work, silvicultural treatments, WSI). However, it is possible that young could be **directly** impacted if a maternity site was destroyed during timber harvest or prescribed burning. Habitat suitable for hibernation (caves, mines and rock talus areas) has not been found within this project area. Therefore, it is highly unlikely that this species would be harmed during the inactive season. **Indirect** and **cumulative** impacts from timber harvest, WSI, TSI, wildlife opening development/maintenance, and treatment of NNIS would be positive as this habitat would temporarily become more open which would improve fight paths and increase habitat for the insect prey base.

No Action Alternative

The No Action alternative would have no "direct impacts" upon this bat, but also would not indirectly create habitat for the species.

4. BALD EAGLE

Breeding habitat is usually close to large water bodies, which provide desired food sources- such as fish and waterfowl. Winter roosting sites appear to be closely associated with available food sources such as small mammals and carrion, and may not be in close proximity to water if such abundant alternative food sources are available. There is a Bald Eagle nest located in the *East Fork* project area.

ENVIRONMENTAL EFFECTS

Proposed Action and Alternative II

Timber harvest and reforestation: There should be no **direct, indirect,** or **cumulative** effect on bald eagles. This is because all trees with obvious large nests will be protected as outlined in the national bald eagle management guidelines.

Wildlife treatments:

- ✓ WSI/TSI would have no **direct** impacts on bald eagles because the trees to be cut are too small to be used as roost or nest trees. WSI/TSI will take place outside of the nesting season in areas where bald eagle nests are located. I**ndirect and cumulative** impacts associated with these activities are not anticipated for this species.
- ✓ Ponds, temporary wildlife openings, and control of NNIS would have no **direct, indirect,** or **cumulative** impact. The effects are similar to timber harvest and reforestation (above).
- ✓ Firewood/Rock Permits would have no **direct, indirect,** or **cumulative** effect due to these actions taking place away from optimal bald eagle nesting and roosting habitat. These actions would not negatively or positively alter bald eagle habitat.

Transportation System: No **direct** effects are predicted, since roadwork will not occur near an eagle nest or winter roost site. **Indirectly** and **cumulatively**, these temporary roads would have no effect on bald eagles.

Prescribed burning: Prescribed burning would have no **direct** impact on bald eagles unless a nest tree with young was directly consumed by fire. Such a scenario is improbable since all known eagle nest trees are prepped before burns by raking fuel away from the base of such trees. It is also possible that a previously unidentified nest tree may exist in the planned ignition area, but this scenario is improbable due to the very large number of field surveys and monitoring work which have been conducted in these areas. If a previously unidentified nest tree does exist in the burn area, it likely would not be damaged since eagles normally build their nest high up in the canopy of mature trees. **Indirectly** and **cumulatively**, these burns would help protect nest trees from catastrophic wild fires by reducing wildfire fuel loads.

No Road Construction Alternative III

The effects from this alternative would be the same as the other action alternatives except for the following:

Transportation System: No effects are predicted since roadwork would not occur near an eagle nest or winter roost site.

No Action Alternative

The No Action alternative would have **"no direct impacts"** upon this bird.

5. BACHMAN'S SPARROW

Historically, Bachman's sparrows were found in very young pine regeneration areas. With the near total cessation of clearcutting as a forest management tool on the Ouachita National Forest in the mid-1990s, most records (involving the distinctive song) come from mature pine stands maintained in an open condition by means of prescribed burning.

There are 0 acres of early seral stage habitat (0 – 10-year-old stands) in *East Fork* that could be considered suitable habitat for this species. Mature pine stands maintained in an open condition with prescribed burning do exist within *East Fork* adding some additional habitat for this species.

ENVIRONMENTAL EFFECTS

Proposed Action, Alternative II and Alternative III

It is unlikely that any adult Bachman's sparrows would be **directly** harmed during The Proposed Action (logging, road work, special use permits, pond reconstruction, control of NNIS, silvicultural treatments, RCW treatments/activities, and WSI). Bachman's sparrows would most likely seek cover while workers are in the area and return later. If logging, silvicultural treatments, or WSI occurred during the nesting season, it is possible that Bachman's sparrow nests could be lost. But this scenario is unlikely, since areas in need of treatment are usually not suitable habitat. **Indirectly and cumulatively**, this Proposed Action would increase the amount of optimal habitat available for this sensitive species.

No Action Alternative

The No Action alternative would have **"no direct impacts"** upon this bird. **Indirectly**, habitat would continue to deteriorate due to succession and eventually the entire project area would not be suitable habitat for this species. Suitable habitat could result from unplanned natural events like wildfires and insect outbreaks.

6. DIANA FRITILLARY

This species has been observed in various areas throughout the district. Most of the older scattered records involved sunny openings associated with roadsides. Surveys on the Poteau RD indicate this species to be common in Management Area 22 where timber thinning, WSI, and repeated prescribed burning has produced approximately 40,000 acres of open, park-like forest.

ENVIRONMENTAL EFFECTS

Proposed Action, Alternative II and Alternative III

The Proposed Action and Alternative II are not likely to have a direct effect on this species as there is little suitable habitat currently present in this project area. These "action" alternatives would indirectly create suitable habitat for this butterfly in the future.

It is extremely unlikely that the actions would have any **direct** impacts on adult butterflies since they are highly mobile. However, there is the possibility of harming eggs and larvae if the proposed activities occur during the reproductive season. **Indirect** impacts would be positive. Logging, WSI, control of NNIS, and prescribed burning would improve habitat for Diana fritillary by stimulating new herbaceous plant growth that would most likely contain desired nectar producing species and violets for egg deposition. No cumulative impacts are anticipated on the Diana fritillary.

No Action Alternative

The No Action alternative would have "**no direct impacts**" upon this butterfly, but also would not **indirectly** create habitat for the species.

7. – 10. SENSITIVE AQUATIC ANIMAL SPECIES

7	*Notropis ortenburgeri*	Kiamichi shiner	Fish
8	*Lampsilis hydiana*	Louisiana fatmucket	Mollusk
9	*Toxolasma lividus*	Purple lilliput mussel	Mollusk
10	*Obovaria arkansasensis*	Southern hickorynut	Mollusk

Survey Information: The headwaters of the Poteau River are in this watershed and project area. Bed Creek is in C-264 and C-265. East Fork Branch also runs through the project area. The EMU has the potential to have all 4 of these species, they will be further evaluated. The presence of these sensitive species occurring is highly unlikely.

ENVIRONMENTAL EFFECTS

Proposed Action and Alternative II

Vegetation management: All activities connected with timber management and WSI occur in upland pine stands, which have been designated as lands suitable for timber production. There are specific restrictions on use of heavy equipment within SMZs that protect stream quality. Vegetation management would not **directly, indirectly,** or **cumulatively** affect these sensitive aquatic species.

Control of non-native invasive species (NNIS): The use of herbicides to control NNIS will have no **direct, indirect**, or **cumulative** effect on the four sensitive aquatic species because herbicides will only be used per Revised Forest

Plan directions, and will not be used within streamside zones.

Wildlife Activities: Pond reconstruction, temporary wildlife openings, RCW treatments/activities, and nest structures all occur in upland pine stands and would not **directly, indirectly,** or **cumulatively** impact these sensitive aquatic species.

Special Use Permits: There would be no **direct, indirect**, or **cumulative** impact on these sensitive species by issuing special use permits in *East Fork EMU 10*.

Transportation system: Properly reconstructed and maintained roads reduce problems of runoff detrimental to streams. Road work in this EMU would have no **direct, indirect,** or **cumulative** impacts on these species due to protective measures for streams within the Forest Plan.

While temporary stream crossings and fording of streams during road construction and during hauling of logs will occur, these four species will not be present at the ford sites, since habitat for these species is unsuitable due to the intermittent quality of these streams. No **direct, indirect,** or **cumulative** impacts on these species will occur.

Prescribed burning: Low intensity burning should have little or no impact on water quality (Bidwell, et al., no date: 2877-10). Therefore, limitations of forest management activities within SMZs included in the Forest Plan would protect these aquatic sensitive species from undesirable impacts.

No Road Construction Alternative III

The effects from this alternative would be the same as the other action alternatives except for the following:

Transportation system: Properly reconstructed and maintained roads reduce problems of runoff detrimental to streams. Road work in this EMU would have no **direct, indirect,** or **cumulative** impacts on these species due to protective measures for streams within the Forest Plan.

No Action Alternative

The No Action alternative would have "**no impacts**" upon these aquatic species.

11. - 13. SENSITIVE RIPARIAN AREA PLANT

11	*Amorpha ouachitensis*	Ouachita false indigo
12	*Vernonia lettermannii*	Narrowleaf ironweed
13	*Vitis rupestris*	Sand grape

These three sensitive riparian plant species are endemic species to the Ouachita Mountains and is locally abundant. Threats to these species would be similar to those for fish and mollusks. Motorized vehicles "playing" along creeks can also have a detrimental impact on this species. These species are protected through the implementation of Revised Forest Plan Standards for protection of streamside zones

ENVIRONMENTAL EFFECTS

Proposed Action and Alternative II

Vegetation management: Most activities connected with timber management and WSI occur in upland pine stands, which have been designated as lands suitable for timber production. There are specific restrictions on use of heavy equipment within SMZs that protect stream quality. Restrictions on herbicide use within the Forest Plan would protect SMZs and therefore limit impacts on these plant species. However, during the removal of off-site loblolly pine from any SMZ, individual plants may be **directly** impacted by being run over, uprooted, or by burying plants under displaced soils, if they happen to occur in these zones. These treatments will occur on a very limited number of acres and will have no significant effect on the viability of these species. Vegetation management would not **indirectly** or **cumulatively** impact these sensitive riparian area plant species.

Control of non-native invasive species (NNIS): The use of herbicides to control NNIS will have no **direct** effect on the three sensitive riparian plant species because herbicides will only be used per Revised Forest Plan directions, and will not be used within streamside zones. **Indirect** and **cumulative** effects of controlling or eliminating NNIS would be positive, due to reducing the spread of NNIS and the restoration of native plants species.

Prescribed burning: Low intensity prescribed burns often will not carry in SMZs and should have discountable impacts. Fireline construction will mostly occur in upland habitat and will follow forest plan restrictions for SMZs, but individual plants may be **directly** impacted. Few to no **indirect** or **cumulative** impacts are anticipated for these three sensitive riparian plant species.

Wildlife Activities: Pond reconstruction, temporary wildlife openings, RCW treatments/activities, and nest structures all occur in upland pine stands and would not **directly, indirectly,** or **cumulatively** affect these three sensitive riparian plant species.

Transportation system: Properly reconstructed and maintained roads reduce problems of runoff detrimental to streams and streamside zones. Road work in this EMU would have no **direct, indirect, or cumulative** impacts on these species due to protective measures for streams within the Forest Plan.

Special Use Permits: There would be no **direct, indirect**, or **cumulative** impact on these sensitive species by issuing special use permits, since these actions will only take place in upland habitats in this EMU.

No Road Construction Alternative III

The effects from this alternative would be the same as the other action alternatives except for the following:

Vegetation management: Most activities connected with timber management and WSI occur in upland pine stands, which have been designated as lands suitable for timber production. There are specific restrictions on use of heavy equipment within SMZs that protect stream quality. Restrictions on herbicide use within the Forest Plan would protect SMZs and therefore limit impacts on these plant species. Vegetation management would not **indirectly** or **cumulatively** impact these sensitive riparian area plant species.

No Action Alternative

The No Action alternative would have “no impacts” on these plant species.

14. SENSITIVE PLANT: WATERFALL’S SEDGE

Waterfall’s sedge is an endemic species to the Ouachita Mountains and is locally abundant. It is found in a variety of habitats such as shaley roadsides, dry shale woodlands, riparian areas, mesic oak hickory forest, pine and pine hardwood forest, and mazarn shale and novaculite glades. This species receives some natural protection from human disturbance by the diversity of its preferred habitats, as described above. Many of the known locations for

this species on the Ouachita National Forest are on sites located within areas that have undergone timber management activities and in areas that have been burned.

ENVIRONMENTAL EFFECTS

Proposed Action, Alternative II and Alternative III

The Proposed Action may **directly** impact individual plants through uprooting, or by burying plants under displaced soils. The use of herbicides to control NNIS will have no **direct** effect on this sensitive plant because herbicides will only be used per Revised Forest Plan directions. Site-specific surveys for PETS plant species will be conducted prior to the treatment of NNIS to identify, delineate, and protect any PETS plant species present at treatment sites. **Indirect** impacts of controlling or eliminating NNIS would be positive, due to the restoration of native plant species. Vegetation management should have minimal **indirect** impacts since waterfall's sedge appears to tolerate practices that mimic natural disturbance, so species viability and distribution are not anticipated to be significantly impacted. Prescribed burning and associated actions are the only other known actions taking place in this EMU and no **cumulative** impacts are anticipated for Waterfall's sedge in the *East Fork* EMU.

No Action Alternative

The No Action alternative would have **"no impacts"** on this plant species.

15. SENSITIVE PLANT Ozark Chinquapin

Ozark Chinquapin has not been recorded in *East Fork* EMU but it is likely to grow there.

Chinquapin is listed as sensitive because throughout its natural range it is threatened with destruction by chestnut blight. Despite its status, it is of widespread occurrence throughout the Interior Highlands. It is found in both early successional and old growth vegetation types. It occurs in dry deciduous and mixed hardwood pine communities on rocky dry slopes and ridge tops. It occurs largely as stump sprouts and it reaches its fastest growth rate where abundant sunlight reaches the forest floor.

ENVIRONMENTAL EFFECTS

Proposed Action and Alternative II

Direct impacts to the population of the Ozark chinquapin may result from any activity removing existing vegetation by uprooting it, or burying existing plants and seeds. Road and pond construction are possibly the most detrimental direct impacts to the chinquapin. Field observations indicate the chinquapin, despite its infection with the chestnut blight, can be expected to hold its own in competition with other tree species in almost all kinds of disturbances resulting from normal forest management practices. The ONF has adopted a policy that does not allow the use of herbicide within 60 feet of any sprouts, allows minimal accidental impacts to tops incidental to normal timber management practices and control of competing vegetation by light surface fire.

No Road Construction Alternative III

The effects from this alternative would be the same as those described for the other action alternatives except there would be no possible uprooting from road construction.

No Action Alternative

The No Action alternative would have **"no impacts"** on this plant species.

INSECT AND DISEASE

Present Conditions

Hypoxylon canker is a disease (fungus) that has become established in the red oaks throughout the Ouachita National Forest. It is in *East Fork* as a result of stressed conditions brought on by several years of summer drought and overstocked conditions. The ice storm of 2000 added to this stress by causing physical damage to the majority of trees of all species district-wide. The fungus infects stressed trees through wounds and either produces a canker or quickly kills the tree by colonizing the sapwood. Fruiting structures develop on the cankers and spores are discharged at a rapid rate into the air and spread to new hosts through wounds. Hypoxylon cankers are generally secondary to other stressing conditions, in this case drought, ice storm damage, and age. This disease is always present in the forest but in normal conditions the individual trees, if healthy, are able to resist and overcome any infection. After the hypoxylon canker became established, secondary pests come in including red oak borers and two-lined chestnut borers. Under normal conditions most healthy red oaks would be able to withstand or overcome an infestation of these insects, but the same stress factors that caused the red oaks and some white oaks to become infested with hypoxylon canker also causes them to becomes susceptible to these insects. At this time most of the red oaks that have died or are infected with hypoxylon canker are scattered along the ridge tops in small pockets. These affected areas are also stocked with various mature white oaks, hickories, and shortleaf pines, which are surviving and still occupying the sites. Hypoxylon canker has infested other parts of the district more severe than in *East Fork* so far but it is established here. If it does become worse, there would be an absence or reduction of red oak and white oak acorn production for a 20 to 25 year period in the most severely affected areas. This is the average age for red oaks and white oaks to begin producing acorns.

Southern pine beetles are also present in small numbers in some individual shortleaf pine trees that are stressed or injured. In normal years most shortleaf pine would be able to withstand or overcome an infestation of this insect if healthy and growing conditions are favorable. In 1995, due to several years of warmer than normal winters, the populations grew to epidemic proportions and infested not only weaker trees (due to overstocked conditions and drought) but also healthy trees. Aerial detection flights located several infestations throughout the district in stands that had mature, heavy stocking. These were active spots that quickly grew until management and salvage operations were able to catch up and keep them in check. Several spots were approximately 2 acres when found or when controlled. Most other SPB spots were 0.25 acre or less and inactive when found and were monitored. The summer of 2011 was also a very dry time that created enough stress in the shortleaf pine to increase the Ips beetle populations throughout the district. These beetles could become established within *East Fork* if the area continues to be rain deficit in FY 13 and beyond. According to Jim Smith the Regional Entomologist from an e-mail in June 2012 SPB's have become established all over Mississippi and could move toward the Ouachita N.F. in the near future.

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on vegetation would be all of the compartments within the *East Fork* Ecosystem Management Unit boundary. Timelines for measuring the effects on vegetation would be from 2013 to 2020-2025 or from entry period to entry period. Methods of analysis include reviewing the past history of the project area, interpreting the field data collected throughout the project area to establish existing and desired conditions. The proposed actions developed to meet the desired conditions are analyzed to determine what the direct effect of these actions would be and what the cumulative effects would be to the vegetation in the overstory, midstory, and understories.

PROPOSED ACTION

Similar to the Proposed Action section in Vegetation of this chapter, the large amount of acres of mature pine and hardwood timber types make *East Fork* susceptible to insect and disease infestations. The proposed actions would immediately create conditions allowing all forest types to remain healthy and more resistant to insect or disease infestations by reducing competition for limited water and nutrients.

CUMULATIVE EFFECTS

The proposed commercial thinning, timber stand improvements, and to some extent wildlife stand improvements would improve the health of the affected stands by enabling the stands to withstand and overcome insect or disease infestations and respond to the silvicultural treatments with increased vigor until the next entry period 10 to 15 years down the road.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

A **direct** result of letting these infestations run their course could be large areas of dead or dying overstory and midstory and infesting adjacent watersheds over a several year period until natural events or predators stopped them or they ran out of a suitable host or food source in *East Fork*. **Indirect** results would be vigorous response of growth from the understory and possible change in forest types. Large fuel loads would increase the chance of a hot, crown killing wildfire that could threaten the remaining surviving mature trees in *East Fork* and in adjacent watersheds. If the hypoxylon canker becomes established here the way it has in other parts of the district, there would be an absence or reduction of red oak acorn production for a 20 to 25 year period in the most severely affected areas due to tree mortality. The 20 to 25 years is the average age for red oaks to begin producing acorns. In this absence other invader species or non-native species could eventually occupy the site. Offsite species like cedar and red maple many times become established in enough numbers to crowd out or shade out the oaks, hickories, and other mast producing trees.

CUMULATIVE EFFECTS

If disease or insect infestations are allowed to run their course a **cumulative effect** could be large openings created where native pine or hardwoods once occupied the site. The openings would be established with vegetative species such as forbs, grasses, and other shade intolerant species responding with rapid growth eventually changing the native forest type. Another **cumulative effect** could be loss of site productivity due to soil loss from erosion or impact on water quality due to sediment deposits in the Poteau River if a hot wildfire removes the duff layer and is followed by a heavy rain.

NO HERBICIDE ALTERNATIVE II

These effects mimic those of the Proposed Action without the effects of herbicide use.

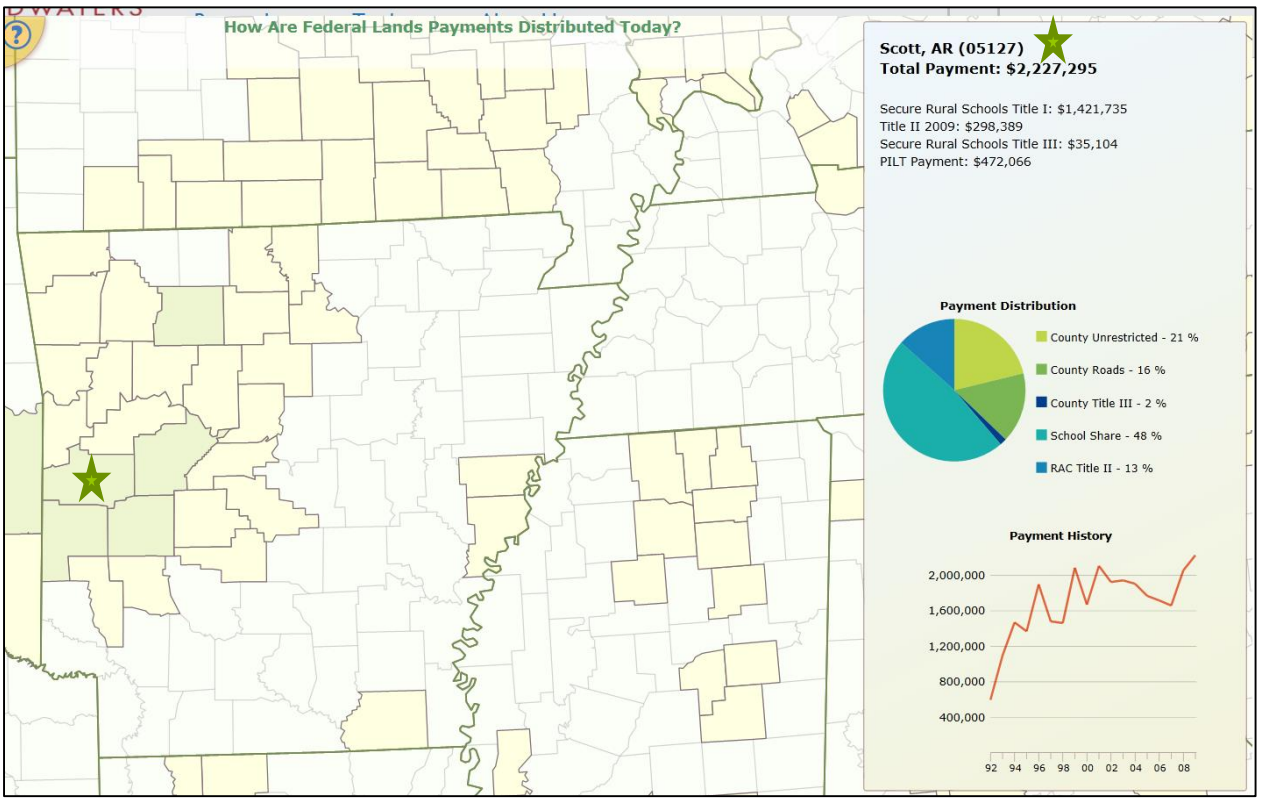
NO ROAD CONSTRUCTION ALTERNATIVE III

This alternative would not include temporary road construction to provide access to stands in need of silvicultural treatment; only areas with existing access would be treated. The effects of this alternative would be the same as the Proposed Action except the reduction in competition would occur on fewer acres.

ECONOMY

Present Conditions

The 2014 annual median household income for Scott County, Arkansas, is $33,202 according to Arkansas Income-Census (http://www.discoverarkansas.net/cgi/dataanalysis/incomeReport.asp?menuchoice=income). The unemployment rate in November 2015 was 4.1. The population for Scott County according to the 2014 Census Population was 10,693. The economic base of the county is timber with 82% of the land area in timber of which 62% is U.S. Forest Service owned and 20%is privately owned. Livestock and poultry production along with food processing also helps make up the economic base (http://scottcountyar.com/). The local timber industry depends on National Forest land for a source of raw material. Many local residents depend on firewood from timber and wildlife activities on the district such as regeneration harvest, site preparation, and wildlife midstory reduction. Approximately 369,618 acres of Scott County is National Forest System lands. The following insert displays how Federal Land payments are distributed in Scott County, Arkansas.



http://headwaterseconomics.org/dataviz/federal-land-payments (1/29/2016)

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on the local or county economy is Scott County. The timeframe used for measuring these effects is the duration of implementation of the activities included in the project financial efficiency analysis. Quick-Silver (version 5.004.45 (2/15/2000)) was used to determine the financial efficiency of each Alternative. This program is a project analysis tool that utilizes a MS Access database for use by forest managers to determine the economic performance of long-term investments.

PROPOSED ACTION

Directly, harvesting sawtimber and roundwood would support the local timber industry's need for raw material and the local residents need for firewood. The treatments proposed would also provide employment for forest industry workers. The Proposed Action has a revenue cost ratio of **1.39**, which means that it does pay for itself from timber receipts. **Indirectly**, timber harvesting would improve wildlife habitat. Also, the money that local forest industry workers earned would be circulated within the local business communities.

CUMULATIVE EFFECTS

Cumulatively, *East Fork* would move toward its desired future condition while providing raw material to the timber industry, firewood to local residents, and improved hunting. The unemployment rate would be stabilized in the forest industry; local businesses would provide demanded services; and the national forest would remain healthy.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

Directly, this alternative would not provide raw material to the timber industry, no firewood to the local community, or improve hunting in *East Fork*. **Indirectly**, Forest industry workers would have to travel further distances for employment. Businesses would suffer the loss of local forest industry workers not having money to circulate.

CUMULATIVE EFFECTS

Cumulatively, *East Fork* would not move toward its desired future condition to improve and maintain the health of the forest stands of timber or provide suitable habitats for wildlife. Also by products of these activities such as timber would not be available. Unemployment rate could increase due to local forest workers not being able to find local jobs. Local businesses could close due to less money in local economy.

NO HERBICIDE ALTERNATIVE II (same as Proposed Action without the use of herbicides)

Most effects to the economy are estimated to be the same as those in the Proposed Action since proposed treatments are the same, minus the effects of herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

Directly, harvesting sawtimber and roundwood would support the local timber industry's need for raw material and the local residents need for firewood. The treatments proposed would also provide employment for forest industry workers. The Proposed Action has a revenue cost ratio of **1.11**, which means that it does pay for itself from timber receipts. **Indirectly**, timber harvesting would improve wildlife habitat. Also, the money that local forest industry workers earned would be circulated within the local business communities.

CUMULATIVE EFFECTS

Cumulatively, *East Fork* would move toward its desired future condition while providing raw material to the timber industry, firewood to local residents, and improved hunting. The unemployment rate would be stabilized in the forest industry; local businesses would provide demanded services; and the national forest would remain healthy.

PROJECT FINANCIAL EFFICIENCY ANALYSIS

The Proposed Action and No Herbicide Alternative would both have costs and revenues associated with the sale of timber. Costs include activities that are directly associated with timber management (site preparation, timber sale administration, road maintenance, etc.). Revenues are generated from the sale of timber. The Quick-Silver evaluation of the financial efficiency of each alternative is displayed in the table below. The detailed costs, revenues, and the complete Quick-Silver analysis report are in the Project file.

Comparison by Financial Efficiency

Cost/Income Activities	No Action Alternative $	Proposed Action $	No Herbicide Action $	No Road Construction
Present Value of Revenues[1]	0	959,828.06	959,828.06	598,932.71
Present Value of Costs[2]	0	-689,496.25	-689,496.25	-541.083.07
Present Net Value[3]	0	**270,331.81**	**270,331.81**	**57,849.64**
Revenue/Cost Ratio[4]	N/A	1.39	1.39	1.11

1- Present Value of Revenues – The sum of all revenues discounted at some interest rate.
2- Present Value of Costs – The sum of all costs discounted at some interest rate.
3- Net Present Value – The sum of the present value of the revenues minus the sum of the present value of the costs.
4- Revenue/Cost Ratio – Present value of revenues divided by the present value of costs.

PUBLIC HEALTH AND SAFETY

Present Conditions

Refer to the present conditions described in the Air Quality section and the Water Resources & Quality section of this Chapter.

METHODS OF ANALYSIS

Site-specific risk assessments developed by Syracuse Environmental Research Associates (SERA) have been conducted for this analysis area as required by the Revised Forest Plan and are located in the project file (Revised Forest Plan, Part 3, pg 87, HU002). The SERA Human Health and Ecological Risk Assessments worksheets for Glyphosate March 25, 2011 and for Triclopyr May 24, 2011 are a series of excel spreadsheets designed to analyze the risks associated with use of specific herbicides. These worksheets allow for the generation of project specific analysis of potential herbicide use.

ENVIRONMENTAL EFFECTS

PROPOSED ACTION AND NO ROAD CONSTRUCTION ALTERNATIVE III

Only one or the other of the two herbicides will be used, if any herbicide is used. The herbicides under consideration, glyphosate and triclopyr, are available commercially in products called Round-up, Accord, and Garlon or other brand names. Herbicides proposed for use would be mixed and applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health. Application rate and work time must not exceed levels that pose an unacceptable level of risk to human or wildlife health. Herbicides are proposed for non-native invasive species treatment in the Proposed Action and Alternative III. Glyphosate is a biodegradable herbicide classed as practically non-toxic, with an oral LD50 of >5000 mg/kg (a single lethal dose that kills 50 percent of a test population). Using toxicological data, the EPA has established the human acceptable daily intake (ADI) value for glyphosate at 0.10 mg/kg body weight/day. This ADI value translates into a maximum permissible intake (MPI) value of 6 mg glyphosate/day for the entire human life span.

Triclopyr is a broad-spectrum herbicide that is also biodegradable and practically non-toxic. In forestry, it is labeled for site preparation and release. Methods of application include cut-surface treatments, foliar spray, and basal bark spray. Triclopyr is primarily absorbed by plant leaves and is readily moved throughout the plant. It affects plants by interfering with normal growth processes. In soil, triclopyr is not highly mobile. It is rapidly broken down by soil microorganisms and ultraviolet light. It is present an average of 30-56 days depending on soils and weather. Its half-life in water is about 10 hours at 72°F. For more information on the latest SERA Risk Assessments on Glyphosate and Triclopyr published in 2011 go to www.sera-inc.com.

The Revised Forest Plan allows for herbicide use at the lowest effective rate. The watershed analysis calls for the potential use of 1.3 pounds/acre of Glyphosate to be used for cut-surface treatments and 1 pound/acre for foliar spray treatments. In the SERA Final Report for the Risk Assessment on Glyphosate they used a typical application rate of 2 pounds/acre and found the following: “Based on the typical application rate of 2 lbs a.e./acre, none of the hazard quotients for acute or chronic scenarios reach a level of concern even at the upper ranges of exposure. This is consistent with the risk characterization given by U.S. EPA/OPP (1993c. p.53): Based on the current data, it has been determined that effects to birds, mammals, fish, insects, and invertebrates are minimal”. Given this, no further analysis of Glyphosate was done using the SERA worksheets. Triclopyr-acid would be applied at a rate of up to 4 lbs/acre for cut-surface treatments and triclopyr-bee at a rate of up to 2 lbs/acre for foliar spray.

The project-specific SERA worksheets completed for this herbicide indicated an increased hazard under certain scenarios in the use of glyphosate. The risk characterization of a worker applying herbicides using a "directed ground spray (backpack)" shows an increased risk for both the typical and upper level applications. This risk can be mitigated however, by requiring the worker to wear the proper attire and safety equipment; have properly functioning equipment; apply the herbicide at the proper rate; work in an organized fashion so as to not re-enter treated areas; by not exceeding the "typical" length of workday (7 hours) and other measures.

The risk characterization for the general public on the SERA worksheets shows several scenarios with an increased risk of acute/accidental and chronic exposures. Public safety in and around areas of herbicide use is a high priority concern. Measures are taken to help ensure that the general public does not come in contact with herbicides. These include posting warning signs on areas that have been treated; selectively targeting for application only that vegetation that needs to be controlled rather than using a broadcast application; establishing buffer zones of non-treatment around private property, streams, roads and hiking trails; carefully transporting only enough herbicide for one days use; mixing it on site away from private land, open water or other sensitive areas; properly maintaining and operating equipment (e.g. no leaks); and having good accident preplanning and emergency spill plans in place. These measures along with others are incorporated into contracts and through good enforcement and administration will be effective in reducing the risk of accidental contamination of humans or the environment.

Herbicides and application methods were chosen to minimize risk to human and wildlife health and the environment (Revised Forest Plan, Part 3, pg 87, HU004). The Revised Forest Plan includes standards for applying herbicides to reduce the possibility of adverse effects. These standards are required at all phases of the project including being incorporated as clauses in contracts (Revised Forest Plan, Part 3, pp 77, 80, 87-89, and 106). In conclusion, application of herbicide at the stated rates would pose only an acceptably low risk to the workers and public in the environment. Indirect risks to the public from the use of hand tools would include the risk of falling on a remaining stump-stub. This risk would be minimized by maintaining attention to one's path of foot traffic. Although hand tools pose a risk to forest workers for injury and accidents, the required proper personal protective equipment would lessen the likelihood of injuries.

Refer to the Air Quality section of this Chapter for disclosure of effects on public health and safety from prescribed burning. Refer to the Water Quality section of this Chapter for additional disclosure of effects on public health and safety from herbicide application.

CUMULATIVE EFFECTS

Refer to the Air Quality section and Water Quality section of this Chapter for cumulative effects on public health and safety from prescribed burning. There are no other known or expected activities within the geographic bounds and timelines that would contribute to a cumulative effect on public health and safety.

ALTERNATIVE II (same as Proposed Action without the use of herbicides)

The direct, indirect, and cumulative effects of Alternative II would be the same as those disclosed above for the Proposed Action with the exception of herbicide use. Since no herbicides would be utilized under this alternative, there would be no direct, indirect, or cumulative effects on public health and safety resulting from herbicide use.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

No direct effects on public health and safety would occur. No Action could have a negative indirect effect to public health and safety in the event that wildfires occur and create excessive smoke, or smoke that fails to disperse.

CUMULATIVE EFFECTS

There are no other known or expected activities within the geographic bounds and timelines that would contribute to a cumulative effect on public health and safety.

RECREATION RESOURCES

Present Conditions

East Fork has a rich history of recreational hunting of various game species. This includes whitetail deer, eastern wild turkey, bobwhite quail, raccoon and limited black bear hunting. There are a few scattered primitive hunter camps within this area, but no developed sites. Some forest visitors do recreate in this area by driving for pleasure, photography and wildlife viewing. This EMU is classified as Roaded Natural with no significant visual concerns that could arise from vegetation management.

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on recreation resources encompass both analysis area and the entire view shed as viewed from the transportation system. Timelines for measuring the effects on the recreation values are the immediate user experience and the values and memories created for a lifetime. The user experiences created or affected by the proposed management activities would be from short term to possibly indefinitely.

PROPOSED ACTION

A **direct effect** of the Proposed Action would be during harvest operations. The evidence of human activity in the area would increase due to the activity associated with logging. This activity may temporarily displace hunters and other dispersed users. Following harvest, logging activity and equipment would leave the area and disruption would cease. In the future, prescribed burning could temporarily limit the activities that would occur on these areas. Initially, prescribed burning may produce ash, which sometimes disturbs hunting dogs. However, this ash would settle after 2 or 3 rains. The slash produced in logging areas could impede foot travel in the areas for 2 or 3 years until the slash decomposed. The habitat work proposed in this alternative would promote diversity for both game and non-game species, increasing recreational opportunities for hunting and bird watching. **Direct effects** from this alternative would include an increase in hunting and other dispersed recreational use over time as a result of management activities. The Proposed Action proposes both wildlife stand improvements and pond rehabilitation. The direct effect of these actions would be minimal on recreation activities. Herbicide work would temporarily display evidence of increased human activity within *East Fork* due to traffic associated with the herbicide workers. Recreational users would notice negligible impacts on wildlife and vegetation due to the timing of the herbicide application. **Indirectly**, wild game for hunting would be more abundant due to new growth and increased browse as a result of timber management and prescribed burning activities. Hunting and dispersed camping would continue to occur and most likely increase.

CUMULATIVE EFFECTS

Cumulatively, an increase in dispersed recreational use would be expected to occur. Proposed management activities would result in improved access to the general forest, enhanced wildlife habitat, and a more open forest appearance.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

Under this alternative, there would be no additional management activity occurring within the project area. Only routine maintenance would continue. **Indirect effects** include a reduction in the number of dispersed recreation

users due to vegetative growth having a negative impact on access and wildlife encounters. **Indirectly**, wild game would not be as abundant due to no timber harvesting or prescribed burning. The result would be a reduction in hunting activity within the project area.

CUMULATIVE EFFECTS

Cumulatively, no timber harvesting or prescribed burning would result in an unhealthy forest becoming susceptible to insects and disease while allowing the understory and midstory to become dense where openings or gaps occur. Dispersed recreational use would eventually decrease because of an overgrown condition and eventually become stagnant.

NO HERBICIDE ALTERNATIVE II

Direct, indirect, and **cumulative effects** are estimated to be similar to the effects of the Proposed Action, without the increased human activity associated with a herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects resulting from road construction would not occur. Because fewer acres would be harvested, the extent of logging effects would be reduced.

VISUAL RESOURCES

Present Conditions

East Fork is a very accessible area of the forest, located approximately6 air miles east of Waldron, Arkansas. The rolling topography and gentle slopes are visible from various Forest Service graveled roads, county roads 91 & 93 and state highways 80 & 248. The Forest Service utilizes the Scenery Management System (SMS) to evaluate land management activities in the context of the integration of benefits, values, desires, and preferences regarding aesthetics and scenery. The SMS provides an overall framework for the orderly inventory, analysis, and management of scenery. The system applies to every acre of national forest and national grassland administered by the Forest Service and to all Forest Service activities.

Scenic integrity generally refers to the degree of intactness or wholeness of the landscape character. Human alteration can increase, lower, or maintain the scenic integrity of a landscape. The existing landscape character being viewed is the frame of reference for measuring scenic integrity and the potential effects of management activities. Scenic integrity levels for the Ouachita National Forest include Very High, High, Moderate, and Low. During the recent revision process for the Revised Forest Plan, a broad overview of Forest scenery resource was developed by establishing Forest-wide Scenic Integrity Levels using Geographic Information System (GIS) technology (USDA Forest Service 2005B, pp. 260-267). Scenic Integrity Levels establish the objective for management of the scenery resource and is called the Scenic Integrity Objective (SIO). (SIO map is in project file.)

The Western Arkansas Valley Mountains Subsection: The project area lies within the Western Arkansas Valley Mountains (Subsection 231Gb; USDA Forest Service 2005b, pp. 24-25, 262). The characteristic features of this subsection consist of low to moderate mountains and ridges interspersed with narrow to wide valleys. Forested slopes covered in shortleaf pine-oak are visible from the valley bottoms. Elevations range from 560 to almost 1,000 feet. Once within the forest, vegetation density prevents most views beyond the immediate foreground with occasional views beyond the foreground. Existing forest types are mainly shortleaf pine and oaks. The resulting vegetation form is evergreen needle-leaved forest with pockets of broad-leaved forest. These mixed pine-hardwood

forests draw numerous tourists to the region during two seasons of the year: the spring, when white dogwood blossoms seem to cover the hills, and the fall, when the mountains blaze with color.

The existing landscape character for the project area consists of moderate to gently rolling hills and lower elevation mountains with long ridges interspersed by narrow to wide valleys positioned in an east-west trending direction. Elevations generally range from 500-1500 ft. Above Sea Level (ASL). The visitor/viewer within the project area perceives a natural landscape having some evidence of human disturbance. Natural disturbances such as fire, wind, pests, or disease have not contributed significantly to vegetative patterns. Understory species include bushes, vines, briars, grasses, and various hardwoods (oak, hickory, dogwood, gum, maple, etc.). Generally forest roads in the project area follow the natural terrain. Users in this portion of the Forest include sightseers engaging in pleasure driving, dispersed camping, hunting and off Highway Vehicle (OHV) riding. Existing recreation use in this area is low to moderate and fits most of the experiences described as the Forest's niche: sightseeing, equestrian use, hunting and nature-viewing. The Scenic Integrity Objective for the majority of this project area is ***moderate***. See map below. Scenic opportunity and seen areas are somewhat limited within the project area. Most of the forest is of a closed-in view shed, meaning that vistas are limited or not present, and trees and understory are normally of such density that the seen area is normally limited to the foreground.

ENVIRONMENTAL EFFECTS

The geographic boundary for the effects on the visual resources encompasses both the foreground viewshed and areas outside the analysis area that would be viewed from forest development roads.

Timelines for measuring the effects on the visual resources are immediate, during planned management activities. Any vegetation manipulation techniques would be evident, to varying degrees, for decades. Analysis strategies include, but are not limited to, special techniques, modeling and evaluating all planned vegetation management and soil disturbing proposals.

PROPOSED ACTION

The scenic resource is affected by management activities that alter the appearance of what is visible in the landscape. Short-term scenic effects are usually considered in terms of degree of visual contrast with existing or adjacent conditions that result from management activity. The scenic landscape can be changed over the long-term or cumulatively by the alteration of the visual character. Management activities that result in visual alterations inconsistent with the assigned SIO, even with mitigation, affect scenery. Management activities that have the greatest potential of affecting scenery are road construction, large-scale and long-term vegetation management, insect and disease control, utility rights-of way, and mineral extraction. Other management activities that also can impact the scenic resource at a lesser degree are threatened and endangered (T&E) species habitat management, prescribed burning, fire suppression, land exchange, old growth forest management, recreation, administrative site facility construction, and wildlife management (USDA Forest Service 2005b, pp. 264, 265). The Scenery Treatment Guide-Southern Region National Forests would be followed.

Direct effects to the scenic character of the forest would occur largely in the form of changes in forest vegetation resulting from proposed timber harvest, prescribe burning, site preparation, reforestation treatments (including possible herbicide release), pond rehabilitation, temporary wildlife openings, and wildlife stand improvement activities (also with possible herbicide application). A **direct effect** would be a loss in vegetative screening. An **indirect effect** of timber harvest activity will be enhanced viewing depth and contrasting tree density. Harvest treatment will also result in a **direct effect** of logging or thinning residue (slash) such as treetops and branches accumulating on the ground. Slash will eventually decay resulting in reduced long-term effect to scenery. Travel-ways within the project area are dominated by a mostly closed view of the forest. Closely spaced trees and dense midstory and/or understory vegetation greatly limit depth of view. Providing some diversity of visibility, with the

development of more open forest conditions, was considered by the ID Team to be consistent with Scenic Integrity Objectives.

Prescribed burning will temporarily reduce the amount of understory vegetation, allowing for greater viewing depth into the forest. Burning would create the **direct effect** of a charred appearance on tree trunks and the forest floor. These effects would diminish in three to six months due to re-growth of vegetation on the forest floor, as well as natural leaf and needle shedding. This "green up" would restore a more natural appearance in the landscape.

Proposed stand improvements through release methods (including herbicide release) would result in a short-term direct effect on visual quality as the vegetation becomes brown and dies off. Over time the visual quality would increase as the leaves drop to the forest floor and decompose or are removed during prescribed burning as mentioned above. By implementing the proposed management activities it is expected that there will be an increase in the vigor or health of the forest that will reduce the **direct and indirect** negative effects to visual quality that could result in an alteration of the landscape due to tree damage or mortality caused by insects and disease. Because some of the management treatments target hardwoods, an **indirect effect** could be a loss of spring and fall colors. Changes in color and texture could possibly result from exposed soil in roads and skid trails; however this indirect effect should be expected to be short-term considering expected revegetation from natural conditions and/or restoration measures. With the implementation of controlled (prescribed) burning the potential **direct and indirect** detrimental effects to visual quality resulting from catastrophic fire are diminished. Prescribed burning substantially diminishes the potential for crown fires that could result in dead overstory trees and large burn scars on remaining live trees. Low intensity prescribed fires tends to create short-term color change.

CUMULATIVE EFFECTS

No cumulative effects are expected from implementation of this alternative because there are no other known or expected activities within the geographic bounds and timelines that would affect visual quality. The changes in the landscape would continue to appear natural to the observer.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

By not implementing the proposed activities, this Alternative would not alter scenic quality. Mature and over-mature trees would decay and die creating contrasts in form, line and texture. All changes in this landscape would appear natural to the observer. Scenic integrity may be compromised by not implementing harvest activities in this area. Densely stocked stands result in reduced vigor or health, which cause susceptibility to insects and disease. Infestations could result in tree death, negatively impacting visual quality. In the event of a catastrophic wildfire, crown fires, or those that sweep through the canopy, would create a visible change to the landscape. Snags would appear as black, brown, and gray "skeletons". Other trees would show burn scars. Burn scars on tree trunks or "torched trees" remain visible for a long time. Understory vegetation would quickly green up, however the standing burned vegetation would remain.

CUMULATIVE EFFECTS

No cumulative effects are expected from implementation of this alternative because there are no other known or expected activities within the geographic bounds and timelines that would affect visual quality. The changes in the landscape would continue to appear natural to the observer.

NO HERBICIDE ALTERNATIVE II

Direct, indirect, and cumulative impacts are expected to be similar to those of the Proposed Action without the effects of an herbicide application.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects attributable to road construction would not occur. Because fewer acres would be harvested, the extent of logging effects on scenic quality would be reduced.

HERITAGE RESOURCES

Present Conditions

Known Cultural Resources. Sixteen (16) archeological sites have been identified in or near the Project Area as a result of previous cultural resources inventory surveys. Based on scientific evaluation and consultation with the SHPO and Tribes, four (4) of the sites were determined to be ineligible for listing in the National Register of Historic Places. Twelve (12) of the sites will require more investigation to formally determine their eligibility and will need to be protected.

Site Locations Not Yet Known. Cultural resource surveys may not be complete for certain activities because additional planning may be required prior to implementation. These activities include, but are not limited to:

- Burn boundary and fireline construction locations
- Temporary roads, skid trails, and log landings outside areas already surveyed
- Road reconstruction, maintenance, conversion, or decommissioning activities involving ground disturbance occurring outside areas already surveyed
- New pond construction for wildlife water source

These areas will be surveyed and regulatory and tribal consultation completed prior to implementation.

ENVIRONMENTAL EFFECTS

The scope of the analysis for potential effects to cultural resources includes the entire *East Fork* Project Area and considers the proposed activities within treatment areas (see Chapters 1 and 2), as well as access to these areas.

An effect to a cultural resource is the "…alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." (36 CFR 800.16(i)) Any project implementation activity that has potential to disturb the ground has potential to directly affect archeological sites, as does the use of fire as a management tool. Specific activities outlined in the *East Fork* Project that have potential to directly affect cultural resources include timber harvesting and associated log landings, skid trails, and temporary roads, prescribed burning and associated fire line construction, road maintenance or reconstruction where ground disturbance takes place outside existing right-of-way area, and pond construction for wildlife water source.

Proposed activities that do not have potential to affect cultural resources, and therefore, are not considered undertakings for purposes of this project include: Non-commercial thinning, timber stand improvements, on-going maintenance of existing Forest roads or reconstruction of previously surveyed roads where ground disturbance does not take place outside existing road prisms and existing drainage features, rehabilitation/closure of temporary roads, log landings, and skid trails using non-ground disturbing methods, road decommissioning using non-ground disturbing methods, and non-native invasive plant species control using non-ground disturbing methods.

In general, proposed Project activities have the potential to affect cultural resources by encouraging increased visitor use to those areas of the Forest in which cultural resources are located. Increased visitor use of an area in which archeological sites are located can render the sites vulnerable to both intentional and unintentional damage. Intentional damage can occur through unauthorized digging in archeological sites and unauthorized collecting of artifacts from sites. Unintentional damage can result from such activities as driving motorized vehicles across archeological sites, as well as from other activities, principally related to dispersed recreation, that lead to ground

disturbance. Effects may also include increased or decreased vegetation on protected sites due to increased light with canopy layer reduction outside of the protected buffer.

PROPOSED ACTION AND ALTERNATIVE II (No Herbicide Use)

Direct and Indirect Effects

Proposed access changes (see §2.6.1.1, §3.4.8, and Road Status and Motor Vehicle Use Map, Appendix "B"), soil restoration work (see §3.4.2 and §3.4.3), and opening of forested areas from timber harvest (see Harvest and Road Work maps, Appendix "B") can impact cultural resources. Surface artifacts or features may be exposed, disturbed or removed due to increased access and visibility.

Project components that have potential to directly affect the archeological sites include primarily timber, prescribed fire, road management, and some wildlife management activities. Adverse effects to cultural resources resulting from *East Fork* Project activities could be avoided provided site avoidance and site protection measures are properly applied to the nine historic properties (see Chapter 2, technical requirements/design criteria). In that instance, Project activities would not be expected to adversely affect archeological sites.

Cumulative Effects

As noted in Section 2.7 (Other Past, Present, and Reasonably Foreseeable Actions), Forest Service activity in the Project Area and adjacent watershed areas has not been extensive. Project scoping and analysis have not disclosed any definitive plans for use on non-national forest lands in the Project Area. Cumulative effects to cultural resources are not expected to occur. Known or discovered historic properties will be monitored to ensure continued protection.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects attributable to road construction would not occur. Because fewer acres would be harvested, the extent of logging effects on heritage resources would be reduced.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

DIRECT AND INDIRECT EFFECTS

Currently, archeological surface and subsurface site integrity in the *East Fork* Project Area is subject to adverse effects from the buildup of hazardous fuels and the potential decline of unmanaged forest. These conditions pose the potential for increased tree mortality and wildfire intensity. Fires occurring in areas with dense concentrations of combustible material have the potential to burn with greater than normal intensity and duration, thereby altering the physical integrity and/or research value of archeological sites or site components. Resulting soil exposure can lead to an increase in erosion, thus disturbing or leading to a loss of archeological soil matrices and/or site components. With no change in current management activities and direction, adverse effects (and the potential for them) on a number of the archeological sites may continue. With the No Action Alternative, historic properties likely would continue to degrade. Where sites exist in currently accessible areas, such as along roads, there is potential for being impacted, disturbed, or vandalized due to accessibility. There would be no change in effects from the current condition, and the potential threat to integrity of cultural resources would remain unchanged.

CUMULATIVE EFFECTS

Cumulative effects are not expected to occur; there are no past or present actions affecting cultural resources, nor is there future actions planned that would affect cultural resources.

CLIMATE CHANGE

Present Conditions

Forests play a major role in the global carbon cycle by storing carbon in live plant biomass (approximately 50% of dry plant biomass is carbon), in dead plant material, and in soils. Forests contain three-fourths of all plant biomass on earth, and nearly half of all soil carbon. The amount stored represents the balance between absorbing CO2 from the atmosphere in the process of photosynthesis and releasing carbon into the atmosphere through live plant respiration, decomposition of dead organic matter, and burning of biomass (Krankina and Harmon, 2006).

Through the process of photosynthesis, carbon is removed from the atmospheric pool. About half the carbon absorbed through photosynthesis is later released by plants through respiration as they use their own energy to grow. The rest is either stored in the plant, transferred to the soil where it may persist for a very long time in the form of organic matter, or transported through the food chain to support other forms of terrestrial life. When plants die and decompose, or when biomass or its ancient remains in the form of fossil fuels are burned, the original captured and stored carbon is released back to the atmosphere as CO2 and other carbon-based gases. In addition, when forests or other terrestrial ecosystems are disturbed through harvesting, conversion, or natural events such as fires, some of the carbon stored in the soils and organic matter, such as stumps, snags, and slash, is oxidized and released back to the atmospheric pool as CO2. The amount released varies, depending on subsequent land use and probably rarely is more than 50% of the original soil store (Salwasser, 2006). As forests become older, the amount of carbon released through respiration and decay can exceed that taken up in photosynthesis, and the total accumulated carbon levels off. This situation becomes more likely as stands grow overly dense and lose vigor. Wildfires are the greatest cause of carbon release from forests. At the global scale, if more carbon is released than is captured and stored through photosynthesis or oceanic processes, the concentration of carbon dioxide (CO2) builds in the atmospheric pool. However, the greatest changes in forest sequestration and storage over time have been due to changes in land use and land use cover, particularly from forest to agriculture and more recently changes are due to conversions from forest to urban development, dams, highways, and other infrastructure (Malmsheimer et al., 2008).

ENVIRONMENTAL EFFECTS

PROPOSED ACTION

The proposed harvest operations would result in a release of carbon and reduce carbon storage in the forest both by removing organic matter (trees) and by increasing heterotrophic soil respiration. However, much of the carbon that is removed is offset by storage in forest products. Forest management that includes harvesting provides increased climate change mitigation benefits over time because wood-decay CO2 emissions from wood products are delayed (Malmsheimer et al., 2008). Prescribed burning activities, although a carbon neutral process, would release CO2, other greenhouse gasses, and particulates into the atmosphere. However, implementing the proposed prescribed burns on a 3 to 5 year cycle would reduce fuel loading and could be expected to reduce fire intensity and severity as well.

Indirectly, implementation of the proposed actions would increase the overall health, vitality, and growth within the project area, reduce the susceptibility to insects and disease, as well as reduce fuel accumulations and lower the risk for a catastrophic wildfire from occurring in the project area. This would serve as a way to increase carbon storage within the project area and mitigate carbon accumulation in the atmosphere.

CUMULATIVE EFFECTS

As GHG emissions and carbon cycling are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with this project or any number of projects. It is not expected that the effects of this project or multiple projects can be specifically attributed the cumulative effects on global climate change.

ALTERNATIVE II (same as Proposed Action without the use of herbicides)

The direct, indirect, and cumulative effects of Alternative II are the same as those disclosed above for the Proposed Action.

NO ROAD CONSTRUCTION ALTERNATIVE III

The effects of this alternative would be the same as the Proposed Action except any effects attributable to road construction would not occur. Because fewer acres would be harvested, the extent of logging effects (both positive and negative) on climate change would be reduced.

NO ACTION ALTERNATIVE I (Deferred Management Activities)

No management activities would occur under this alternative, therefore no direct effects on GHG emissions and carbon cycling would occur.

Because no management activities would take place under this alternative, carbon would continue to be sequestered and stored in forest plants, trees, (biomass) and soil. Unmanaged, older forests can become net carbon sources, especially if probable loss due to wildfires is included (Malmsheimer et al., 2008). In the absence of prescribed fire, fuel loadings would continue to increase and accumulate on the forest floor. In the event of a wildfire, fuel loading would be higher, increasing the risks of catastrophic damage to natural resources. This would result in a large release of GHG and carbon into the atmosphere. By deferring timber harvest activities, the forests would continue to increase in density. Over time this could pose a risk to density dependent mortality, insects, and disease. This could result both in a release of carbon from tree mortality and decomposition as well as hinder the forests ability to sequester carbon from the environment because live, vigorous stands of trees retain a higher capacity to retain carbon.

CUMULATIVE EFFECTS

As GHG emissions and carbon cycling are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with this project or any number of projects. It is not expected that the effects of this project or multiple projects can be specifically attributed the cumulative effects on global climate change.

CHAPTER 4 ID TEAM MEMBERS AND PRIMARY AUTHORS*

District Ranger Audie J. Brigance
Timber Management Assistant Scott Saunders*
USDA Forest Service Region 8 Air Quality Specialist Melanie Pitrolo*
Archeologist Lexi Rue-Harris*
Heritage Resource Technician Raymond McGrath
Heritage Resource Technician Marilyn Huddleston
Environmental Protection Assistant Donna Reagan (NEPA)*
Soil Scientist Jeff Olson*
Wildlife Biologist Warren Montague
Wildlife Biologist Jason Garrett*
Wildlife Biologist BJ Stephens*
Acting Silviculturist Nicole James*
Recreation Assistant John Strom*
Natural Resource Planner Jade Ryles
Fire Specialist Tim Nutley*
Forest NEPA Planner Lisa Cline

CHAPTER 5 PERSONS AND AGENCIES CONTACTED AND/OR CONSULTED

List of Agencies Consulted

Arkansas State Historic Preservation Officer
Arkansas Archeological Survey
The Osage Nation
Quapaw Tribe of Oklahoma
Caddo Nation of Oklahoma
The Choctaw Nation of Oklahoma

List of Contacts

Mailed Hardcopy

Jerry Williams
Howard Robinson
Richard A. Gordon

Mailed Electronically 03/16/2105

Dick Artley
cindy@arkansasheritage.org
dzollner@tnc.org
gguess@blm.gov
trulyjudy@msn.com
vcharmon@ou.edu
ramansour@hotmail.com
spiro.antzoulatos@gmail.com
jsturgeon@fs.fed.us
gibandella@hughes.net
lec@wildvirginia.org
jeremy.fancher@imba.com
bpell@fs.fed.us
okzonk@gmail.com
crimelady2004@yahoo.com
czmek@fs.fed.us
sjdlrn@hotmail.com
newearthlandscape@gmail.com
te1229t@yahoo.com
jim.parma@blpole.com
NWTF Biologist in Arkansas Jeremy Everitts
NWTF Conservation Field Supervisor Derek Alkire
ahammed.kabeer@efsme.com
jewlzmcq@gmail.com
amandafyffe81@gmail.com
jskusacorp@gmail.com
imluna47@yahoo.com
edsue.hawkins@gmail.com
randy.easley@carkw.com
matt.mcnair@arkansas.gov

CHAPTER 6 LITERATURE CITED

Arkansas Forestry Commission. 2002. Best Management Practices for Water Quality Protection.

Beasley, R.S., E. L. Miller and E. R. Lawson. 1987. Chemical Properties of Soils and Streams in Natural and Disturbed Forest Ecosystems in the Ouachita Mountains. Publication No. 132. Technical Completion Report Research Project G-1212-02. Arkansas Water Resources Research Center.

Clingenpeel, J. Alan. 1989. Above and Below Storm Sampling BMP Effectiveness FY 1989 Monitoring Results. Internal report on file at the Ouachita National Forest, Supervisors Office, Hot Springs. AR. 2 pages.

EPS-HDT. 2014. Economic Profile System-Human Dimensions Toolkit. (http://headwaterseconomics.org/tools/economic-profile-system)

Garrett, Jason; Stephens, William. September, 2015. Biological Evaluation of Environmental Assessment for East Fork.

Guynn, D. C., Guynn, S. T., Wigley, T. B. and Miller, D. A. (2004), Herbicides and forest biodiversity—what do we know and where do we go from here?. Wildlife Society Bulletin, 32: 1085–1092. doi

Hardy, Colin C.; Ottmar, Roger, D; Peterson, Janice L., Core, John E., and Seamon, Paula. 2001. Smoke Management Guide for Prescribed and Wildland Fire. National Wildfire Coordination Group. 226 p. http://www.nwcg.gov/pms/pubs/SMG/SMG-72.pdf

Krankina O.N. and Harmon M.E. 2006. Forest, Carbon, and Climate Change: A Synthesis of Science Findings. A Project of Oregon Forest Resources Institute, Oregon State University College of Forestry, and the Oregon Department of Forestry. pp. 79-85.

Lacki, M. J., J. P. Hayes, and A. Kurta (eds.). 2007. Bats in Forests: Conservation and Management. Johns Hopkins University Press, Baltimore, Maryland, 329 pp.

Lippe, M.V. and I. Kowarik. 2006. Long-distance dispersal of plants by vehicles as a driver of plant invasions. Conservation Biology 21: 986-996.

Malmsheimer, R.W., Heffernan, P., Brink, S., et al. “Forest Management Solutions for Mitigating Climate Change in the United States”. Journal of Forestry. April/May 2008. pp 141-156.

Perry, Thill, & David Jr., 2008 Summer Roosting by Adult Male Seminole Bats in the Ouachita Mountains, Arkansas

Perry, R.W. and R.E. Thill. 2007. Roost selection by male and female northern long- eared bats in a pine-dominated landscape. Forest Ecology and Management 247(1): 220- 226. - See more at: http://forestamerica.org/content/letter-fws-proposed-listing-northern-long-eared-bat-endangered-species-midwest-and-southeast#sthash.2pXMhnwe.dpuf

Ryles, J. 2013. East Fork Stream Monitoring 2013. Unpublished report on file at Ouachita NF, Poteau/ Cold Springs Office.

Salwasser, H. 2006. Forest, Carbon, and Climate Change: A Synthesis of Science Findings. A Project of Oregon Forest Resources Institute, Oregon State University College of Forestry, and the Oregon Department of Forestry. pp. 3-5.

Sandberg, David V.; Hardy, Colin C.; Ottmar, Roger D.; Snell, J.A. Kendall; Acheson, Ann; Peterson, Janice L.; Seamon, Paula; Lahm, Peter; Wade, Dale. 1999. National strategic plan: Modeling and data systems for wildland fire and air quality. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 60 p.

USDA Forest Service. 1991a. Forest Service Manual 2605.

USDA Forest Service. 1991b. Forest Service Manual 2621.1.

USDA Forest Service. 1994. A Cumulative Effects Analysis of Silvicultural Best Management Practices Using Basin Area Stream Survey Methods (BASS). Ouachita National Forest. Hot Springs AR 71902 Vols. I and II. 129 pages

USDA Forest Service. 2003. A Summary and Analysis of Data pertaining to MIS for the Ouachita National Forest, August 2003.

USDA Forest Service. 2004. National Strategy and Implementation Plan for Invasive Species Management. FS 805, October 2004. 24 pp.

USDA Forest Service, 2005a. Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005.

USDA Forest Service, 2005b. Final Environmental Impact Statement (FEIS), Revised Land and Resource Management Plan, Ouachita National Forest, Arkansas and Oklahoma, 2005

USDA Forest Service. 2010. Decision Notice and Finding of No Significant Impact, Salvage of Dead, Down, and/or Damaged Timber on National Forest Lands within Sebastian, Polk, Scott, Logan, and Yell Counties, Arkansas Located on the Poteau-Cold Springs Ranger District

US Environmental Protection Agency (EPA). 1996. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources. Washington D.C. [online]. http://www.epa.gov/ttnchie1/ap42/

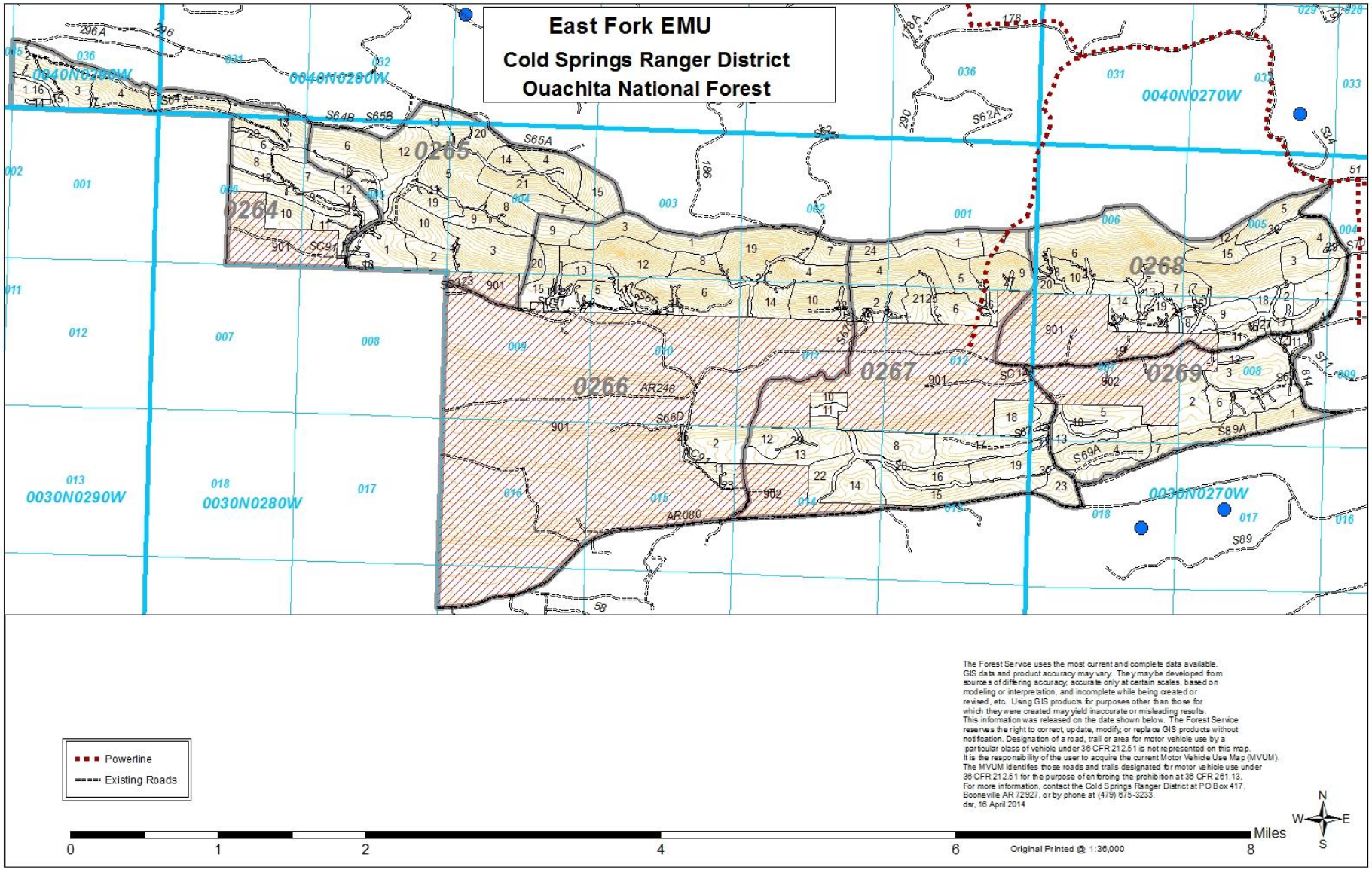
US Environmental Protection Agency (EPA). 2013. The Green Book Nonattainment Areas for Criteria Pollutants. Washington D.C. [online] http://www.epa.gov/oaqps001/greenbk/index.html

US Environmental Protection Agency (EPA). 2013. National Emissions Inventory (NEI) Air Pollutant Emissions Trends Data. Washington D.C. [online]. http://www.epa.gov/ttnchie1/trends/ and ftp://ftp.epa.gov/EmisInventory/2011/2011neiv1_eventfire_countyscc_caphap.zip

US Environmental Protection Agency (EPA). 2014. AirData. Washington D.C. [online] http://www.epa.gov/airdata/

US Fish and Wildlife Service. 2013. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Eastern Small-Footed Bat and the Northern Long-Eared Bat as Endangered or Threatened Species; Listing the Northern Long-Eared Bat as an Endangered Species

APPENDIX A – STAND MAP



APPENDIX B – DESIRED, EXISTING, NEEDS

Results of National Forest Management Act (NFMA) analysis describing desired conditions, existing conditions, site specific needs, and possible management activities.

Desired Conditions	Existing Conditions	Site Specific Needs	Possible Management Activities
Maintain or restore community diversity-and a significant component of species diversity-by utilizing prescribed burning in appropriate portions in Management Area 14 (Revised Forest Plan, pp 35).	Trees in many pine stands are crowded or densely stocked; many Forest stands are older than 70 years of age. These conditions result in stress and reduced vigor and health, increasing susceptibility to insects and disease.	Need to restore healthy conditions by limiting overstory, and open the overstory to create suitable wildlife habitats by removing unhealthy trees, and reducing stocking.	Commercial Thinning Wildlife Stand Improvements Prescribed Burning
To have at least 6% and not more than 14% of the suitable land in the 0-10 year age class in Management Area 14 (Revised Forest Plan, pp. 7-8).	There are no acres of suitable in the 0-10 year age class in Management Area 14, not meeting the minimum of 6%	Need to increase early seral stage habitat within *East Fork*.	Modified Seed Tree Modified Shelter wood Clear Cut Wildlife openings Construct, close and seed temporary roads
Manage the project area for native species while limiting nonnative species and off-site species (Revised Forest Plan, pp.6, 58, 59, 60, 82).	There are various nonnative and off-site species including loblolly pine, mimosa, lespedeza, privet, etc. C-268 (Stands 2, 16, 17, 18) consists of the off-site species loblolly pine.	Need to remove and/or reduce the nonnative and off-site species within the project area and where possible replace with native species. Remove loblolly from C-268 (Stands 2, 16, 17, 18) and replace with Shortleaf pine.	Prescribed burning Clear cut Loblolly Herbicide Hand Tools
Improve or maintain soil quality (Revised Forest Plan pp.74).	There are several scattered pockets of mod-high, high, and severe compaction concerns on soils in the project area.	Need to ensure Best Management Practices are followed and use mitigation where necessary.	Mitigation
To reduce midstory and allow development of grasses and forbs at ground level (Revised Forest Plan, OBJ06, pp. 59, WF001, pp. 78).	Midstory is too dense to allow development of grasses and forbs	Need to reduce the midstory.	Wildlife Stand Improvement (WSI) & Prescribed Burning
To have sufficient numbers of nest structures (Revised Forest Plan, pp. 77, WF009, pp.79)	Nest boxes are either non-existent or need to be replaced	Need to increase numbers of nest structures	Install nest boxes at pond construction & reconstruction sites

Desired Conditions	Existing Conditions	Site Specific Needs	Possible Management Activities
To have a healthy forest stand (Revised Forest Plan, pp.58-60, 80-83).	Conditions do not exist for successful natural regeneration. There are several stands that are dense and need treatment, mostly in the 10-20 year age class. Competition among species is reducing growth rate affecting tree quality.	Need to create a bed for seed fall after the regeneration harvests. Need to create a suitable seedbed in regeneration sites after initial prescribed burning in even-age regeneration stands. Need to create a suitable seedbed in the even-age regeneration stands after initial prescribed burning and handtools. Need to reduce the stocking rate in stands, where needed. Need to decrease competition for limited nutrients and water among species.	Reforestation Treatments Prescribed Burning Site Prep by Hand tools Site Prep Mechanical Scarification Hand planting of shortleaf pine, Pre-commercial Thin Hand Tool Release Commercial Thinning
To provide at least one permanent water source per 160 acres for wildlife objectives (Revised Forest Plan, WF010, pp. 79)	There are 9 existing ponds. All ponds need some type of reconstruction. Twenty three (23) additional water sources are needed.	Reconstruct 9 existing ponds and construct 23 new ponds.	Pond construction & reconstruction
To have the understory and midstory more open, & dominated by herbaceous vegetation (Revised Forest Plan, WF001, pp. 78)	The understory and midstory currently meet the Forest Plan objectives as a result of past prescribed burning practices.	Need to ensure that the understories and midstories maintain open condition with prescribed fire	Prescribed burning and WSI treatments
Improve or maintain water resources (Revised Forest Plan pp. 74).	This project area falls within one 6th level watershed – East Fork-Poteau River Watershed 111101050101-High Risk. (17,668 acres).	Need to ensure that management activities meet Revised Forest Plan standards for water quality and follow Arkansas Best Management Practices (BMP's)	Mitigation
To have healthy, productive stands in these areas (Revised Forest Plan, pp.58 -60, 79-83).	Portions of this project area are acquired stands that have been cutover in the past and the entire project area is in Management Area 9 and Management Area 14.	Manage the cutover stands to meet Mgt. Area 14 objectives. Continue to manage the remaining project area to meet Mgt. Areas 9 and 14 objectives. Need to increase growth rates in these stands and create new age classes.	Commercial Thinning Seed Tree Shelterwood clearcut Prescribed Burning WSI Pre-commercial thinning
To have a reliable and abundant hard mast crop.	Hardwood crowns are not developed to produce a reliable and abundant hard	Need to develop hardwood crowns with WSI treatments, so that residual hardwoods will	Commercial Thinning

(Revised Forest Plan, OBJ003, pp. 78)	mast crop due to overstocked conditions.	produce a more reliable & abundant mast crop	WSI treatments
Desired Conditions	**Existing Conditions**	**Site Specific Needs**	**Possible Management Activities**
To achieve open road density (open road per square mile) objective (1.0 mi per sq mi) driven by wildlife concerns (Revised Forest Plan, pp. 59, 67, 90-92)	There are 5,108 acres of NF and 3,805 acres of private land resulting in approx. 7.98 sq. miles. There are 25.97 miles of total existing roads (both open and closed). Of these roads, 6.5 miles are currently open. Open road density is 0.81 mi. /rd. per sq. mile.	Need to maintain the open road density, where feasible.	None
To provide a safe transportation system that meets the minimum needs of the various resources and their users, minimizes wildlife habitat disturbance, and satisfies some public demand for motorized recreation (Revised Forest Plan, pp. 67).	Current road system is in constant use by hunters, sightseers, Forest Service personnel, and other forest visitors.	Need to access harvest units and provide safe road system. Need to repair rusted-out drains and road surface and ditch erosion. Ensure safe road conditions through periodic maintenance	Road Construction Road Reconstruction Prehaul Maintenance Temporary Roads Decommission Seasonal Closing
There is a need to provide recreation and visual opportunities in the project area. (Revised Forest Plan, pp. 4, 5, 22, 23, 24, 64).	Heavily traveled roads and mostly mature forest conditions are present. There are no scenic level I or II roads.	Maintain roads to standard and manage the project area to meet habitat requirements. All mgt. activities would meet Scenic Integrity Objectives (SIO) in Mgt. Area 22.	Road maintenance contract and monitor forest management practices.
To provide adequate protection of heritage resource sites. (Revised Forest Plan, pp. 21, 64)	There are known archeological sites and 8 are currently being protected	Need to use protective measure to ensure that known and found sites are protected.	Identify the other sites on the ground for protection. If any grave sites are discovered, they will be fenced and protected.
To reduce wildfire hazards. (Revised Forest Plan, pp. 25, OBJ42, OBJ43, pp.68, 69)	Natural fuel buildup and heavy visitor use, increase wildfire hazards in East Fork.	Need to create conditions where a wildfire would not become too hot to kill the overstory and a threat to adjacent private properties.	Prescribed Burning, commercial thinning, pre-commercial thinning, and WSI treatments.

APPENDIX C – PROPOSED ACTION

Matrix of Needed Road Work

Road Name	Segment	Type of Work	Description
296	NA	Reconstruct	Reconstruct approximately 0.50 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be seasonally open after harvest.
296A	NA	Reconstruct	Reconstruct approx. 0.50 mile of this road as needed to replace rusted out pipe 36 inches or larger and place riprap at slab as needed. Road will be seasonally open after harvest.
S64	NA	Reconstruct	Reconstruct approximately 0.50 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
S65	NA	Reconstruct	Reconstruct approximately 0.43 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
S66C	NA	Reconstruct	Reconstruct approximately 0.70 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
S68	NA	Reconstruct	Reconstruct approximately 0.90 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
SC91	NA	Reconstruct	Use a County Road Agreement to place surfacing where needed for up to 1.0 mile.
			Total Reconstruction – 4.53 miles.
296	NA	Prehaul Maintenance	2.0 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
296A	NA	Prehaul Maintenance	0.90 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
S64	NA	Prehaul Maintenance	1.18 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest.
S65	NA	Prehaul Maintenance	0.43 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest.
S65A	NA	Prehaul Maintenance	1.52 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
S65C	NA	Prehaul Maintenance	1.85 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S64B	NA	Prehaul Maintenance	1.50 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S66A	NA	Prehaul Maintenance	0.70 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S67	NA	Prehaul Maintenance	0.80 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S65B	NA	Prehaul Maintenance	0.50 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
S66A	NA	Prehaul Maintenance	0.40 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S67A	NA	Prehaul Maintenance	0.40 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S67B	NA	Prehaul Maintenance	0.90 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S69	NA	Prehaul Maintenance	0.89 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S69A	NA	Prehaul Maintenance	1.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S69B	NA	Prehaul Maintenance	0.49 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest

S89A	NA	Prehaul Maintenance	1.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
186	NA	Prehaul Maintenance	4.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
186A	NA	Prehaul Maintenance	0.75 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
814	NA	Prehaul Maintenance	0.50 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S63	NA	Prehaul Maintenance	0.30 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
			Total Prehaul Maintenance – 22.01 miles
			Total Construction – None
S64A	NA	Road to Obliterate	Obliterate this road as it is in a poor location and not needed any more, 0.20 mile.
			Total Road Obliteration – 0.20 miles
Temp Roads			10.0 miles – Many of these are old roads that would be opened. A few would be new. All temporary roads would be closed after harvest.
Various		Decks	Approximately 100 decks to be seeded as temporary wildlife openings.

Firelines would be constructed around perimeters of all natural and artificial regeneration areas (i.e. seedtree or existing regeneration areas). The mechanically constructed fireline would be bladed down to mineral soil and approximately 8 feet wide. Bladed lines would be water barred as necessary on slopes to limit soil movement. Firelines would normally be installed within 50 feet either side of stand boundaries. The purpose of a fireline is for "control" if a prescribed fire is applied to the stands for site preparation and/or to exclude fire during years of stand development.

Nest boxes for other species would also be installed where appropriate.

All Regeneration Stands would have **reforestation** and **timber stand improvement** activities**:**

- Site Preparation, Release, Mechanical Scarification, and TSI.
- (If activities are not successful, rip and plant with shortleaf pine; hand tool release and pre-commercial thinning would be utilized—no herbicides)

Permits would be offered to the public for collection of rocks by private individuals within road construction and reconstruction corridors. That is, rocks can be collected within areas of disturbance associated with road construction and reconstruction. Firewood and shale pit permits may be issued.

Compartment 264 Proposed Actions

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	27	27											R-1
2	Suitable New Regen	40	40						40	40				
3	Suitable	46	46											
4	Suitable	57	57											
5	Suitable	50	50	50									50	
6	Suitable	46	46											
7	Suitable	43	43	43									43	
8	Suitable	31	31	31									31	
9	Suitable	59	59											R-1
10	Suitable New Regen	40	40						40	40				
11	Suitable	28	28	28									28	
12	Suitable	28	28											
13	Suitable	54	54	54									54	
14	Suitable Progeny Test site	4	No Burn											
15	Suitable	9	9											
16	Drain-Uns.	7	7											
17	Drain-Uns.	2	2											
18	Drain-Uns.	4	4											
19	Drain-Uns.	15	15											
20	Drain-Uns.	5	5											
TOTAL		**595**	**591**	**206**	**0**	**0**	**0**	**0**	**80**	**80**	**0**	**0**	**206**	**R-2**

*See Proposed Management Activities descriptions and footnotes on Summary of Proposed Actions page

Compartment 265 Proposed Actions

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	67	67											
2	New Regen Suitable	35	35						35	35				
3	Suitable	98	98				98							
4	Suitable	47	47				47							
5	Suitable	84	84				84							
6	Suitable	75	75				75							N-1
7	Suitable hdw>pine	38	38	38									38	N-1
8	Suitable New Regen	40	40						40	40				N-1
9	Suitable	28	28	28									28	
10	Suitable	51	51	51									51	N-1
11	Drain-Uns.	62	62											
12	Suitable	71	71	71									71	N-1
13	Suitable	34	34	34									34	
14	Suitable	23	23	23									23	
15	Suitable	47	47	47									47	N-1
16	Suitable	28	28	28									28	
17	Drain-Uns.	2	2											
18	Unsuitable Shale pit	1	No Burn											
19	Suitable Old Regen	32	32								32			
20	Suitable Old Regen	47	47								47			N-1
21	Unsuitable	48	48											
TOTAL		**958**	**957**	**320**	**0**	**0**	**304**	**0**	**75**	**75**	**81**	**0**	**320**	**N-7**

*See Proposed Management Activities descriptions and footnotes on Summary of Proposed Actions page

Compartment 266 Proposed Actions

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	39	39	39									39	N-1
2	Suitable Old Regen	68	68									68		
3	Suitable Old Regen	54	54									54		
4	Unsuitable	47	47											
5	Suitable	49	49											
6	Suitable	110	110											N-2
7	Suitable New Regen	31	31						31	31				N-1
8	Unsuitable	24	24											
9	Suitable	32	32	32									32	
10	Suitable Old Regen	63	63									63		N-1
11	Suitable New Regen	17	17						17	17				R-1
12	Unsuitable	108	108											
13	Suitable	30	30						30	30				
14	Suitable	36	36						36	36				
15	Suitable	39	39	39									39	R-1
16	Drain-Uns.	6	6											
17	Drain-Uns.	13	13											
18	Drain-Uns.	9	9											
19	Unsuitable	108	108											
20	Suitable	17	17				17							
21	Drain-Uns.	18	18											
22	Drain-Uns.	4	4											
23	Drain-Uns.	2	2											
24	Drain-Uns.	5	5											
25	Drain-Uns.	4	4											
TOTAL		**933**	**933**	**110**	**0**	**0**	**17**	**0**	**114**	**114**	**0**	**185**	**110**	**R-2 N-5**

*See Proposed Management Activities descriptions and footnotes on Summary of Proposed Actions page

Compartment 267 Proposed Actions

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	54	54	54									54	
2	**Suitable**	52	52	52									52	
3	Drain-Uns.	3	3											
4	Unsuitable	83	83											
5	Unsuitable	35	35											
6	Suitable	42	42											R-1
7	Suitable	34	34	34									34	N-1
8	Suitable	67	67											R-1
9	Unsuitable	63	63											
10	Unsuitable	13	13											
11	Drain-Uns.	11	11											
12	Suitable New Regen	33	33						33	33				
13	Suitable	77	77	77									77	N-1
14	Suitable	52	52	52									52	
15	Suitable	95	95	95									95	
16	Suitable New Regen	35	35						35	35				
17	Suitable	88	88	88									88	
18	Suitable New Regen	40	40						40	40				
19	Suitable	53	53	53									53	N-1
20	Drain-Uns.	37	37											
21	Suitable	35	35											N-1
22	Old Regen	34	34								34			
23	Suitable New Regen	33	33						33	33				
24	Suitable	25	25	25									25	N-1
25	Drain-Uns.	6	6											
26	Drain-Uns.	8	8											
27	Drain-Uns.	2	2											
28	Drain-Uns.	2	2											
29	Drain-Uns.	4	4											
30	Drain-Uns.	3	3											
31	Drain-Uns.	2	2											
32	Unsuitable	2	2											
TOTAL		1123	1123	530	0	0	0	0	141	141	34	0	530	R-2 N-5

*See Proposed Management Activities descriptions and footnotes on Summary of Proposed Actions page

Compartment 268 Proposed Actions

Stand	Manage -ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	68	68	68									68	
2	Suitable Regen takes loblolly from drains	14	14					14		14				
3	Suitable	42	42	42									42	N-1
4	Suitable	61	61	61									61	
5	Suitable	51	51	51									51	N-1
6	Unsuitable	330	330											N-1
7	Suitable	52	52	52									52	
8	Suitable	5	5											
9	Suitable	38	38											
10	**Suitable New Regen**	**25**	**25**											
11	Suitable	22	22											
12	Unsuitable	18	18											
13	Suitable	13	13				13							
14	Suitable	46	46				46							R-1
15	Suitable	30	30											
16	Suitable Regen/loblolly	4	4					4		4				
17	Suitable Regen/loblolly	9	9					9		9				
18	Suitable Regen/loblolly	13	13					13		13				R-1
19	Suitable	28	28	28									28	N-1
20	Suitable	16	16											
21	Drain-Uns.	5	5											
22	Drain-Uns.	2	2											
23	Drain-Uns.	12	12											
24	Drain-Uns.	2	2											
25	Drain-Uns.	4	4											
26	Drain-Uns.	9	9											
27	Drain-Uns.	23	23											
28	Drain-Uns.	9	9											
29	Drain-Uns.	2	2											
30	Drain-Uns.	5	5											
TOTAL		**958**	**958**	**302**	**0**	**0**	**59**	**40**	**0**	**40**	**0**	**0**	**302**	**R-2 N-4**

*See Proposed Management Activities descriptions and footnotes on Summary of Proposed Actions page

Compartment 269 Proposed Actions

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable New Regen	40	40						40	40				
2	Suitable	64	64	64									64	
3	Suitable	90	90	90									90	
4	Suitable	71	71				71							N-1
5	Suitable	54	54	54									54	N-1
6	Suitable	65	65				65							R-1
7	Suitable	83	83	83									83	
8	Drain-Uns.	5	5											
9	Drain-Uns.	9	9											
10	Drain-Uns.	15	15											
11	Suitable	17	17	17									17	
12	Drain-Uns.	2	2											
13	Suitable	26	26	26									26	
TOTAL		**541**	**541**	**334**	**0**	**0**	**136**	**0**	**40**	**40**	**0**	**0**	**334**	**R-1 N-2**

*See Proposed Management Activities descriptions and footnotes on Summary of Proposed Actions page

APPENDIX D – ALTERNATIVE III

Matrix of Needed Road Work

Road Name	Segment	Type of Work	Description
296	NA	Reconstruct	Reconstruct approximately 0.50 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be seasonally open after harvest.
296A	NA	Reconstruct	Reconstruct approx. 0.50 mile of this road as needed to replace rusted out pipe 36 inches or larger and place riprap at slab as needed. Road will be seasonally open after harvest.
S64	NA	Reconstruct	Reconstruct approximately 0.50 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
S65	NA	Reconstruct	Reconstruct approximately 0.43 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
S66C	NA	Reconstruct	Reconstruct approximately 0.35 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
S68	NA	Reconstruct	Reconstruct approximately 0.90 mile of this road needed to replace rusted out pipe over 36 inches or larger and place riprap as needed at slabs. Road will be closed after harvest.
SC91	NA	Reconstruct	Use a County Road Agreement to place surfacing where needed for up to 1.0 mile.
			Total Reconstruction – 4.18 miles
296	NA	Prehaul Maintenance	2.0 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
296A	NA	Prehaul Maintenance	0.90 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
S64	NA	Prehaul Maintenance	1.18 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest.
S65	NA	Prehaul Maintenance	0.43 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest.
S65A	NA	Prehaul Maintenance	1.52 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
S65C	NA	Prehaul Maintenance	1.85 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S64B	NA	Prehaul Maintenance	1.50 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S66A	NA	Prehaul Maintenance	0.70 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S67	NA	Prehaul Maintenance	0.80 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S65B	NA	Prehaul Maintenance	0.50 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
S66A	NA	Prehaul Maintenance	0.40 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S67A	NA	Prehaul Maintenance	0.40 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S67B	NA	Prehaul Maintenance	0.90 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S69	NA	Prehaul Maintenance	0.89 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S69A	NA	Prehaul Maintenance	1.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
S69B	NA	Prehaul Maintenance	0.49 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest

S89A	NA	Prehaul Maintenance	1.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
186	NA	Prehaul Maintenance	4.00 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be seasonally open after harvest.
186A	NA	Prehaul Maintenance	0.75 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
814	NA	Prehaul Maintenance	0.50 miles of dozer blading to smooth road bed; add surfacing, clean ditches and maintain drainage structures between areas of reconstruction. Road would be closed after harvest
			Total Prehaul Maintenance – 21.71 miles
			Total Construction – None
S64A	NA	Road to Obliterate	Obliterate this road as it is in a poor location and not needed any more, 0.20 mile.
			Total Road Obliteration – 0.20 miles
Temp Roads			None
Various		Decks	Approximately 65 decks to be seeded as temporary wildlife openings.

Compartment 264 Alternative III

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	27	27											R-1
2	Suitable New Regen	40	40						40	40				
3	Suitable	46	46											
4	Suitable	57	57											
5	Suitable	50	50	50									50	
6	Suitable	46	46											
7	Suitable	43	43	43									43	
8	Suitable	31	31	31									31	
9	Suitable	59	59											R-1
10	Suitable New Regen	40	40						40	40				
11	Suitable	28	28	28									28	
12	Suitable	28	28											
13	Suitable	54	54	54									54	
14	Suitable Progeny Test site	4	No Burn											
15	Suitable	9	9											
16	Drain-Uns.	7	7											
17	Drain-Uns.	2	2											
18	Drain-Uns.	4	4											
19	Drain-Uns.	15	15											
20	Drain-Uns.	5	5											
TOTAL		**595**	**591**	**206**	**0**	**0**	**0**	**0**	**80**	**80**	**0**	**0**	**206**	**R-2**

*See Proposed Management Activities descriptions and footnotes on Alternative III summary page

Compartment 265 Alternative III

Stand	Manage -ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plan t w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	67	67											
2	New Regen Suitable	35	35						35	35				
3	Suitable	98	98				98							
4	Suitable	47	47				47							
5	Suitable	84	84											
6	Suitable	75	75				75							N-1
7	Suitable hdw>pine	38	38											
8	Suitable New Regen	40	40						40	40				N-1
9	Suitable	28	28	28									28	
10	Suitable	51	51	51									51	N-1
11	Drain-Uns.	62	62											
12	Suitable	71	71											
13	Suitable	34	34	34									34	
14	Suitable	23	23	23									23	
15	Suitable	47	47											
16	Suitable	28	28											
17	Drain-Uns.	2	2											
18	Unsuitable Shale pit	1	No Burn											
19	Suitable Old Regen	32	32								32			
20	Suitable Old Regen	47	47								47			N-1
21	Unsuitable	48	48											
TOTAL		**958**	**957**	**136**	**0**	**0**	**220**	**0**	**75**	**75**	**81**	**0**	**136**	**N-4**

*See Proposed Management Activities descriptions and footnotes on Alternative III summary page

Compartment 266 Alternative III

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	39	39											
2	Suitable Old Regen	68	68									68		
3	Suitable Old Regen	54	54									54		
4	Unsuitable	47	47											
5	Suitable	49	49											
6	Suitable	110	110											N-2
7	Suitable New Regen	31	31						31	31				N-1
8	Unsuitable	24	24											
9	Suitable	32	32											
10	Suitable Old Regen	63	63									63		N-1
11	Suitable New Regen	17	17						17	17				R-1
12	Unsuitable	108	108											
13	Suitable	30	30						30	30				
14	Suitable	36	36											
15	Suitable	39	39	39									39	R-1
16	Drain-Uns.	6	6											
17	Drain-Uns.	13	13											
18	Drain-Uns.	9	9											
19	Unsuitable	108	108											
20	Suitable	17	17											
21	Drain-Uns.	18	18											
22	Drain-Uns.	4	4											
23	Drain-Uns.	2	2											
24	Drain-Uns.	5	5											
25	Drain-Uns.	4	4											
TOTAL		**933**	**933**	**39**	**0**	**0**	**0**	**0**	**78**	**78**	**0**	**185**	**39**	**R-2 N-4**

*See Proposed Management Activities descriptions and footnotes on Alternative III summary page

Compartment 267 Alternative III

Stand	Manage-ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	54	54	54									54	
2	**Suitable**	52	52	52									52	
3	Drain-Uns.	3	3											
4	Unsuitable	83	83											
5	Unsuitable	35	35											
6	Suitable	42	42											R-1
7	Suitable	34	34	34									34	N-1
8	Suitable	67	67											R-1
9	Unsuitable	63	63											
10	Unsuitable	13	13											
11	Drain-Uns.	11	11											
12	Suitable New Regen	33	33											
13	Suitable	77	77	77									77	N-1
14	Suitable	52	52											
15	Suitable	95	95											
16	Suitable New Regen	35	35											
17	Suitable	88	88	88									88	
18	Suitable New Regen	40	40											
19	Suitable	53	53											
20	Drain-Uns.	37	37											
21	Suitable	35	35											N-1
22	Old Regen	34	34								34			
23	Suitable New Regen	33	33						33	33				
24	Suitable	25	25	25									25	N-1
25	Drain-Uns.	6	6											
26	Drain-Uns.	8	8											
27	Drain-Uns.	2	2											
28	Drain-Uns.	2	2											
29	Drain-Uns.	4	4											
30	Drain-Uns.	3	3											
31	Drain-Uns.	2	2											
32	Unsuitable	2	2											
TOTAL		**1123**	**1123**	**330**	**0**	**0**	**0**	**0**	**33**	**33**	**34**	**0**	**330**	**R-2 N-4**

*See Proposed Management Activities descriptions and footnotes on Alternative III summary page

Compartment 268 Alternative III

Stand	Manage -ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plant w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable	68	68	68									68	
2	Suitable Regen takes loblolly from drains	14	14											
3	Suitable	42	42											
4	Suitable	61	61											
5	Suitable	51	51											
6	Unsuitable	330	330											N-1
7	Suitable	52	52	52									52	
8	Suitable	5	5											
9	Suitable	38	38											
10	**Suitable New Regen**	**25**	**25**											
11	Suitable	22	22											
12	Unsuitable	18	18											
13	Suitable	13	13				13							
14	Suitable	46	46				46							R-1
15	Suitable	30	30											
16	Suitable Regen/loblolly	4	4											
17	Suitable Regen/loblolly	9	9											
18	Suitable Regen/loblolly	13	13											R-1
19	Suitable	28	28	28									28	N-1
20	Suitable	16	16											
21	Drain-Uns.	5	5											
22	Drain-Uns.	2	2											
23	Drain-Uns.	12	12											
24	Drain-Uns.	2	2											
25	Drain-Uns.	4	4											
26	Drain-Uns.	9	9											
27	Drain-Uns.	23	23											
28	Drain-Uns.	9	9											
29	Drain-Uns.	2	2											
30	Drain-Uns.	5	5											
TOTAL		**958**	**958**	**148**	**0**	**0**	**59**	**0**	**0**	**0**	**0**	**0**	**148**	**R-2 N-2**

*See Proposed Management Activities descriptions and footnotes on Alternative III summary page

Compartment 269 Alternative III

Stand	Manage -ment	Acres	RX Burn	Commercial Thin				Clear cut Loblolly/plan t w/shortleaf pine	Seed Tree	Reforestation and TSI of Proposed Regeneration Stands *	PCT *	TSI*	WSI*	Ponds N – new R - recon
				60 BA pine 10 BA Hdw	70 BA pine 10 BA Hdw	80 BA pine 10 BA Hdw	20' spacing							
1	Suitable New Regen	40	40											
2	Suitable	64	64	64									64	
3	Suitable	90	90											
4	Suitable	71	71				71							N-1
5	Suitable	54	54	54									54	N-1
6	Suitable	65	65				65							R-1
7	Suitable	83	83	83									83	
8	Drain-Uns.	5	5											
9	Drain-Uns.	9	9											
10	Drain-Uns.	15	15											
11	Suitable	17	17	17									17	
12	Drain-Uns.	2	2											
13	Suitable	26	26	26									26	
TOTAL		**541**	**541**	**244**	**0**	**0**	**136**	**0**	**0**	**0**	**0**	**0**	**244**	**R-1 N-2**

*See Proposed Management Activities descriptions and footnotes on Alternative III summary page

Under this alternative, there would be no road construction or temporary roads. Reconstruction and prehaul maintenance would be slightly less than the Proposed Action. See the transportation maps in Appendix H.

*****All Regeneration Stands** would have **reforestation** and **timber stand improvement** activities**:**

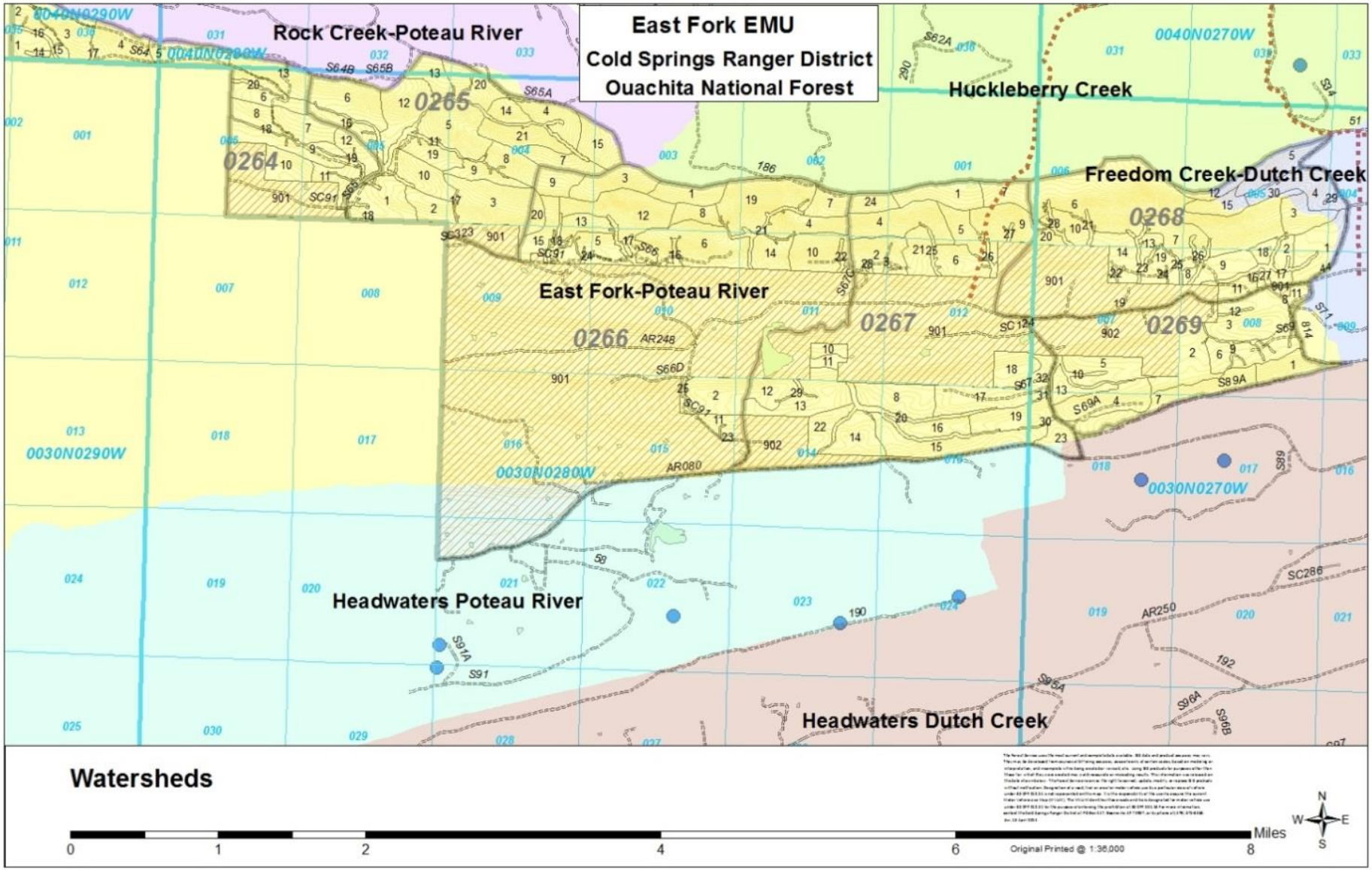
- Site Preparation, Release, Mechanical Scarification, and TSI.
- (If activities are not successful, rip and plant with shortleaf pine; hand tool release and pre-commercial thinning would be utilized—no herbicides)

Firelines would be constructed around perimeters of all natural and artificial regeneration areas (i.e. seedtree or existing regeneration areas). The mechanically constructed fireline would be bladed down to mineral soil and approximately 8 feet wide. Bladed lines would be water barred as necessary on slopes to limit soil movement. Firelines would normally be installed within 50 feet either side of stand boundaries. The purpose of a fireline is for "control" if a prescribed fire is applied to the stands for site preparation and/or to exclude fire during years of stand development.

Nest boxes for other species would also be installed where appropriate.

Permits would be offered to the public for collection of rocks by private individuals within road construction and reconstruction corridors. That is, rocks can be collected within areas of disturbance associated with road construction and reconstruction. Firewood and shale pit permits may be issued.

APPENDIX E – WATERSHED MAP



APPENDIX F – MATRIX OF EXISTING ROADS

Matrix for Existing Roads OUTSIDE East Fork EMU

Road Number	Road Name	Segment	Jurisdiction	Length (Miles)	Current Management Status	Future Management Status	Maintenance	Reconstruction Miles
296A	Square Rock Creek	FS	1.0	SO	SO	2	0.50 mile reconstruct and 0.50 mile PHM	296A
186	Sugar Bee	FS	2.50	SO	SO	2	PHM	186
296	Square Rock	FS	2.50	SO	SO	2	0.50 mile reconstruction and 2.0 miles PHM	296
178	White Oak	FS	7.02	O	O	3	NA	178
20	Girrard	FS	3.0	O	O	3	NA	20
S65A	Hand	FS	0.82	SO	SO	2	PHM	S65A
S65B	Hand Spur	FS	0.50	SO	SO	2	PHM	S65B
S66D	Prarrie Creek	PVT	0.40	PVT	PVT	1	Take this part off FS system	S66D
186A	----	FS	0.47	C	C	1	PHM	186A
SC91	WILLOW RIDGE	C	4.20	O	O	3	SPOT GRAVEL COUNTY AGREEMENT	SC91
S63	Boy	FS	0.30	O	O	1	PHM	S63

APPENDIX G – MATRIX OF EXISTING ROADS

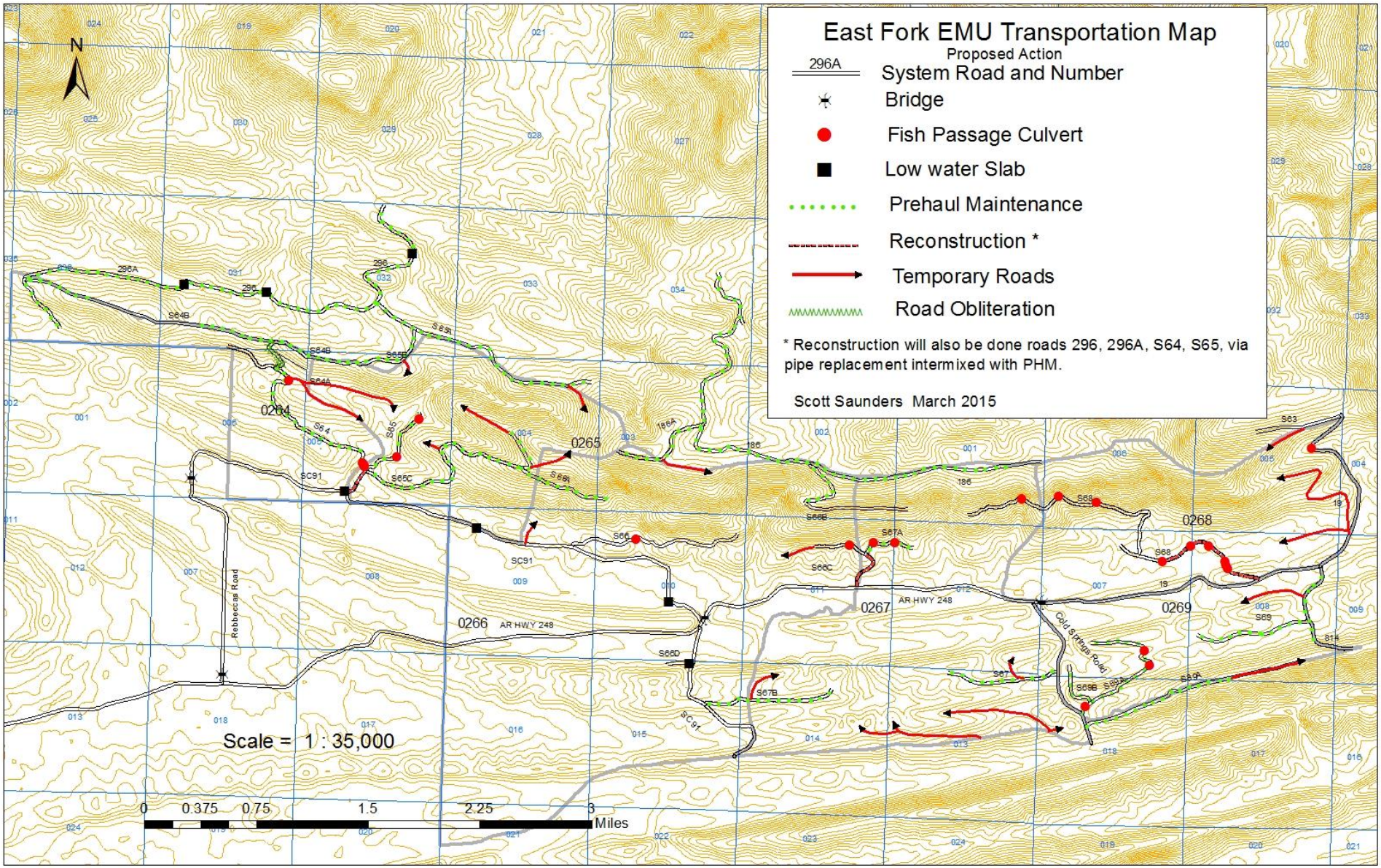
Matrix for Existing Roads WITHIN East Fork

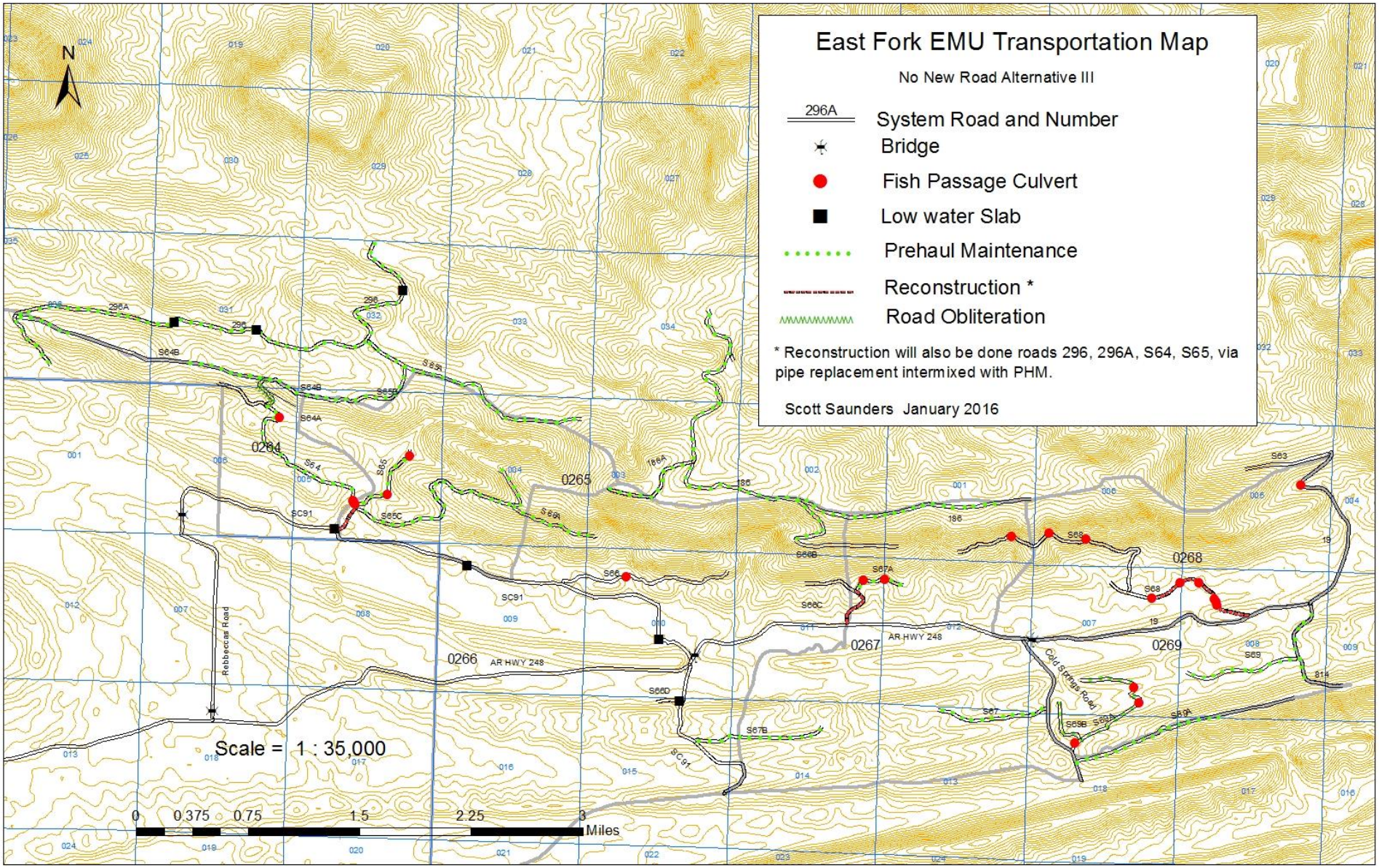
Road Number	Road Name	Jurisdiction	Length Miles	Current Management Status	Future Management Status	Maintenance	Reconstruction/ Pre Haul Maintenance / Obliteration
296A	Square Rock Creek	FS	0.40	SO	SO	2	PHM
S65	Bed Creek	FS	0.83	C	C	1	0.40 mile reconstruct and 0.43 mils PHM
S65A	Hand	FS	0.70 (0.39)	SO	SO	2	PHM
S65C	Est Bed Creek	FS	1.85	C	C	1	PHM
S64	Bed Creek Spur	FS	1.68	C	C	1	0.50 mile reconstruction and 1.18 miles PHM
S64A	Shortcut	FS	0.20	C	C	1	OBLITERATE
S64B	Square Rock Ridge	FS	2.00 (1.00)	C	C	1	PHM
S66	Don't Know	FS	1.15	C	C	1	NA
S66A	Lake View	FS	0.70	C	C	1	NA
S66B	Lilbit	FS	1.20	C	C	1	NA
S66C	House	FS	0.70	O	C	1	0.70 Reconstruct
S66D	Prarie Creek	FS	0.10	O	O	1	ACCESS PVT
S67	Spring	FS	0.80	C	C	1	PHM
S67A	House Spur	FS	0.40	C	C	1	PHM
S67B	Moore Lake	FS	0.90	C	C	1	PHM
S68	Upper Poteau	FS	2.70	C	C	1	0.90 mile reconstruct
S69	Camp Spur	FS	0.89	C	C	1	PHM
S69A	Dunlap ridge	FS	1.0	C	C	1	PHM
S69B	Dunlap Ridge Spur	FS	0.49	C	C	1	PHM
S89A	North Ridge 80	FS	1.0	C	C	1	PHM
19	Freedom Gap	C	2.02 1.36 (0.68)= 2.70	O	O	3	NA
186	Sugar Bee	FS	1.50 (0.75)	SO	SO	2	PHM
186A	------	FS	0.28	C	C	1	PHM
814	Camp	FS	0.86	C	C	2	PHM
SC93	Cold Springs	C	1.20	O	O	4	PAVED
AR HWY 80	-------	ST	1.00	O	O	4	PAVED
SC91	Willow Ridge	C	0.80	O	O	3	SPOT GRAVE COUNT AGREEMENT

( ) = boundary road, ½ length.

Current Open Road Density	Total Ac = 5111 acres / 640 ac = 7.98 sections	Open Roads = 6.50 mi	Open Road Density = 0.81 mi per section
Future Open Road Density		Open Roads = 6.30 mi	Open Road Density = 0.79 mi/ per section

APPENDIX H – TRANSPORTATION MAPS


East Fork EMU Transportation Map
Proposed Action
296A System Road and Number
Bridge
Fish Passage Culvert
Low water Slab
Prehaul Maintenance
Reconstruction *
Temporary Roads
Road Obliteration
* Reconstruction will also be done roads 296, 296A, S64, S65, via pipe replacement intermixed with PHM.
Scott Saunders March 2015
N
0264
0265
0266 AR HWY 248
0267
0268
0269
Rebbeccas Road
Cold Springs Road
Scale = 1 : 35,000
0 0.375 0.75 1.5 2.25 3 Miles


East Fork EMU Transportation Map
No New Road Alternative III
296A
System Road and Number
Bridge
Fish Passage Culvert
Low water Slab
Prehaul Maintenance
Reconstruction *
Road Obliteration
* Reconstruction will also be done roads 296, 296A, S64, S65, via pipe replacement intermixed with PHM.
Scott Saunders January 2016
N
Scale = 1 : 35,000
0 0.375 0.75 1.5 2.25 3 Miles
0264
0265
0266
0267
0268
0269
AR HWY 248
Rebbecca Road
Cold Springs Road
SC91
S64A
S64B
S65
S65C
S66
S66B
S66C
S67A
S67B
S68
S69
S69A
S69B
S63