



United States
Department of
Agriculture

Forest
Service

July 2009



Environmental Assessment

South Fork Project

**Big Piney Ranger District, Ozark-St. Francis National Forest
Pope and Van Buren Counties, Arkansas**

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Background

The location of the project area is immediately north of Austin AR and west of the Arkansas Game and Fish's Gulf Mountain Wildlife Management Area containing two tributaries Brushy Fork and South Fork of the Little Red River. This project is being called South Fork and contains approximately 12575 acres.

The entire project area is in Management Area (MA) 3.B - Oak Woodland of the Revised Land and Resource Management Plan (RLRMP). The primary emphasis in this management area is to restore and maintain a landscape mosaic of open oak woodlands that mimics historic conditions. Restoration and maintenance of oak woodland is accomplished through application of a variety of forest management practices such as: thinnings using manual, mechanical, or chemical methods including commercial timber sales, and frequent prescribed fire use at the landscape scale.

A watershed analysis for the South Fork of the Little Red River (South Fork) watershed was completed 12 September, 2007. This analysis describes the current condition of ecosystem components in the watershed, provides the desired condition, and identifies possible management practices to achieve the desired condition (see Table 1).

Table 1 also provides the desired condition and possible management practices by resource area. Implementation of these possible management practices would, over time, change ecosystem current conditions to the ecosystem desired conditions as defined in the RLRMP vision.

I. PURPOSE AND NEED FOR ACTION

A. Purpose. The purpose of this initiative is to:

- Restore the historic fire regime to improve health and sustainability of fire-dependent woodland and forest ecosystems throughout the watershed
- Re-establish the historic fire frequency and reduce the tree density to develop Fire Regime Condition Class 1 landscapes.
- Improve timber stand health so that stands are more resistant to insects and other pathogens.
- Improve long term water quality for federally threatened and endangered species through road and trail management.
- Increase and maintain wildlife habitat diversity
- Improve conditions for Regional Forester's Sensitive and Management Indicator Species.
- Address three (fire and fuels, invasive species, and unmanaged recreation) of the chief's four threats
- Provide commercial timber products for local mills.
- Improve viewing into the forest.
- Stabilize roads.
- Allow for salvage response to weather events, insect and disease outbreaks.
- Respond to potential requests for mineral extraction on leased areas of land containing federal minerals in a timely, environmentally responsible manner to meet the President's Energy Initiative.
- Provide a source of firewood that is available to the public.
- Allow surface rock collection in commercially harvested timber units.

B. Need.

The analysis of reference file information, field-derived information, and spatial information by each resource area was used to describe the current condition of ecosystem components during the watershed analysis. Those conditions along with the desired condition and possible management practices are shown in Table 1, on the next few pages:

**WATERSHED ANALYSIS:
SOUTH FORK OF THE LITTLE RED RIVER**

BIG PINEY RANGER DISTRICT, OZARK-ST. FRANCIS NATIONAL FOREST

SEPTEMBER 2007

VEGETATION

Current Condition	Desired Condition	Possible Management Practices
Overstory tree species (pine and oak) generally exist in their ecologically correct landscape position however healthy forest communities (specifically Dry Oak Forest and Woodland, Dry-Mesic Oak Forest, and Shortleaf Pine-Oak Forest and Woodland) are lacking due to closed canopies, overstocked conditions, and fire suppression.	Forest communities are healthy and diverse; resistant to insects, disease and catastrophic fire. Pine and Oak Woodlands have an open canopy (10-60% coverage), sparse midstory, and grass/forb understory. Pine and Oak Forests have a relatively open canopy (60-80% coverage), sparse to complex midstory, and advanced natural regeneration in the understory.	<ul style="list-style-type: none"> ▪ Commercially thin ~2,200 acres of Dry Mesic Oak Forest ▪ Commercially thin ~3,700 acres of Dry Oak Forest/ Woodland and Shortleaf Pine-Oak Woodland ▪ Commercial or noncommercial thinning of ~2,300 acres of Dry Oak Woodland depending on accessibility and operability. ▪ Landscape scale Rx burning regime on about 10,000 acres with a 3-5 year fire return interval. ▪ Pre-harvest midstory herbicide treatment on ~1,400 acres of Dry Mesic Oak Forest depending on accessibility, operability, and advanced regeneration pool. ▪ Glade restoration (cedar removal on 50-100 acres.
Mature forest predominates (approx. 70%) with adequate old growth (approx. 11%) however less than 3% of the area is in a young forest condition (10-40 years) with the regenerating 0-10 age class being non-existent.	Age class distributions are relatively balanced; Mature (>70 years of age) forest and woodland conditions predominate, but forest age classes are diverse with regenerating (0-10 years old), young (11 to 40 years old) and old growth (110+ years) forests common.	<ul style="list-style-type: none"> ▪ Commercial regeneration harvest on ~1,300 acres of Dry Mesic Oak Forest depending on accessibility, operability, and advanced regeneration pool. ▪ Thinning and Rx burning to encourage advanced oak and shortleaf pine regeneration.

PRESCRIBED FIRE

Current Condition	Desired Condition	Possible Management Practices
Prescribed fire has been almost non-existent in this fire-dependent ecosystem for well over 30 years. However, in 2007, 5,628 acres were burned and in 1999, 500 acres were burned.	Re-establish the historic fire return interval to improve ecosystem health and sustainability.	<ul style="list-style-type: none"> ▪ Utilize areas within the Woodland Ecosystem Project, and any subsequent landscape-scale management actions to establish burn blocks for rotational burns totaling about 10,000 acres.
The watershed is primarily in Fire Regime I (0-35 year fire frequency and low to mixed severity); and Condition Class 3 (High departure from the historical regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances).	Landscape is moved from FRCC 3 to FRCC 1 (Within historical range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances).	<ul style="list-style-type: none"> ▪ Landscape-scale prescribed fire is utilized to move the watershed toward FRCC1. All vegetation treatments including pre-commercial, commercial, and noncommercial thinning and regeneration harvests (~10,000 acres), in rotational burning areas will attain FRCC 1.
Hazardous fuels have accumulated due to decades of fire suppression and lack of prescribed burning.	Hazardous fuels are reduced at least 50%	<ul style="list-style-type: none"> ▪ Utilize landscape scale prescribed burning on an established rotation. ▪ Manage natural ignitions as wildland Fire Use fires. ▪ Utilize mechanical fuel treatments through integrated resource management to decrease fuels on ~10,000 acres.
A majority (> 80%) of the area is classified as WUI (Wildland-Urban Interface).	WUI areas would be treated to provide protection for private property and more	<ul style="list-style-type: none"> ▪ Utilize mechanical fuel treatments on ~2,000 acres in WUI areas adjacent to

	defensible space for firefighters during wildfires.	private property to reduce fuel loading and alter the fuel complex. <ul style="list-style-type: none"> Apply prescribed fire on 300-500 acres of private in-holdings in conjunction with the Arkansas Forestry Commission.
WILDLAND FIRE		
Current Condition	Desired Condition	Possible Management Practices
Minimal wildland fire activity in the last 20 years. The last fire was in 2006, and came from pile burning on private land. Prior to that, there were five fires between 1987 and 1991. Four of those were arson.	The number of human caused fires remains low.	<ul style="list-style-type: none"> Continue to provide fire prevention/education materials and presentations in cooperation with the Arkansas Forestry Commission.
The watershed is primarily in Fire Regime Condition Class 3.	Landscape is moved from FRCC 3 to FRCC 1.	<ul style="list-style-type: none"> Utilize the entire suite of mechanical treatments as well as prescribed burning to alter the vegetation/fuels complex on ~10,000 acres.
Lack of prescribed burning in the area has led to an accumulation of hazardous fuels throughout the watershed.	Wildland fires would be of low to moderate intensity (Fire Regime Group I); firefighter and public safety would be enhanced by less intense fires.	<ul style="list-style-type: none"> Reduce hazardous fuel accumulation by establishing a prescribed burn rotation to include about 10,000 acres of the watershed Where possible, utilize mechanical fuel treatments to decrease fuels. Manage natural ignitions as Wildland Fire Use fires where practical.
The majority (> 80%) of the landscape is classified as Wildland-Urban Interface.	WUI areas would be treated to provide protection for private property and more defensible space for firefighters during wildfires.	<ul style="list-style-type: none"> Utilize mechanical fuel treatments in WUI areas to reduce fuel loading and alter the vegetation/fuel complex. Apply prescribed fire to private in-holdings on about 300-500 acres in conjunction with the Arkansas Forestry Commission.
WILDLIFE		
Current Condition	Desired Condition	Possible Management Practices
Ecological communities that provide woodland habitats are under represented in the watershed.	Woodlands occupy south aspect slopes, ridge tops and upper north slopes.	<ul style="list-style-type: none"> Thin (~6,200 acres) to provide 10-60% canopy coverage depending on slope and implement burning regime on a 3 year cycle. Use of herbicides to control sprouting of woody plants on ~6,200 acres and spot treat non-native invasive species (NNIS) on 1,200 acres.
Early successional habitat is under represented. Currently, there is less than 1 acre of forest younger than 35 years of age.	5-10% of the watershed is in early successional habitat and 5% of the watershed is in regeneration with a basal area <30 and <10 years old.	<ul style="list-style-type: none"> Regeneration cuts on blocks greater than 35 acres, totaling ~1,500 acres. Restoration of woodlands (~1,500 acres) that have basal area of 40. Use herbicides to control sprouting of woody plants (~1,500 acres) and spot treat NNIS (~1,200 acres). Maintain wildlife openings on ~ 6 acres
Due to long term fire suppression, woody plant species encroachment in glades is jeopardizing these rare and special communities	Restore glade vegetation and ecological processes to the natural range of variability.	<ul style="list-style-type: none"> Reduce woody plant species densities in glades, totaling 50-100 acres, with prescribed fire, mechanical and herbicide treatments.
Upland water sources for amphibians appear to be limited. Currently two upland water sources have been identified.	Increase vernal ponds in the uplands.	<ul style="list-style-type: none"> Construct ~ 18 small (< 1/2 acre) ponds. Address data gap on existing pond numbers and distribution.
Three wildlife openings are maintained by the public. They are being fertilized and mowed annually. The openings are re-seeded with	Maintain this regime	<ul style="list-style-type: none"> Treat any noxious weed encroachments with herbicide (4 -6 acres).

clovers and winter wheat about every 3 years.		
NNIS are present along many of the road right of ways and other locations in the watershed including glades.	Reduce abundance of NNIS in the area and limit spread of NNIS in non-infested areas.	<ul style="list-style-type: none"> ▪ Treat NNIS with herbicides (~1,200 acres). ▪ Continue to record new locations of NNIS in the watershed.
FISH		
Current Condition	Desired Condition	Possible Management Practices
Smallmouth bass may be negatively affected by sediments from poorly maintained roads in the watershed.	Maintain high quality smallmouth bass habitat.	<ul style="list-style-type: none"> ▪ Improve the condition of the roads, reduce the road density in riparian habitats, and reduce or improve road/stream crossings by decommissioning, closing, and/or relocating ~8 miles of roads. ▪ Evaluate ~13 miles of roads for closure or decommission. ▪ Improve or eliminate 10 stream crossings. ▪ Use the CATT (Center for Aquatic Technology Transfer) Team data to determine potential problem crossings.
There is a shortage of large woody debris (LWD) in streams due to past land use practices. Average LWD count is 14 pieces/mile.	Increase LWD to Forest Plan standards (75-200 pieces LWD per mile with 7-20 pieces longer than 5 meters and >55 cm diameter).	<ul style="list-style-type: none"> ▪ Increase LWD in streams per CATT team data and Forest Plan standards by felling trees (~170-480 each) into the streams.
THREATENED, ENDANGERED AND SENSITIVE SPECIES		
Current Condition	Desired Condition	Possible Management Practices
Caves occur in the watershed and evidence of bat use was found at one cave, although no endangered or threatened bats have been identified in the watershed.	Caves exhibit the composition structure, and function necessary to support populations of species characteristic of the community.	<ul style="list-style-type: none"> ▪ Manage lands in a manner that protects significant caves (~10) and their associated resources. ▪ Survey 1 cave where evidence of bat (Ozark big-eared bat) use was found.
Lady slipper (<i>Cypripedium sp.</i>) has been identified in the watershed.	Provide suitable habitats that will support viable populations at the Forest level.	<ul style="list-style-type: none"> ▪ Address identification data gap for <i>C. kentuckiense</i>
Yellowcheek darter (<i>Ethoestoma moorei</i>) is in the South Fork of the Little Red River drainage, but has not been found on the Forest. Suitable habitats are down stream of the Forest.	Maintain water quality in the watershed for downstream resource values.	<ul style="list-style-type: none"> ▪ Reduction and/or improvements of roads and road crossings. ▪ Reduce roads in the riparian habitats.(See Fish section)
Speckled pocketbook (<i>Lampsilis streckeri</i>) is in the South Fork of the Little Red River drainage, but has not been found on the Forest.	Maintain water quality in the watershed for downstream resource values.	<ul style="list-style-type: none"> ▪ Reduction and/or improvements of roads and road crossings. ▪ Reduce roads in the riparian habitats.(See Fish section)
Ozark Chinquapin (<i>Castanea pumila</i>) root-crown sprouts are common through out the area.	Provide diverse habitats that will support viable populations of all native and desirable nonnative species.	<ul style="list-style-type: none"> ▪ Protect large reproducing trees if encountered. ▪ Decrease competition in areas that have chinquapin and increase canopy openings by thinning overstory, midstory and understory.
SOIL, WATER, AND AIR		
Current Condition	Desired Condition	Possible Management Practices
Soils stable, erosion generally confined transportation system features.	Stabile, productive soils with reduced erosion.	<ul style="list-style-type: none"> ▪ Improve the condition of the roads, reduce road density in riparian habitats, and reduce or improve road/stream crossings by decommissioning, closing, and/or relocating ~8 miles of roads. ▪ Evaluate ~13 miles of roads for closure or decommission. ▪ Improve or eliminate 10 stream crossings.
Nutrient cycling probably reduced from	Increase nutrient cycling rates.	<ul style="list-style-type: none"> ▪ Reduce overstory and midstory vegetation

historic levels.		<ul style="list-style-type: none"> density with mechanical treatments and prescribed fire on ~10,000 acres. Re-establish historic fire return interval on ~10,000 acres.
Soil productivity probably reduced from historic levels.	Increase productivity.	<ul style="list-style-type: none"> Reduce overstory and midstory vegetation density with mechanical treatments and prescribed fire on ~10,000 acres. Re-establish historic fire return interval on ~10,000 acres.
Partially hydric soils (Spadra loam and Kenn-Ceda complex) in riparian areas of watershed.	Riparian area soils hydrological functions maintained or improved.	<ul style="list-style-type: none"> Reduce road and trail density in riparian areas. Decommission FS 93007F (~1 mile) eliminating 5 stream crossings. Schedule off-road resource management activities in riparian areas in dry seasons.
RECREATION		
Current Condition	Desired Condition	Possible Management Practices
There are no recreational designations in the watershed. However, recreational use is occurring in the form of motorized vehicles such as 4-wheelers and dirt bikes. These visitors are using old existing roads and trailblazing where roads do not exist in order to expand riding opportunities within the area.	Provide recreational opportunities in the form of adequate trails with trail heads as needed. Develop trails to protect water quality and soils by limiting stream crossings and steep climbs.	<ul style="list-style-type: none"> GPS user-made trails. Expansion of Brock Creek Trail System to incorporate trails in South Fork watershed. Close all user-made trails not designated as trails.
HERITAGE		
Current Condition	Desired Condition	Possible Management Practices
Since 1988, the majority of areas which could be potentially impacted by ground disturbing activities have been surveyed for heritage resources prior to any disturbance. For the South Fork analysis area, by 2007, about 65-70% of the total Forest Service land has been inventoried. Fifty heritage resource sites have been located, described, and management recommendations made to the SHPO.	All cultural resources in the landscape are located and protected.	<ul style="list-style-type: none"> All areas of the landscape that may be subject to ground disturbing activities will be surveyed for heritage resources before any activities take place. Heritage resource sites that are found will be protected from damage through mitigation measures.
TRANSPORTATION SYSTEM		
Current Condition	Desired Condition	Possible Management Practices
There are 2.72 miles of road per square mile. Some roads are unstable and heavily eroded.	Stabilize the soils to reduce erosion and make transportation system more useable.	<ul style="list-style-type: none"> Reconstruct or maintain ~43 miles of roads beneficial to transportation system for public and resource management use.
Sections of roads are in riparian areas.	Reduce miles of road in riparian areas and reduce the number of stream crossings.	<ul style="list-style-type: none"> Improve the condition of the roads, reduce the road density in riparian areas, and reduce or improve road/stream crossings by decommissioning, closing, and/or relocating ~8 miles of roads. Evaluate ~13 miles of roads for closure or decommission. Improve or eliminate 10 stream crossings.
MINERALS		
Current Condition	Desired Condition	Possible Management Practices
Seismic exploration for natural gas is occurring in the watershed.	Mineral and energy developments are administered to facilitate production of mineral and energy resources and minimize adverse impacts on ecosystem health.	<ul style="list-style-type: none"> Minimize adverse impacts of energy resource development. Utilize energy resource development infrastructure for other resource management objectives.
LANDS AND SPECIAL USES		
Current Condition	Desired Condition	Possible Management Practices
Acquisition: Private property occupies about 2,100 acres in the watershed inside the	Acquisition: Consolidate forestland ownership.	Acquisition: Consolidate Forest land ownership.

proclamation boundary. Administrative Access: Right-of-Ways are very limited with ~3 secured in the western part of the watershed only. Boundary Corners and Lines: There are about 47 miles of private/FS boundary lines in the watershed.	Administrative Access: Ensure legal access for National Forest System lands. Boundary Corners and Lines: Re-establish the Public Land Survey System to provide for management of the Forest lands	Administrative Access: Secure ROWs necessary for resource management. Boundary Corners and Lines: Re-establish about 47 miles of private/Fs boundary lines.
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II. PROPOSED ACTION

The following actions are proposed in the project area (see attached maps for locations of treatment areas):

Regenerate 15 acres of pine and 420 acres of hardwoods using shelterwood harvest with reserves in the following areas:

Table 2: Regeneration Treatments

Treatment	Compt.	Stand	Acres	Connected Actions	Area Number
Pine Shelterwood w/reserves	5	9	15	Site Prep (Herb/Burn), Release, Plant	11
TOTALS		1 stand	15 acres		
Hardwood Shelterwood w/reserves	2	8	22	Site Prep (Herb/Burn), Release, Plant	45
	4	10	30	"	54
	5	2	40	"	8
	5	5	47	"	13
	5	18	22	"	17
	7	17	20	"	55
	7	18	18	"	55
	7	19	8	"	55
	7	6	13	"	34
	8	2	35	"	49
	8	8	26	"	36
	714	4	30	"	22
	714	11	38	"	25
	715	5	55	"	26
	715	12	15	"	22
TOTALS		15 stands	420 acres		

Thinning of 1,950 acres of pine and 181 acres of hardwoods in the following areas:

Table 3: Thinning Treatments

Treatment	Compt.	Stand	Acres	Connected Actions	Area Number
Pine Commercial Thinning				Post-harvest understory control w/handtools and wildlife burning	48
	1	3	15		
	1	4	74	"	48
	1	6	52	"	48
	1	17	79	"	48
	1	24	55	"	48
	2	9	49	"	44
	2	14	12	"	47
	3	5	326	"	6
	3	6	25	"	6
	3	7	15	"	5
	3	10	44	"	20
	4	4	40	"	1
	4	6	12	"	2
	4	12	77	"	4
	4	23	100	"	9
	4	25	12	"	15

	4	28	30	“	3
	5	3	16	“	18
	5	4	70	“	9
	5	6	89	“	14
	5	8	80	“	9
	5	20	100	“	9
	5	22	13	“	9
	5	27	10	“	16
	6	2	122	“	29
	7	3	6	“	33
	7	5	6	“	37
	7	9	43	“	31
	7	10	11	“	30
	7	11	23	“	32
	7	16	30	“	31
	7	21	13	“	22
	8	5	7	“	35
	8	6	71	“	52
	8	7	11	“	51
	8	29	53	“	35
	8	30	5	“	37
	8	34	12	“	35
	714	2	26	“	20
	715	1	87	“	20
	715	7	19	“	27
	715	10	10	“	28
TOTALS		42 stands	1950 acres		
Hardwood Commercial Thinning	5	34	38	Post-harvest understory control w/handtools and wildlife burning	12
	8	3	73	“	39
	714	5	32	“	24
	714	7	38	“	23
TOTALS		4 stands	181 acres		

Non-commercial treatments (see table below) would include: manual understory control of 368 acres with manual and chemical treatment; 141 acres of timber stand improvement (TSI) (pre-commercial thinning); and 200 acres of pre-harvest midstory/understory herbicide treatment. These treatments would include all or some of the following methods: use of prescribed fire, herbicide applied manually or mechanically, chainsaw felling, and/or mechanical cutting. Multiple treatments may be applied in a varied manner to match on the ground conditions. This would ensure that newly harvested stands are similar in species composition to pre-harvest conditions and maintain tree growth in a healthy manner.

Table 4: Non-commercial Treatments

Treatment	Compt.	Stand	Acres	Connected Actions	Area Number
Timber Stand Improvement (TSI)/Precommercial Thinning (PCT)	8	7	26	Control of Understory (CUS) Prescribed Burning	53
	8	29	7	“	50
	714	6	62	“	21
	714	15	46	“	43
TOTALS		4 stands	141 acres		
Pre-harvest midstory/understory control w/herbicide	2	7	18	Wildlife Prescribed Burning and Planting if necessary	46
	5	10	30	“	7
	5	16	26	“	19
	5	17	32	“	16
	6	8	22	“	40
	6	9	33	“	41
	714	13	39	“	42
TOTALS		7 stands	200 acres		

Post-harvest understory control w/herbicide	5	6	88	Wildlife Prescribed Burning	14
	5	34	38	"	12
	7	9	43	"	31
	7	16	30	"	31
	8	3	75	"	39
	714	7	94	"	23
TOTALS		6 stands	368 acres		

Firewood would be available to the public through commercial and non-commercial permits. Timing would be before or after commercial sale operations.

Provide the opportunity for salvage operations and removal of hazard trees caused by weather events, disease, and insect attacks.

Prescribed burning would be done on 12501 acres multiple times, during the dormant or growing season. Construction of up to 10 miles of permanent firelines may be established along the Wildland Urban Interface (WUI) adjacent to private property where landowners do not want the use of fire on their property.

Woodland restoration thinning would be done on 3083 acres to permit diffuse and direct sunlight to reach the forest floor and increase habitat diversity. Midstory removal would be done by non-commercial methods. Understory control in these areas would be accomplished using chemicals on 1975 acres and manual cutting on 1108 acres. Firewood permits would be available in areas determined to be accessible to the public.

Construct 18 small wildlife ponds (< ½ acres) in order to improve wildlife habitat.

Glade restoration (cedar removal) on approximately 50 acres.

Maintenance on three existing wildlife openings totaling 4 acres to include discing, liming, and seeding.

Use of herbicides on 1787 acres in WEP thinning areas for understory brush control and 1200 acres for treatment of non-native invasive species (NNIS) along roads, powerline rights-of-way, and wildlife openings.

Associated road work would include approximately 13.21 miles of reconstruction, 33.34 miles of maintenance and 4.3 miles of temporary road construction. Close 2.4 miles of existing roads using signs, gates or berms and decommission 3.04 miles. Improve three and close seven stream crossings.

Recreational use would be enhanced by designating of 2.31 miles of existing roads and 1200 feet of existing fire line as OHV trails.

Respond to potential requests for minerals exploration and development. This would require additional BE and archeological surveys on specific sites as they are identified.

Meet a public need by allowing surface rock collection in commercially harvested timber units in the project area where Biological Evaluations, Heritage surveys and other permit requirements have been completed.

III. DECISION FRAMEWORK

The decision to be made is whether or not to implement the Proposed Actions or an alternative or portions of alternatives to meet the purpose and need. The Big Piney District Ranger will make this decision.

IV. PUBLIC INVOLVEMENT

The South Fork Project was scoped for issues by District Ranger Lew W. Purcell, Jr. Scoping for this project began with the mailing of the proposed action (dated July 16, 2008) to known interested individuals, organizations, and adjacent landowners for issue development. The package contained a description of the proposed action and maps showing the location of the proposed actions. The names of those who were mailed the proposal are listed in the process file. Eight public responses were received from this issue development effort. These comments are located in the project file at the RD office in Hector, AR.

V. ISSUES

Two issues were raised during scoping: herbicide use and mineral development. Alternative 1, No Herbicides, is being analyzed. The Forest Service does not have the authority to prevent mineral development if a mineral owner or leaseholder requests to develop their minerals below Forest Service owned land. However, when possible drilling sites are identified, site specific inspections will be conducted in order to determine if the requested site is environmentally acceptable.

VI. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Table5: Comparison of the proposed action and alternatives.

ACTIVITY	PROPOSED ACTION	ALT 1 (No herb.)	ALT 2 (No action)
Pine shelterwood w/reserves	15 ac	15 ac	no
Hardwood shelterwood w/ reserves	420 ac	420 ac	no
Site prep w/herbicide/handtools, burning, release, planting	435 ac	0	no
Site prep w/handtools, burning, release, planting	0	435 ac	no
Commercial pine thinning	1950 ac	1950 ac	no
Commercial hardwood thinning	181 ac	181 ac	no
Manual understory treatment of commercially harvested areas	2131 ac	2131 ac	no
Chemical understory treatment of commercially harvested areas	368 ac	0	no
Timber stand improvement thinning (precommercial)	141 ac	141 ac	no
Pre-harvest midstory/understory herbicide treatment	200 ac	0	no
Pre-harvest midstory/understory treatment w/handtools	0	200 ac	no
Firewood available in commercially harvested areas	yes	yes	no
Prescribed fire	12500 ac	12500 ac	no
Woodland restoration thinning	3083 ac	3083 ac	no
Chemical resprouting control on woodland thinning	1747 ac	0	no
Manual resprouting control on woodland thins w/handtools	1108 ac	3083 ac	no
Understory control w/herbicide in WEP areas	1787	0	no
Understory control w/handtools in WEP areas	0	1787	no
Cane restoration	303 ac	303 ac	no
Wildlife pond construction	18	18	no
Glade restoration	50 ac	50 ac	no
Herbicide use on woody species in glades	yes	no	no
Wildlife opening maintenance	3 openings	3 openings	no
Chemical NNIS treatments (no more than 200ac per year)	up to 1200 ac	0	no
NNIS treatment (brush hogging, handtools, discing, planting)	0	1200 ac	no
Road reconstruction	13.21 miles	13.21 miles	no
Road maintenance	33.34 miles	33.34 miles	no
Temporary road construction	4.3 miles	4.3 miles	no

Road closure	2.4 miles	2.4 miles	no
Road decommissioning/obliteration	3.04 miles	3.04 miles	no
Close stream crossings	7 crossings	7 crossings	no
Improve stream crossings	3 crossings	3 crossings	no
Dozed fire lines	up to 12 mi	up to 12 mi	no
Designation of roads for OHV use	2.31 miles	2.31 miles	no
Designation of permanent fireline for OHV use	1200 feet	1200 feet	no
Minerals exploration/extraction	yes	yes	no
Surface rock permits (no more than 250 ac per year)	2566 ac	2566 ac	no

a. Detailed Description of the Proposed Action

Conduct regeneration cuts on 15 acres of pine and 420 acres of hardwood. The shelterwood with reserves harvesting method would be used in both pine and hardwood species followed by chemical site preparation, burning, planting (if natural regeneration doesn't develop), and chemical release of established regeneration (young trees). The shelterwood with reserves harvesting method would remove 60-80% of the trees from selected stands in order to create the environment for the development and growth of advanced regeneration. These regeneration harvests would create 435 acres of early seral habitat. After these stands have been certified as regenerated, some shelterwood reserve trees could be removed to allow seedlings to grow and develop leaving a 2-aged stand.

Currently there are 1,950 acres of pine and 181 acres of hardwoods that are overstocked (too many trees per acre) slowing growth and creating unhealthy conditions. Commercial thinning to a BA of 50 for pine and 40-50 for hardwood would be used to correct this unhealthy condition and promote the growth and development of the remaining trees. Trees to be selected for harvest will be poorly formed (crook, sweep, forked, etc.) and have poorly developed crowns. Applying this treatment will leave a healthier and more vigorously growing stand of trees. In conjunction with thinning these stands a manual understory treatment (cutting trees down with a chainsaw) will be applied to all 2,131 acres and an additional chemical treatment on 368 acres in selected stands (see map for locations). These treatments would improve the composition of the understory and promote the development of the desired condition of oak and pine woodland in MA 3.B. Rubber-tired skidder is the normal logging system used to remove harvested timber, but other methods may be used, dependent on site conditions.

Use timber stand improvement (TSI) to thin 141 acres of young trees too small to commercially harvest. These areas are overstocked and unhealthy; thinning will correct this unhealthy condition and promote the development of a woodland condition.

A pre-harvest midstory/understory herbicide treatment along with prescribed burning and planting (if natural regeneration doesn't develop) will be used on 200 acres. The areas selected for this treatment are mature stands of hardwood that have no advanced regeneration to replace the old stand when harvested. This treatment will be used to promote the establishment, development, and growth of advanced natural regeneration so these areas can be harvested in the future. These stands would be monitored and when regeneration is present the overstory will be removed to further the growth and development of the now established young trees.

Firewood would be available to the public through permits before or after commercial and non-commercial operations on areas determined to be accessible to the public.

Portions of the project area are experiencing mortality from weather events, disease and insect attack, especially in the oak species. Snags are a desirable wildlife component but they pose a threat to public safety in high use areas such as areas adjacent to roadways and trails. Snags or dead and dying trees would be removed within 100ft of roads, trails, facilities or recreation areas. If trees are damaged by natural events, the damaged trees and/or trees that need to be removed to reduce fuel loading and to protect the overall health of the stand will be salvaged.

Prescribed burning would be done at 2 to 7 year intervals on the entire project area of 12,500 acres of U.S. Forest Service land multiple times, during the dormant or growing season. The project area is a fire adapted ecosystem in which fire has been absent for many years creating an overall unnatural condition. The use/reintroduction of fire into this system would assist in restoring the area to its desired future condition. Natural firebreaks, such as streams and roads, would be used where feasible. Up to 10 miles of permanent firelines may be established along the Wildland Urban Interface (WUI) adjacent to private property where landowners do not want the use of fire on their property.

Habitat diversity has decreased in the project area primarily due to the loss of the more open habitats such as woodlands. Woodland restoration thinning would be done on 3083 acres to begin the process of restoring these habitats. South aspects and ridge top land types (1747 ac) would be thinned to a basal area of 10 below the site index (40-60 BA). Upper and middle sloped northern aspects (1108 ac) would be thinned to a basal area of 10 above the site index (60-80 BA). 228 acres in the upper south aspects and ridge top land types would be cut to a 30 BA to increase the variability in canopy closure and overall structure of restored woodland in the project area.

The primary objective in stands on ridge top and mid to upper south aspects is to create woodlands that have an herbaceous dominated understory. The resprouting of trees removed from these stand which comprises 1747 acres would be controlled using herbicides. Spot treatments after the initial treatment may be required to reach the desired future condition. The 12,501 acres of prescribed burning previously mentioned would help achieve and maintain the desired future condition of these woodlands. Firewood would be available in areas determined accessible by the public.

One of the RLRMP objectives is to improve and restore composition, structure and function of rare communities such as canebrakes. Canebrakes have been found on the Southfork drainage. 303 acres will be thinned to an 80 basal area to promote the expansion and maintenance of this rare community. The previously described prescribed burning will also help meet future desired conditions. Species such as the Swainson warbler are dependent on this community type.

Researchers and managers believe one of the reasons for the decline of groups such as amphibians is the loss of wetlands and upland vernal ponds. In order to increase this type of habitat, 18 small wildlife ponds (< ½ acres) would be constructed.

The project area has approximately 50 acres of glade habitats. This habitat typically has shallow soil and is very open with few if any trees. They are dominated by forbes and grasses, but due to fire suppression, woody species such as cedar has moved into this habitat and reduced species richness and diversity there. To improve these areas, basal area (BA) would be reduced to 0-10 BA using non commercial mechanical methods and control of woody species with herbicide. Some spot treatments after the initial herbicide application may be required to reach the desired future condition.

In order to maintain habitat diversity in the project area, 3 wildlife openings would be maintained by seeding, discing, liming, and planting on a rotation necessary to maintain desirable plant species.

NNIS have been identified as one of the Chiefs four threats to our forestlands. The project area has NNIS primarily along our roadsides and rights-of-way. Chemical treatments would be used to control NNIS on 1,200 acres along roads, powerline rights-of-way and wildlife openings. As populations are identified, infestations would be treated with both mechanical and/or herbicide methods following forest plan standards and direction on labels associated with the herbicide. Dependent on funding, it is estimated that approximately 200 acres would be treated per year.

Associated road work would include approximately 13.21 miles of reconstruction, 33.34 miles of maintenance,

and 4.3 miles of temporary road construction. Use signs, gates, or berms to close 2.4 miles of existing roads. Decommissioning of 3.04 miles of existing roads no longer needed for the transportation system in this area would also close 7 stream crossings. Three existing stream crossings would be improved during road reconstruction.

Recreational use would be enhanced by designating 2.31 miles of existing road located on Hatley Mountain and approximately 1,200 feet of an existing fire line around private property located on John Mountain. These trails are already being used and would be designated once road reconstruction is completed.

Conduct minerals exploration and development. Respond to potential requests for mineral investigation and potential extraction, on National Forest lands containing federal minerals in a timely, environmentally responsible manner to meet the President's Energy Initiative. As possible drilling sites are identified, they will be inspected to ensure environmental/heritage feasibility.

The District has been receiving a growing number of requests for surface rock permits. In order to meet this demand, areas designated for commercial timber harvest would also be designated for surface rock collection. This activity would include the removal of no more than 80% of the rock that is not embedded in the soil. No more than the top 12 inches of soil would be affected by this activity. Small equipment such as a bobcat would be used to remove the rock. No roads would be constructed to access areas to remove surface rock. More than 250 acres or rock removal per year would require further site specific analysis.

b. Detailed Description of the No Herbicide Alternative (Alternative I)

All the proposed actions would be implemented with the exception of the use of herbicides, which would be dropped from consideration.

Site preparation would be accomplished using handtools, prescribed fire or mechanical only. Multiple treatments may be required.

TSI and Release would be done in the same stands as described in the Proposed Action using handtools only. Because of understory control problems associated with hand tools, three TSI or release treatments may be needed. Pine regeneration stands would need planting, or supplemental planting. Understory control may need a second treatment.

WSI and glade restoration activities would be done in the same stands as described in the proposed action. Instead of using herbicides to control woody sprouting, mechanical treatment using hand tools on a three year cycle will be used to achieve desired future conditions.

NNIS treatments would be conducted in the same areas as described in the proposed action using handtools and brush hogging. In addition, relatively flat areas where operation of a tractor is plausible, would be disced and planted in green grass for 3 to 5 years and then planted in native warm season grasses and forbs.

These treatments would be very labor intensive and might also be too costly to complete all planned activities.

c. Detailed Description of the No Action Alternative (Alternative II)

None of the proposed actions would be implemented, which would leave the project area in the current undesirable and unhealthy condition.

d. Design Criteria

Design criteria or standards are contained in Part 3 of the RLRMP. Since the use of herbicides is such a critical issue with much of the public, the standards for herbicide use are repeated in the hopes of allaying the concerns of the public. There are many more that will also be adhered to that are listed in the RLRMP, Part 3.

FW20 - Herbicides and application methods are chosen to minimize risk to human and wildlife health and the environment. Diesel oil will not be used as a carrier for herbicides, except as it may be a component of a formulated product when purchased from the manufacturer. Vegetable oils will be used as a carrier for herbicides when available and compatible with the application used.

FW21 - Herbicides are 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. If the rate or exposure time being evaluated causes the Margin of Safety (MOS) or the Hazard Quotient (HQ) computed for a proposed treatment to fail to achieve the current Forest Service Region 8 standard of acceptability (acceptability requires an MOS >100 or, using the SERA Risk Assessments found on the Forest Service website, a HQ of <1.0), additional risk management must be undertaken to reduce unacceptable risks to acceptable levels or an alternative method of treatment must be used.

FW22 - Fuelwood sales will not be made for a minimum of 30 days after treatment in areas where pesticide treatments have been made. Should injection of trees be done, effected trees will not be sold as fuelwood.

FW23 - Weather is monitored and the project is suspended if temperature, humidity, and/or wind do not meet the criteria shown in the table below.

Table 6: Weather criteria for herbicide application

Application Techniques	Temperatures Higher Than	Humidity Less Than	Wind (at Target) Greater Than
Ground			
Hand (cut surface)	NA	NA	NA
Hand (other)	98°	20%	15 mph
Mechanical (liquid)	95°	30%	10 mph
Mechanical (granular)	NA	NA	10 mph

FW24 - Each Contracting Officer’s Representative (COR), who must ensure compliance on contracted herbicide projects, is a certified pesticide applicator.

FW25 - A certified pesticide applicator supervises each Forest Service application crew and trains crew members in personal safety, proper handling in application of herbicides, and proper disposal of empty containers.

FW26 - With the exception of treatment by permittees of right-of-way corridors that are continuous into or out of private lands and through Forest Service managed areas, no herbicide is broadcast within 100 feet of private land or 300 feet of a private residence unless the landowner agrees to closer treatment. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

FW27 - No soil-active herbicide is ground applied within 30 feet of the drip line of non-target vegetation specifically designated for retention (e.g., den trees, hardwood inclusions, adjacent untreated stands) within or next to the treated area. However, chemical side pruning is allowed in this buffer if necessary, but movement of herbicide to the root systems of non-target plants must be avoided. Buffers are clearly marked before treatment so applicators can easily see and avoid them.

FW28 - No herbicide is ground broadcast within 60 feet of any known threatened, endangered, proposed, or sensitive species except for endangered bats. Selective applications may be done closer than 60 feet, but only when supported by a site-specific analysis. Selective herbicide treatments using a non-soil active herbicide may be used closer than 60 feet to protect TES plants from encroachment by invasive plants.

FW29 - Application equipment, empty herbicide containers, clothes worn during treatment, and skin are not cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separate labeled containers.

FW30 - Herbicide mixing, loading, or cleaning areas in the field are not located within 300 feet of private lands, open water or wells, or other sensitive areas.

FW31 - Pine straw or any other mulching material will not be sold (as mulch or for any other purpose) from areas treated with clopyralid.

FW32 - Herbicide will not be used within the appropriate SMZs or within 300 feet of any public or domestic water intake. Selective treatments may occur within SMZs only when a site-specific analysis of actions to prevent significant environmental damage (such as noxious weed infestations) supports a "Finding of No Significant Impact" (FONSI), and then using only herbicides labeled for both terrestrial and aquatic use within these areas.

e. Mitigation Measures specific to this Project

No site specific mitigations other than those contained in the RLRMP have been identified.

f. Monitoring

The OSFNF carries out an extensive monitoring program to ensure that projects are implemented consistent with the Objectives and Standards of the RLRMP and to evaluate whether those requirements are effective in accomplishing their intended purposes, such as protecting the beneficial uses of streams. Results from the monitoring program are summarized in annual and periodic reports on specific subjects. Special attention has been given to monitoring the effects of management on water quality.

Some examples of our monitoring efforts have included bat surveys, deer surveys, Christmas bird counts, migratory and breeding bird surveys, fisheries surveys, herbicide sampling (water quality), macro-invertebrate sampling (water quality) and perceptual monitoring for soil disturbance. Monitoring results indicate that projects are consistent with the RLRMP management objectives and standards and would not significantly affect the quality of the human environment. The overall monitoring plan is displayed in the RLRMP.

Monitoring of commercial timber harvest activities is documented on timber sales inspection forms or contract daily diaries and maintained on file at the District Rangers' Office in Hector, Arkansas or at the Ozark-St. Francis National Forests Supervisor's Office in Russellville, Arkansas.

For those actions prescribing the use of herbicides, monitoring to ensure that herbicide label instructions are being followed would be conducted as part of the "on-the-ground" contract administration. To monitor any off-site movement of herbicides, water sampling would be conducted on 10% of sites where herbicides are used.

g. Tiering/Incorporation by Reference

The actions described by the Proposed Action and alternatives are typical projects in the RLRMP. This Environmental Assessment tiers to the analyses and disclosure of effects presented in the FEIS.

The RLRMP, and FEIS have been reviewed through the Forest Services administrative appeals process. Each level of review has determined that these documents were complete and in compliance with all relevant statutes. To eliminate repetitive discussions of issues and to focus on the actual decision being made, the effects analyses in these EIS documents are incorporated by reference.

The actions described in the Proposed Action and alternatives are similar to other actions that have been proposed and analyzed for effects in other EAs implemented on this district. An Analysis and Monitoring Summary (Summary) has been prepared for twenty (20) Environmental Assessments (EA) and the Findings of No Significant Impact (FONSI) done on the Big Piney Ranger District (RD) since 1990. These EAs and FONSI include timber harvest in pine and hardwood types, road construction/reconstruction, herbicide application, and prescribed burning. This Summary is incorporated by reference and is on file at the Big Piney RD office.

VII. ENVIRONMENTAL EFFECTS

a. Soils

This section describes the soil characteristics, existing conditions and analysis method used within the project area.

Table 7: Soils Types

VanBuren County Soil Types	Symbol	Erosion Hazard	Permeability
Enders Gr Fine Sandy loam, 3-8 % slopes		Slight	
Enders Gr Fine Sandy loam, 8-20% slopes		Slight	
Enders Gr Fine Stony loam, 8-20% slopes		Slight	
Enders-Mountainburg Assn, 8-20% slopes		Slight/ Moderate	
Enders-Nella-Steprock Assn, 8-20% slopes		Slight	
Enders-Nella-Steprock Assn, 20-40% slopes		Moderate	
Enders-Steprock Assn, 8-20% slopes		Slight	
Enders-Steprock Assn, 20-40% slopes		Moderate	
Kenn-Ceda Complex, 0-3% slopes		slight	
Leadvale Loam, 0-3% slopes		slight	
Linker fine sandy loam, 3-8% slopes		slight	
Linker fine sandy loam, 8-20% slopes		slight	
Linker gravelly loam, 3-8% slopes		Slight	
Linker Mountainburg complex 3-8% slopes		Slight	
Linker Mountainburg complex 8-20% slopes		Slight/ Moderate	
Mountainburg Rock Outcrop, 8-20% slopes		Slight	
Nella-Steprock complex 8-20% slopes		Slight	
Nella-Steprock complex 20-40% slopes		Moderate	
Spadra Fine Sandy Loam, 0-3% slopes		Slight	
Spadra Fine Sandy Loam, 3-8% slopes		Slight	
Pope County Soil Types			
Enders Gravelly Fine Sandy loam, 8-20% slopes	8	Slight	Very slow
Enders-Mountainburg Assn, 20-40% slopes	11	Severe	Very slow to moderately rapid
Linker Fine Sandy loam 3-8% slopes	17	Slight	Moderate
Linker gravelly loam 3-8% slopes	17	Slight	Moderate
Linker-Mountainburg Complex, 3-8% slopes	19	Slight	Moderate
Nella-Enders Assn, 8-20% slopes	32	Slight	Moderate
Nella Mountainburg Assn, 8-20% slopes	35	Slight/ Moderate	Moderate to moderately rapid
Nella Mountainburg Assn, 20-40% slopes	36	Severe	Moderate to moderately rapid

The area for evaluating effect on the soils includes the treatment blocks identified in the project area of the South Fork of the Little Red River watershed.

Current activities occurring within the project area are limited to minor disturbances such as road maintenance and wildlife stand improvements along with maintenance of wildlife openings by the Arkansas Game and Fish Commission and some grazing of cattle on private lands. Gas well development is increasing significantly on private lands north of the project area outside the Forest Boundary.

Soil Characteristics

Soils within the project area can be subdivided into 2 different soil map units. Each map unit shows broad areas that have a distinctive pattern of soils, relief, and drainage. Typically, a map unit consists of one or more major soils and some minor soils. The unit is named for the major soils. The following map units lie within the project area;

Enders-Nella -Mountainburg-Steprock: (Van Buren County soil map unit) Deep, moderately deep, and shallow, gently sloping to very steep, well drained, very stony, stony, or gravelly, loamy soils that formed in colluviums and residuum of sandstone and of some inter-bedded shale and sandstone

Nella-Enders-Mountainburg: (Pope County soil map unit) Well drained, gently sloping to very steep, deep and shallow, loamy soils that are gravelly or stony; on hills and mountains. These soils formed in loamy and clayey residuum weathered from sandstone and shale.

The soil county surveys related the pattern to their geology, landforms, relief, climate and vegetation of the area. The treatment areas commonly had more than one soil type present as the soils merge into one another on the landscape as their characteristics gradually change. Numerous soil types were found within the project area and twenty-eight soils types are found within the treatment areas. The following characteristics help to identify potential concerns relating to treatments areas:

The analysis method used in evaluating effects of the soils consists of identifying the soils characteristics relating to erosion hazards, permeability and soil detrimental disturbance. The Van Buren and Pope County Surveys were used to gather information to identify soil types, their suitability, and limitations.

Compaction has also, been noted to impact the ability of the soil to re-vegetate, therefore treatment blocks identified as needing treatment in Chapter II have been evaluated for effects on detrimental soil disturbance. Soil compaction can occur on skid trails, landings, and temporary roads. The amount of compaction would depend on the amount of timber removed per acre, the number of acres being harvested, type of logging equipment used, and the soil moisture conditions at the time of harvest. Compaction reduces the amount of air and water held in the soil, which can reduce soil productivity. Compaction can increase runoff which could increase erosion on disturbed areas.

Detrimental soil disturbance includes all of the physical factors that adversely affect soil, including erosion, displacement, puddling, severe burning, and compaction. A threshold has been established in the Revised Land Resource Management Plan that no more than 15% of the activity area should be detrimentally impacted to maintain soil productivity. To estimate the amount of disturbance coefficients for each harvest method are multiplied according to the acres harvested by each method then added together and divided by the total acres harvested. The result is multiplied by 100 to produce the percentage of predicted detrimental soil disturbance. The coefficients for the harvest methods are based on monitoring done on harvested units from 1993 to 2002.

Table 8: Soil Disturbance

Detrimental Soil Disturbance in Acres	Proposed Action	Alternative 1 No Herbicide	Alternative 2 No Action	
Roads (ac)	24.8	24.8	No construction	
Harvest (ac)				
Pine Shelterwood	1.3	1.3	0	
Pine Thinning	233.9	233.9	0	
Hardwood Shelterwood	37.8	37.8	0	
Hardwood Thinning	10.9	10.9	0	
Prescribed Burning	13	13	0	
Total acres disturbed	321.7	321.7	0	
Detrimental Soil Disturbance in Percent				
Roads by %	1.0%	1.0%	0%	
Harvest by %				
Pine Shelterwood	.05%	.05%	0%	
Pine Thinning	9.1%	9.1%	0%	
Hardwood Shelterwood	1.5%	1.5%	0%	
Hardwood Thinning	0.4%	0.4%	0%	
Prescribed Burning %	0.5%	0.5%	0%	
Total in %	12.55%	12.55%	0%	

Cumulative Effects

Harvested areas would not be visited for a minimum of 30 years and potentially a maximum of 40 years. Areas disturbed by the Proposed Action would be expected to be recovered prior to a future entry to these areas since soil recovery may take between 30 to 40 years depending on the specific soil types and actual impacts. The roads to be designated as OHV routes have been used as such for the past two decades and the maintenance resulting from the designation would reduce future soil disturbance.

Cumulative effects from past, present and future management activities are expected to be minimal, since harvesting activities are expected to utilize mostly existing roads and skid trails. Roads and skid trails that were used in previous harvesting activities would be compacted and disturbed again during the proposed harvesting activities. Recovery of these roads and skid trails would begin again after the harvesting activities are completed. Disking and seeding of skid trails and roads would help to speed up the recovery process.

b. Water

This section describes watershed characteristics, existing water quality, and analysis method used.

Watershed Characteristics

Watersheds in the United States are divided into progressively smaller units known as hydrologic units. This project area falls within the upper portion of Little Red River a tributary of the White River. This portion of the Forest is located in the Boston Mountain eco-region with deeply dissected drainages that cut into the Boone Formation which is cherty limestone.

The majority of the project area lays within the Brushy Fork watershed (approximately 29,000 acres) and the Cedar Creek watershed (approximately 19,00 acres), tributaries of the South Fork Little Red River watershed totaling 47,857 acres sixth level watershed that would be used for the cumulative effects. Some of the proposed treatments are bounded by the Austin Ridge (#1307) and White Oak Mountain (#1301) Roads and are partly in the adjacent watershed to the south. Forest activities have the potential to influence water quality, downstream and outside the Forests' boundaries. The project area is essentially bound by the Ridges associated with the Austin Ridge (#1307) and White Oak Mountain (#1301) Roads and the Forest Boundary to the north and east.

Field reconnaissance was conducted to map and inventory the roads in the analysis area. There are approximately 131 miles of road within the Brushy Fork and Cedar Creek Watersheds with one third (47 miles) being under Forest Service jurisdiction. Only 3.4 miles of road is within close proximity (within 100 feet) to streams and there are 13 stream crossings. The proposed action plans to obliterate 3.0 miles of road adjacent to Brushy Fork eliminating six stream crossings.

There are only two major perennial streams within the sixth level watershed within the analysis area. The Bloyd formation (karst topography) is associated with the major drainages below the proposed treatments of Alternative 1 and Alternative 2. Most treatments considered are located on the upper slope and ridge tops. Therefore following Forest Standards and State BMPs there will be no effects associated with karst topography expected to occur.

Average annual precipitation for the project area is about 48 inches. The elevation range is approximately 820 feet to 1840 feet. At the lower level, the drainage gradients become less steep allowing the streams to be less confined and develop small floodplains.

Surface and Ground Water Quality

Surface water quality is generally good on the Forest because the dominant land use is forest.

Water uses (beneficial uses) on the forest include warm water fisheries, livestock and wildlife watering and recreation. The most common sources of increased sediment and other non-point impacts to streams include poorly located and/or maintained roads, livestock grazing in riparian areas, and unwise off-road-vehicle use.

Ground water on the Forest is typically at depths of >150 feet but in general can be highly variable. Ground water is most likely closest to ground surface (high water table) approximately >6 feet in December to April then declining through the summer as streams approaches low flow conditions.

Floodplains and Wetlands

There are small floodplains and minor wetlands within the project area; however no specific areas have been identified at this time to occur on treated acres. Therefore no impacts are expected within these areas. However, if an area is found within any treatment block the best management practices and mitigation measures in the Revised LRMP would be followed, therefore no impacts are expected.

Analysis Method

A valid cumulative effects analysis must be bounded in space and time. For the purposes of project planning, 6th level watersheds (10,000 to 40,000 acres) are the appropriate spatial bounds for cumulative effects analysis at the project level.

Local research has shown that the effects of increase sediment as a result of timber harvest are identifiable for up to 3 years (Miller, Beasley and Lawson 1985). The timeframe of this model is bound by three years prior and one year following the current year. This captures the effect of other management activities that may still affect the project area. Proposed actions are constrained to a single year even through they usually occur over a period of three to five years. This would express the maximum possible effect that could occur in a worst case scenario. 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. As a result of the watershed selection, numerous characteristics of the watershed would be used in the calculation of sediment such as watershed size, acres of Forest Service surface ownership, private ownership, land use distribution including vegetation cover (forest, pasture, forest grazing and terrain) road density and eco-region.

The majority of the project area lays within the Brushy Creek (approximately 29,000 acres) and Cedar creek (approximately 19,000 acres) watersheds, tributaries of the South Fork Little Red River watershed totaling 47,857 acres sixth level watersheds that would be used for the cumulative effects. Some of the proposed treatments are bounded by the Austin Ridge (#1307) and White Oak Mountain (#1301) Roads and are partly in the adjacent watershed to the south. However, it was decided due to size and limited amount of impacts it would not be noticeable if the treatment effects were analyzed in a separate watershed therefore the treatments were analyzed as if they were entirely in the Brushy Fork and Cedar Creek drainages. The sixth level watershed was selected to perform appropriate cumulative analysis for water resources.

Changes in land use and other disturbances can be modeled with respect to estimated increases in sediment. The model use in this analysis estimates current condition and the effects of various management alternatives. These predictions are then compared to risk levels established by the effects of sediment increases on fish communities.

Sediment is an appropriate measure to determine the effects of management activities on water quality and its associated beneficial uses on forested lands (Coats and Miller, 1981). Sediment increases can adversely affect aquatic biota and habitat including fish productivity and diversity (Alexander and Hansen, 1986), degrade drinking water and affect the recreational values of streams and rivers.

Monitoring studies on the Ouachita National Forest have demonstrated that, with proper implementation of forest standards and state BMPs, direct and indirect impacts are individually insignificant on water quality and associated beneficial uses (Clingenpeel 1989, 1990, USDA Forest Service, Ouachita National Forest 1993, Meihardt 1994, Vestal 2000, and Whitsett 2004). A cumulative assessment determines if these individually insignificant actions collectively have an adverse affect on water quality. Pollutants associated with forest management activities (timber harvest, site preparation, road construction and maintenance) can potentially include sediment, nutrient enrichment, changes in water yield, and pesticides within the water column.

A change in water yield is an effect that does not serve as a pollutant until a large change occurs. In addition, water yield models do not characterize the impacts of all management activities such as road construction and water yield changes that typically occur following vegetation management activities are less than the natural variability (Miller, Beasley and Covert 1986). The researchers measured a significant increase in summer base flow, but could not identify an increase in peak flow as a result of timber harvest and site preparation.

Changes in water nutrients or nutrient fluxes within streams as a result of management activities are minor (Miller, Beasley and Lawson 1987) and not an appropriate consideration of cumulative effects at the project level.

Proposed Action and Alternative 1

Increase in potential sediment within the project area could occur from proposed road activities and the use of skid roads and log landings which could or would expose soils, cause rutting, and alter surface and subsurface water flows. Such short term effects could cause sediment to be carried in runoff to stream channels. Also, development of gas wells with their associated well pads and access roads and pipeline corridors could also contribute to increased sediment and altering surface and subsurface water flows.

Within the 6th level watershed designated 110100140301 the Proposed Action and Alternative 1 shows an increase of 109.8 tons/yr from harvest, road management, and associated activities. This predicted increase in sediment would create a low risk, indicating minimal effects from sediment to aquatic beneficial uses and only requires the application of Revised LRMP standards. However, expected gas well development outside the proclaimed Forest Boundary but within the watershed could result in an estimated increase in sediment of 13,446 tons/yr. This large increase in predicted sediment would create a high risk and could have significant potential adverse effects to aquatic beneficial uses. The current Revised Land and Resources Management Plan requires a no net increase from proposed activities and monitoring.

Within the 6th level watershed designated 110100140302 the Proposed Action and Alternative 1 shows an increase of 327.4 tons/yr from harvest, road management, and associated activities. This predicted increase in sediment would create a low risk, indicating minimal effects from sediment to aquatic beneficial uses and only requires the application of Revised LRMP standards. However, expected gas well development within the watershed could result in an estimated increase in sediment of 2,390.5 tons/yr. This increase in predicted sediment would create a moderate risk which could have adverse effects to aquatic beneficial uses. In addition to applying Forest Standards monitoring will be required.

Within the 6th level watershed designated 110100140303 the Proposed Action and Alternative 1 shows an increase of 106.5 tons/yr from harvest, road management, and associated activities. This predicted increase in sediment would create a low risk, indicating minimal effects from sediment to aquatic beneficial uses and only requires the application of Revised LRMP standards. However, expected gas well development within the watershed could result in an estimated increase in sediment of 3,585.8 tons/yr. This increase in predicted sediment would create a moderate risk which could have adverse effects to aquatic beneficial uses. In addition to applying Forest Standards monitoring will be required.

The four herbicides (Glyphosate, Triclopyr, Metsulfuron methyl and Imazapyr) proposed for use in the project area are not expected to adversely affect water resources.

Glyphosate is a broad spectrum herbicide that is strongly absorbed by the soil. The major degradation pathway is microbial breakdown in the soil although varying rates result in a longer half-life than some of the other common herbicides used in management. Glyphosate does not photodecompose to any extent and does not volatilize (Rueppel and others, 1977). Therefore, there is a risk of this chemical leaving the site and entering a stream if erosion occurs and sediment with the chemical attached to it makes it to a stream channel. However given that proper application rates, (Forest Standards and State BMPs would be followed and riparian buffer zones would be used) the risk of contaminated sediment entering a stream channel is low. This would result in low potential of decreased water quality.

Triclopyr is readily absorbed by roots and foliage and translocated easily to meristems. This compound is metabolized by bacteria and photodegrades rapidly. Its half-life is less than 90 hours in water, but Triclopyr is

more persistent in soils. It is moderately soluble and not strongly absorbed in the soil. Studies indicate that it is not usually leached into the water table under normal use (Lee and others 1986). Therefore given that proper application rates, Forest Standards and State BMPs would be followed and riparian buffer zones would be used, the risk of decreased water quality is low.

Metsulfuron methyl may be transported off site by runoff or percolation. Both runoff and percolation are considered in estimating contamination of water quality. Assessing off site soil contamination by runoff can be monitored by amount of non target plants impacted. Percolation, on the other hand, represents the amount of the herbicide that would be transported below the root zone and thus may impact water quality but would not affect off site vegetation. GLEAMS modeling showed that losses from clay soils were associated almost exclusively with runoff (SERA 2000). Modeling showed that about 75% of the losses in loam soils was associated with runoff and the remaining losses were due to percolation. An Australian study found that metsulfuron methyl residues usually stayed between 0 and 20 centimeters of the surface in clay soils(Noy and Holloway 2001). The soils in the project area are underlain by loam or clay so leaching losses are expected to be minimal. Therefore given that proper application rates, Forest Standards and State BMPs would be followed, and riparian buffer zones would be used, the risk of decreased water quality is low.

Imazapyr may be transported off-site by runoff and damage non target plants. Residual of soil contamination with imazapyr could be prolonged in some areas. Imazapyr does not metabolize extensively in plants but could be transported rapidly from treated leaves to root systems and may even be exuded into the soil from the roots of treated plants. However, since the percolation characteristics of the soils in treatment areas and given that proper application rates (Forest Standards and State BMPs would be followed and riparian buffer zones would be used) the risk of decreased water quality is low.

A study by (Neary, 1985) on the effects of herbicide use on ground water shows that regional, confined, and groundwater aquifers are not likely to be affected by silviculture herbicides. Surface unconfined aquifers in the immediate vicinity of herbicide application zones have the most potential for contamination. It is these aquifers which are directly exposed to leaching of residues from the root zone that have the greatest potential.

Where buffer strips are used or other mitigation techniques are employed, forestry herbicides generally do not pose a threat to water quality. Peak concentrations are usually low ($< 100 \text{ mg/m}^3$) and do not persist for long periods of time ($< 6 \text{ mos.}$) (Neary and Michael, 1996).

Generally speaking, buffer strips of 15 m (45 feet) or larger are effective in minimizing pesticide residue contamination of stream flow (Neary et al., 1993). The use of buffer strips can keep herbicide residue concentrations within water quality standards. They are not absolute, one as large as 140 m did not keep residues out of perennial streams in North Carolina. However the peak concentration was 50 times lower than the water quality standard.

No significant direct or indirect effects to water or soil are expected from the application of the herbicides discussed when applied at the lowest recommended effective rate, following RLRMP standards and guidelines, and state Best Management Practices.

Alternative 2: (No Action)

Without implementation of proposed action or other alternatives water resource conditions would continue along their current trends within the three 6th level watersheds. This alternative would address Forest Plan goals for maintaining water quality however, not for improving it. Roads left open in poor locations and/or not maintained would continue to impact water quality as a result of this alternative.

The Water Resource Analysis for Cumulative Effects model shows 52.6 tons/yr increase in 6th level watershed designated 110100140301, 13.1 tons/yr increase in 6th level watershed designated 110100140302, and 54.5 tons/yr increase in 6th level watershed designated 110100140303, in sediment as existing conditions associated with roads that would continue. This increase of predicted sediment in tons would create a low risk, indicating minimal effects from sediment on aquatics and beneficial uses.

Cumulative Effects

Past, present and reasonably foreseeable future activities on Federal and non federal lands (such as the agricultural uses, federal and private logging known to occur, road activities, OHV routes, and gas well development) that could affect water resources have been incorporated within the Water Resource Analysis for Cumulative Effects. The Proposed Action and Alternative 1 had similar outputs with an increase ranging from 144 to 169 tons. Due to the density of gas well development in 6th level watershed designated 110100140301 the cumulative impact was high with a high risk to aquatics and beneficial uses and expected possible gas well development on state lands in 6th level watersheds designated 110100140302 and 110100140303 resulted in a moderate risk to aquatics and beneficial uses. Alternative 2, the No Action alternative had the lowest increase at 13.07 tons with a low risk to aquatics and beneficial uses.

The effects associated with herbicide use was also considered a low risk to water quality, due to the location of treatment areas (position on slope, ridge tops, and 100' buffers on streamside management zones), soil characteristics and given that proper application rates, Forest Standards and State BMPs would be followed, and riparian buffer zones would be used.

c. Air

The National Ambient Air Quality Standards (NAAQS), set by authority of the Clean Air Act, cover six “criteria” pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter 10 microns in size (PM₁₀), and nitrogen dioxide (NO₂). No county in Arkansas is classified as being in “non-attainment,” meaning all counties are in compliance with the NAAQS.

Existing emission sources occurring within the project area consist mainly of mobile sources. These would include, but are not limited to, combustion engines (such as those found in motor vehicles); dust from unpaved surfaces; smoke from local, county, agricultural, forest burning, and wildfires.

The closest Class I Area of concern with respect to Regional Haze compliance is the Upper Buffalo Wilderness Area.

Air quality in northern Arkansas is considered to be of high quality. Monitoring indicates that it is better than NAAQS requirements. Air quality is currently monitored within the National Forest boundaries by the Interagency Monitoring of Protected Visual Environments (IMPROVE) system near Deer, Arkansas.

All Alternatives

Direct/Indirect Effects

Based on the nature of the proposed management activities in all alternatives there should be no expected long-term impacts on air quality within the analysis area. The dust generated by logging activities would have a minor localized impact on air quality. The impact would be short term (lasting only as long as the logging) and sporadic (any rainfall during the harvest activities would prevent dust from being airborne). Since this type of activity has occurred over many areas within the air-shed and the air quality is still of high quality, there is no reason to suspect there would be anything other than some local short term impacts to air quality from this project.

To calculate the consumption of fuel, emission of particles, and dispersion of pollutants produced by prescribed burning of forest vegetation the Simple Approach Smoke Estimation Model (SASEM) was used (see Project File for further explanation of inputs and calculations). Table 9 lists the parameters and results for the South Fork Block C landscape burn conducted in March 2007. Since the average size of site preparation burns are normally about 50 acres, they would fall well within the parameters below.

Table 9: Simple Approach Smoke Estimation Model Parameters and Output

All Action Alternatives	Southfork Block C.
Burn Type	Broadcast
Burn Duration (hours)	4
Burn Area (acres)	1096
Transport Wind Speed and Direction (min – max)	6 – 22 North – N Northwest
Smoke Sensitive Receptor 1 and distance from project area (miles and direction)	Hector (14 miles Northeast)
Smoke Sensitive Receptor 2 and distance from project area (miles)	Clinton (17 miles West)
Smoke Sensitive Receptor 3 and distance from project area (miles and direction)	Atkins (24 miles N Northeast)
Smoke Sensitive Receptor 4 and distance from project area (miles and direction)	Russellville (27 miles Northeast)
PM ₁₀ Concentration (ug/m ^{3*})	38.2 – 41.1 No Exceedence
PM _{2.5} Concentration (ug/m ³)	38.2 – 41.1 No Exceedence
Total Fuel Consumed	2110 Tons

*ug/m³ – micrograms per cubic meter

The No Action Alternative does not include prescribed burning and therefore has negligible potential for affecting air quality other than that which may occur under a wild fire situation. For the Action alternatives the potential exists for smoke to cause temporary local effects on private homes and farms, and to the rural communities of Scotland, Cleveland, and Ahead. Air quality effects could include temporary decreased visibility on roads, discomfort for local residents with respiratory problems, and the nuisance of the smell of smoke in and around residences.

The mitigation measures described in the Prescribed Fire Plan would be applied. These measures are designed to ensure that state regulations, EPA standards, and the requirements of the Clean Air Act are met, and that local effects to air quality are acceptable. Key is the development of a prescribed fire plan prior to implementation that considers wind direction and other smoke dispersal factors. The prescribed fire plan would be prepared for each burn to ensure that the combustion products (smoke) are minimized in smoke-sensitive areas. Burning would only occur when conditions are right for adequate smoke dispersal. Proposed burn areas under all action alternatives are large enough for efficient burning but small enough to allow burning to be completed by mid-afternoon so that most smoke is dispersed by nightfall when smoke tends to sink down slope into valleys. With these measures, effects from smoke under all alternatives are expected to be small and within local acceptable levels.

Based upon the most recent of EPA-air quality data for Pope and Van Buren Counties; potential emissions being below the lower limit acceptable by EPA; our compliance with NAAQS; and our meeting general conformity

and the intent of the Regional Haze regulation, the prescribed treatments should not detrimentally impact the quality of air in the proposed project area nor in any Class 1 airshed.

Cumulative Effects

Given the mobility of the pollutants considered, the scale for cumulative effects is the Forest. With similar projects, as described here, proposed on a yearly basis throughout the Forest, the sources of the pollutants would be similar (e.g., vehicle exhaust, dust from logging and travel on dirt roads, smoke and particulates from fires). Due to the distance of this area from major metropolitan areas or heavy concentrations of heavy industry, and due to favorable weather patterns keeping the atmosphere well mixed, the area should continue to exceed the NAAQS. Therefore, no significant cumulative effects are anticipated from implementing any of the alternatives described.

d. Visual Quality

Existing Condition

The analysis area is located in a rural and mostly forested area. Some pastures occur on private land along the northern boundary and county roads. Sight-seeing is limited along the gravel roads because the terrain and the vegetation offer little opportunities of any vista. The creeks are mostly intermittent in nature therefore providing limited recreational opportunities except for hunting and hiking/bushwhacking. The project area Scenery Management is predominately a scenic level of very low (8,030 acres). The RLRMP priorities pg. 2.20 are to maintain or enhance the visual character of the Forest by establishing scenic integrity objectives. The intent is to manage landscapes and use the best environmental design practices to harmonize changes in the landscape to reduce visual effects of management. The Scenic class numbers range from 1 to 8 with 1 representing extremely high public value and 8 as moderate/low public value which usually is found in unseen areas. The management area (3.B Oak Woodland) combined with the scenic class numbers identifies the Scenic Integrity Objectives for the South Fork Project which are High, Moderate and Low:

* High –Only the foreground along the western edge of the project area, adjacent to the county road 1301 is designated with a high Scenic Integrity objective. The only area proposed for treatments with a high scenic objective is area #3.

*Moderate – The main open Forest Service System interior roads and County Road 1307 along the southern boundary foreground and some middle-ground are designated with a moderate Scenic Integrity objective. These designation include all or portions of the following areas 4, 6, 8, 9, 13, 14, 15, 20, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, and 47

*Low – The remainder of the watershed is designated with a low Scenic Integrity objective since these areas are seldom visible /unseen. These designations include Middle-ground or Background of all or portions of the following areas: 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 30, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 50, 51, 52, and 53

Table G-2 Scenic Integrity Objectives by Management Area only shows Objectives of High in Class 1, Moderate in Class 2 and Low in all other scenic classes found in the RLRMP Appendix G. The definitions found on page G-4 for each Scenic Integrity Objectives is described as follows:

High – (Appears unaltered – Retention) Scenic integrity refers to landscapes where the valued landscape character “appear” intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident

Moderate (Slightly Altered –Partial Retention) Scenic integrity refers to landscapes where the valued landscape character “appear” slightly altered”. Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Low (Moderately Altered- Modification) Scenic integrity refers to landscapes where the valued landscape character “appears moderately altered.” Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but also compatible or complimentary to the character within.

Direct/Indirect Effects

No Action alternative would have no effect on the visual since management activities would be limited to the existing maintenance of the existing infrastructure already in place.

The proposed Action and the other alternatives would alter the current vegetation with negative initial impacts, however with suggested mitigation measures impacts would be limited and short duration. Treatments proposed are Timber Stand Improvement, Hardwood Shelterwood Hardwood and Pine Thinning with Under-story Treatment, Pine Shelterwood, and Site Preparation in regeneration harvests areas, chemical Pre-Harvest and under-story control and Prescribed burning. Each of the treatment would affect the density of the vegetation allowing the potential of increase sight distance providing a greater depth of viewing within the forest.

Cumulative Effects

Based on the proposed treatments in the alternatives and proposed action there are no known long term negative cumulative effects to the visual resource in the project area. The treatment areas are expected to increase viewing opportunities for the forest visitors enhancing their recreational experience over the long term. Currently there are no special use permits located within the South Fork watershed.

Mitigation Measures “Scenery Treatment Guide- Southern Regional National Forests” April 2008.

Timber Stand Improvement and Hardwood and Pine Thinning with Under-story Treatment – Moderate and Low Scenery treatments for following techniques to achieve Scenic Integrity objectives and Landscape Character where suggested B, D, E, G, H, I, S, T, V, W, and AA however only the ones listed below were appropriate:

D. Slash should be removed, burned, chipped or lopped to within an average of 2 feet of ground when visible within 100 feet on either side of Forest Service Road 1307 and all interior roads 4 feet of the ground when visible within 100 feet on either side.

G. Leave tree marking or unit boundary marking should be applied so as to not be visible within 100 feet of roads.

I. When possible, log landings, roads and bladed skid trails should be located out of view to avoid bare mineral soil observation from travel routes.

T. The visual impact of roads and constructed fire lines should be blended so that they remain subordinate to the existing landscape character in size, form, line, color, and texture.

V. Openings and stand boundaries should be organically shaped. Straight lines and geometric should be avoided. Edges should be shaped and/or feathered where appropriate to avoid a shadowing effect in the cut unit. Openings should be oriented to contours and existing vegetation patterns to blend with existing landscape characteristics, as appropriate.

Hardwood and Pine Shelterwood – Moderate and Low Scenery treatments for following techniques to achieve Scenic Integrity objectives and Landscape Character where suggested B, D, E, G, H, I, M, N*, O, P, Q, T, V, W, and AA however only the ones listed below were appropriate: *noted only for low scenery objective.

B. Flowering and other visually attractive trees and understory shrubs should be favored when leaving vegetation.

D. Slash should be removed, burned, chipped or lopped to within an average of 2 feet of ground when visible within 100 feet on either side of Forest Service Road 1307 and all interior roads 4 feet of the ground when visible within 100 feet on either side.

G. Leave tree marking or unit boundary marking should be applied so as to not be visible within 100 feet of roads.

I. When possible, log landings, roads and bladed skid trails should be located out of view to avoid bare mineral soil observation from travel routes.

M. An actual opening size of up to 25 acres with inclusions may be appropriate

N. *An actual opening size of up to 40 acres with inclusions may be appropriate. Larger openings may occur in certain forest types based on specific Forest Plan direction.

O. Harvest units in contiguous woodland should be spaced no closer than 1000 feet apart next to the travelway.

P. Along FSR 1307 openings of up to 200 linear feet may be appropriate. Interior roads, openings of up to 400 linear feet may be appropriate.

T. The visual impact of roads and constructed fire lines should be blended so that they remain subordinate to the existing landscape character in size, form, line, color, and texture.

V. Openings and stand boundaries should be organically shaped. Straight lines and geometric should be avoided. Edges should be shaped and/or feathered where appropriate to avoid a shadowing effect in the cut unit. Openings should be oriented to contours and existing vegetation patterns to blend with existing landscape characteristics, as appropriate.

Prescribed burning - High, Moderate and Low Scenery treatments for following techniques to achieve Scenic Integrity objectives and Landscape Character where suggested D, E, F**, H* however only the ones listed below were appropriate: *noted only for low scenery objective and **noted for high scenery objective.

Notes:

The RLRMP, pg.2-20, for Scenery Management identifies Priorities for the analysis area as follows:

*Maintain or enhance the visual character of the Forest by using the Scenery Mgt System (SMS) to achieve scenic integrity objectives.

*Manage landscapes and build elements in order to achieve scenic integrity objectives.

*Promote the planning and improvement of infrastructure along scenic travel routes. Use the best environmental design practices to harmonize changes in the landscape and to advance environmentally sustainable design solutions.

*Restore landscapes to reduce visual effects on nonconforming features.

*Manage scenic restoration to be consistent with other management area objectives.

*Maintain the integrity of the expansive, natural landscapes, and traditional cultural features that provide the distinctive character of places. Maintain the character of key places in order to maintain their valued attributes

e. Recreation

Existing Conditions

The analysis area for evaluating effects on recreation will be the watershed boundaries of the South Fork drainage with multiple smaller tributaries of Brushy, Little Red, West Prong and North Prong joining the main water course forming the HUCs 6 watershed. The project area lies within Van Buren and Pope Counties and is located north of Austin, west of Scotland and south of Rupert/Alread.

Developed recreational opportunities are limited within the watershed; however in the general area dispersed recreation abounds within the following designation: East Fork Wilderness is immediately west of the project, and Brock Creek Motorized Trail system is adjacent south of the project area that includes a small developed campground on the west side.

Hunting for whitetail deer, squirrel and eastern wild turkey is a popular dispersed recreational activity in the general area. Dispersed camping can be found mostly from hunters, or visitors seeking solitude with some site inside or just outside the project area. These sites receive moderate use with the peak use in spring and fall. Other activities include Recreational driving interior roads, small amount of ATV use, wildlife viewing and firewood gathering within the project area.

The previous LRMP and the Revised LRMP restricted ATV use from general forest and closed roads. However under the current plan additional limitations have been imposed following the National direction associated with unmanaged recreation and the ATV National policy to use designated trails only. The project area currently has three designated ATV trails within the project area (6.25 mi.). Due to management goals to limit impacts on T & E species within the project area, there will be only 2.31 miles of additional existing open, closed roads or fire-lines on the ridge tops accepted as viable proposals for ATV trails to be included in any alternative.

The analysis area for evaluating effect on Recreation can be described in terms of three principle components: the recreational activity, the setting in which it takes place, and the resulting experience. These three components make up the Recreation Opportunity Spectrum (ROS) that was originally completed in 1986. However, during each Environmental Assessment, ROS for the area is reviewed and updated as needed. The setting includes both environmental and social factors. Its physical, natural features and the amount of apparent modification from human activity characterize the environmental setting of an area. The social setting of an area is characterized by the amount of contact among the visitors using it and the probability of their experiencing isolation from the sights and sounds of non-recreation human activity. The experience is the desired psychological outcome realized by participating in a preferred activity in a preferred environmental and social setting. Different combinations of these components provide a range of recreation opportunities. The ROS is a way to classify this range of opportunities and to identify the capability of the Forest to provide them. There are five classes of ROS in the Forest Plan: Semi-primitive non-motorized (SPNM), Semi-primitive motorized (SPM), Roaded Natural (RN), Rural (R) and Urban (U). The Forest Plan objective is to maintain a balance of Recreation Opportunity Spectrum on the Ozark- St. Francis National Forest. This project area contains only two ROS classifications which include 4,224 acres of RN associated with the ridge roads on the perimeter and 8,209 acres of SPM the main core of the area. Semi-primitive motorized areas are characterized

by a predominantly natural or natural-appearing environment of moderate to large size. Motorized use is permitted. In a roaded natural ROS, the area is characterized by predominantly natural appearing environments with moderate evidences of the sights and sounds of man that usually harmonize with the natural environment. Therefore no restriction on vegetation management since recovery time after treatments is relatively short, three to five years.

There are no special designations within the project area such as trails, wilderness, Special Interest Areas, or Research Natural Areas that would limit or restrict vegetation management.

Direct/Indirect Effects

A large portion of the analysis area will be impacted due to wildlife stand improvement (WSI), timber harvesting and creating opening for forage, however management activities should not exceed the ROS classification and forest visitor would be expected to encounter resource utilization while traveling Forest Service roads, hunting or while cross country hiking.

The temporary black appearance of the stands after prescribed burning may detract from the recreation experience of users for approximately one year or until spring green up. Wildlife habitat will be improved so hunting and wildlife viewing opportunities would increase with prescribed burning.

ATV use will be impacted due to enforcement of existing policy limiting access to closed roads. However, some additional miles of roads will allow ATVs on 2.3 miles of ridge top open roads and fire-line on John's Mtn.

Cumulative Effects

Based on the proposed treatments in the alternatives and proposed action there are no cumulative effects to the recreational opportunities in the project area expected over the long term. Realizing that the recreational ATV opportunities within the area has mostly been undesignated/unauthorized use and all alternatives and proposed actions designates some areas for the public enjoyment. Therefore, all alternatives accomplish the objective of the National ATV policy and unmanaged recreation directives while providing some of the needs to the ATV user. This would have limited adverse impacts that would affect the recreational opportunities of ATV user in the foreseeable future.

f. Heritage Resources

Existing Condition

Heritage Resources (HR) inventory surveys (with pre-field records checks) have been completed and have received concurrence by the State Historic Preservation Office (SHPO). Eighteen new sites were recorded and 43 previously recorded sites were revisited.

Effects of any Alternative

The values of known HR would be protected through proper documentation and complete avoidance for potentially significant (Undetermined and Potentially Eligible) properties. Resources would be flagged and painted-out in order to place them outside the area of potential effect of the project or other management recommendations as determined by the nature of the HR. With these actions there would be no adverse effect to the resources. Sites that are determined to be insignificant by SHPO (Not Eligible) will be recorded as such and may not be protected.

If new HRs are located during management activities, they will be flagged, painted-out, and recorded with a state site form and submitted to the Arkansas Archeological Survey (AAS) Coordinating office for state site numbers.

Action alternatives produce a positive effect. HR surveys (required for any action alternative) discovered 18 previously unknown heritage resources in the project area. These resources are documented and protected until their NRHP eligibility has been determined.

g. Transportation

Existing Condition

A Roads Analysis Process (RAP) has been completed and includes the roads in this project. This RAP is included in the process file.

A table in the RAP displays road numbers, mileages, and maintenance level for all existing roads.

There are a total of approximately 67.19 miles of existing roads in the area or bounding the area. Some of these roads are in a deteriorated condition, with suffering soil and water values.

There are 3 County Jurisdiction roads within the area 1342, 1307, and 1301 with maintenance shared between the Forest Service and the County.

If the low standard woods roads in the area are not part of a timber sale, they receive maintenance by dozer as needed, with availability of funds. Maintenance is primarily to minimize erosion.

Direct/ Indirect Effects of Proposed Action

This alternative is in compliance with the priorities and objectives listed in the transportation and public access section of the RLRMP and produce no increase of on-the-ground miles.

Timber harvesting would utilize many of the system roads in the area. Road maintenance includes blading the road, cleaning culverts, reshaping dips, pulling ditches, and cutting back encroaching brush and trees from the right-of-way. System roads that are currently closed will be re-closed following sale activities. Temporary roads will be closed and seeded, after use.

Reconstruction is planned on roads 1302,1342,1301F,1302B, 93005A, 93005B, 93005G, 93006A and 93715B. Reconstruction work consists of blading, shaping, and reconditioning travelway, cleaning existing drainage structures, clearing and grubbing for additional ditches, curve widening, and turnouts, removing and replacing existing culverts that have ceased to function, and adding additional culverts as needed. Other work includes replacing gravel surfacing, and seeding and mulching disturbed areas.

Associated road work would include approximately 13.21 miles of reconstruction, 33.34 miles of maintenance and 4.3 miles of temporary road construction. 2.4 miles of roads would be closed using signs, gates or berms. 3.04 miles of roads would be decommissioned. Improve or close 10 stream crossings.

Effects of Alternative 1

Road operations would be the same as the Proposed Action, except no herbicides will require multiple entries during site preparation, TSI, Release and Understory control. Reopening closed roads could result in a possible increase in erosion.

Alternative 2

Roads needing routine maintenance would remain in their current condition. Some deterioration of other roads can be expected due to natural processes such as erosion and plant encroachment into the road right-of-way. Erosion and sedimentation would continue to occur. Road density per square mile would remain higher, without road closing or decommissioning.

h. Vegetation Management and Vegetation Diversity

Historic Conditions:

Historically, the lands that are now the Ozark – St. Francis National Forest consisted of fire-dependent woodland and forest ecosystems with well-developed herbaceous under-stories. Currently, the ecosystem in the project area is considered unhealthy because the area lacks these forest conditions. This absence is due to seventy years of fire suppression and lack of sufficient vegetation management. Existing ecological conditions in the project area include dense, overstocked forest, a shift from the historic plant community composition toward fire intolerant plant species, lack of herbaceous species diversity and insect epidemics.

Dendrochronology studies on the Forest have studied fire scars on both living and dead pines, and one cross-section of an old pine tree revealed that at least 14 fires occurred on the district from 1747 to 1902. The fact that there is evidence of 14 fires should not imply that those were the only ones that occurred during this time period. Accounts of early travelers frequently describe wildfires and large burned-over areas.

Large scale logging in the 1920's and 1930's combined with effective fire control influenced the existing vegetation. Mature sawtimber on large tracts was often cut in a single entry, leaving smaller pines and hardwoods to occupy the site. Exclusion of fire from southern pine stands can produce a hardwood forest with conditions quite foreign to what probably existed in prehistoric times with a community of wildlife different from the wildlife that would be present in the natural fire climax pine forest (Conner, 1986). Repeated summer ground fires favor grass over midstory hardwood trees.

Current Conditions:

This project tiers to the Revised Land and Resource Management Plan (RLRMP-2005), its Desired Future Conditions established for this area, and its Objectives and Standards.

The entire project area is contained in the Oak Woodland Management Area, as defined by the RLRMP-2005. The primary emphasis in this management area is to restore and maintain a landscape mosaic of open oak woodland that mimics historical conditions. Vegetation management activities are generally applied in these areas that restore the area to a woodland condition; however, in areas not suitable for woodland restoration, other management actions are applied. Areas typically suited for woodland restoration are of lower productivity and thus have lower site indices.

Hazardous fuel accumulation has increased in the area due to tree mortality from the Red Oak Borer, wind and ice storms.

Areas that contain pine are mostly located on southerly slopes or mountaintops. Some of these areas with

younger pine are old fields that have been planted, but other areas with trees up to 100+ years old appear to have developed due to other ecological conditions, such as heavy cutting, field abandonment, and/or fire. Hardwood forest types in the project area include mixtures of white, black, and southern/northern red oak and hickory, as well as other species such as pine, cedar, beech, blackgum, sweetgum, black cherry, ash, maple, walnut, and elm. The mid-story and ground vegetation components and densities in proposed stands are typical of those found in the cover types of the area. The species composition in the mid-story consists of oak, hickory, dogwood, sassafras, sweet gum, black gum, elm, pine, red cedar, and red maple. Common shrubs and vines found include spicebush, hawthorns, blueberries, viburnums, greenbriers, blackberry, honeysuckle, and grape. Grasses and other herbaceous vegetation in the understory include bluestem, cheat, foxtail, Johnson grass, nutsedge and panicums, and a variety of other species depending on slope and aspect.

Forest disease has become a top priority on the Ozark National Forest within the past few years. A red oak borer epidemic has materialized with affected acreage going from 19,000 acres in 1999 to around 300,000 acres in 2001. Preliminary field investigations indicate that the red oak component is being reduced by as much as 85% within the affected areas. Preventive action is limited but it is thought the best hope lies in regeneration and thinning (harvest & salvage). This will accomplish two objectives: first, it will reduce inter-tree competition and relieve the water stress on the remaining trees and help them repel some of the borers and; second, the trees that are harvested will be able to begin stump sprouting which will help to provide a source of young oaks for the future.

Currently there are no large pockets of dead or dying red oaks in the analysis area, but rather scattered small pockets and numerous individual trees are found. Areas across the forest that have had extensive infestation of the red oak borer have a substantially higher red maple component than prior to the infestation. Should large areas become impacted within the project area by red oak borers, it is reasonable to expect a higher than desired population of red maple sprouts, which are not as desirable for wildlife forage or forest products.

Compartments 1-8, and 714 - 715 include approximately 3,927 acres of private ownership and 13,362 acres of National Forest Land. Of these National Forest Lands, approximately 10,376 acres are suitable for timber production and 2,425 acres are considered non-suitable. Twenty-three percent are pine or pine-hardwood forest cover types, and seventy-seven percent are hardwood or hardwood pine types. Eighty-three percent of the forested areas, especially the hardwood forest, within the project area is in the 61 to 100+ year age classes. The following table shows forest types and stand conditions as they now exist.

Table 10: Forest type/Age-class distribution on Public lands in the South Fork project area (12501 acres).

Pine (includes pine/hdwd & cedar/hdwd mixes)

Age class	% of Total Acres
0-10	0%
11-20	0%
21-40	4%
41-60	10%
61-80	4%
81-100+	5%
Total	23%

Hardwood (includes hdwd/pine mixes)

Age class	% of Total Acres
0-10	0%
11-20	1%
21-40	0%
41-60	2%
61-80	19%
81-100+	54%
Total	77%

The South Fork project has about 2,425 acres (19%) designated as unsuitable for timber production. These areas are either currently in old-growth status or will develop old-growth characteristics.

Herbicides for NNIS, Site Prep, Release, TSI, and Understory Control:

Glyphosate – is a wide spectrum herbicide and is effective in treating a variety of annual and perennial herbaceous species including grasses. It is not as effective in penetrating woody bark. Because it is non-selective, application or drift spray could effect non-target vegetation if care is not taken. Where it is used for aquatic treatments, only specified formulations would be used that are registered for aquatic use. In water, it is rapidly dissipated through adsorption to suspended and bottom sediments. It is strongly adsorbed to soil particles, which prevents it from excessive leaching or from being taken up from the soil by non-target plants. It is degraded primarily by microbial metabolism, but strong adsorption to soil can inhibit microbial metabolism and slow degradation. Soil microorganisms break down Glyphosate and the surfactant used to carbon dioxide. (SERA)

Triclopyr – is a selective systemic herbicide used to control woody and herbaceous broadleaf plants. Triclopyr controls target weeds by mimicking the plant hormone auxin, causing uncontrolled plant growth that leads to withering and death. It is absorbed through the roots, foliage and green bark of plants. Grasses are not as susceptible to this chemical. It is especially effective against root-or stem-sprouting species. Offsite movement through surface or subsurface runoff is a possibility with Triclopyr acid, as it is relatively persistent and has only moderate rates of adsorption to soil particles. In water, the salt formulation is soluble and, with adequate sunlight, may degrade in several hours. (SERA)

Hexazinone (liquid)- is a effective herbicide mostly used for site preparation and conifer release. Workers need to follow prudent handling practices to minimize exposure. Unintended effects are plausible on non-target vegetation which can be minimized by timing and application manner. Drift and runoff need to be accounted for, and use around aquatic vegetation is not recommended. (SERA)

Metsulfuron methyl – is a selective herbicide used to control brush and certain woody plants, annual and perennial broadleaf weeds, and annual grassy weeds. It is water-soluble and remains in the soil unchanged for varying lengths of time, depending on soil type and moisture availability. Under certain conditions, adverse effects on some non-target terrestrial plant species and, to a lesser degree, some aquatic plant species can occur. If ground broadcast applications are used, damage to sensitive non-target species could occur as a result of offsite drift, if protective measures are not taken. When used in directed foliar applications (i.e. backpack), offsite drift could be reduced substantially, but this amount can't be quantified. If Metsulfuron methyl is applied in areas where transport to water containing aquatic macrophytes is likely, it would be plausible that detectable but transient damage could be observed.

Imazapyr - is an effective herbicide in treating annual and perennial grasses, broadleaf herbs, and certain woody species. Even tolerant plants that are directly sprayed with Imazapyr at normal application rates are likely to be damaged. Imazapyr is strongly adsorbed by soils, found only in the top few inches of the soil. It is broken down by exposure to sunlight and soil microorganisms. It has a low potential for leaching to ground water, but may reach surface water during storm events over recently treated areas. As Imazapyr can affect a wide range of plants, care must be taken in its application. (SERA)

Tank Mixes: For more effective treatment one or more herbicides are mixed. SERA risk assessments apply, but a SERA worksheet must be completed for each chemical then summarized to evaluate the overall Hazard Quotients. The following tank mixes have been evaluated 1) 0.056lbs/ac Imazapyr + 2.692lbs/ac Glyphosate + 1.77lbs/ac Triclopyr. 2) 0.056lbs/ac Imazapyr + 2.692lbs/ac Glyphosate + 1.77lbs/ac Triclopyr + 0.038lbs/ac Metsulfuron Methyl. 3) 0.016lbs/ac Imazapyr + 0.932lbs/ac Triclopyr Ester. 4) 2.5lbs/ac Glyphosate + 0.348lbs/ac Triclopyr. 5) 0.40lbs/ac Imazapyr + 3.176lbs/ac Glyphosate + 1.983lbs/ac Triclopyr. If other tank mixes are scheduled then additional worksheets and summaries would be completed and applicable hazard quotients kept under one or mitigated.

For all herbicides follow Forest Standards, the product label and SERA. See SERA and mitigations.

Proposed Action and Alternative 1 – No Herbicide

Direct and Indirect Effects

The effects of the hardwood shelterwood with reserves harvests on 420 acres and 15 acres of pine shelterwood with reserves harvest will be the eventual replacement of a mature even-aged stand with a predominately immature two-aged stand containing naturally-seeded hardwood & pine sprouts/seedlings. This treatment would reduce the density to approximately 30 square feet of basal area per acre. This harvest method meets the guidelines and objectives set out in the RLRMP. It is an appropriate method because the trees have reached a mature stage, exhibit good seed-bearing characteristics, and are located on soils suitable for natural regeneration.

Treating some of the remaining non-merchantable hardwoods with herbicides in the shelterwood areas that are not needed for wildlife and other purposes, will let light reach the forest floor and allow stump-sprouting and seeds to germinate in these areas. Prescribed burning for site preparation in these and other areas will reduce the duff and litter, topkill small brush, and expose some bare soil, which will promote a successful seed catch from the overstory pine and hardwood trees. In the short term, the stand will be more open and early seral vegetation will develop across this area. Within ten years, the understory will be very dense and emerging into mid-story status.

Under Alternative 1 (no herbicide), many of the handtool-treated stems in the shelterwood with reserves harvests will resprout vigorously and may require subsequent re-treatments, depending on hardwood sprouting and pine seed catch.

The effects of thinning the overstory and controlling the mid/understory on 1,950 acres of pine, 181 acres of hardwood, and 4,548 acres of other hardwood and pine for wildlife will be to improve the vigor and growth of future crop trees in the stand and favor more vegetation diversity on the forest floor by permitting more sunlight. Commercial thinning treatments would reduce the density to a residual of approximately 60 square feet of basal area per acre. These treatments will also promote a more open park-like appearance and woodland condition. In the short term, limited amounts of early seral vegetation will develop in these areas as well as more mast (nut & fruit production) from the residual trees.

The effects of 141 acres of timber stand improvement/pre-commercial thinning will give the residual trees a good headstart, and increase early seral vegetation and forage production for wildlife benefits. These areas contain young trees too small to commercially harvest. They are currently overstocked and unhealthy.

The effects of release on 420 acres of sapling hardwoods will allow the best small hardwood to get a good growth jump to stay ahead of its competitors. Release in the 15 acres of pine shelterwood with reserves harvest will allow the existing pine regeneration to gain dominance over its competitors. Most of this vegetation in these treated areas will resprout and remain part of the stand structure and composition, but it will allow oak and pine seedlings and saplings to express dominance.

The effects of midstory/understory control and prescribed burning on 200 acres of mature hardwood areas will allow the presence of desirable natural regeneration to become established prior to regenerating the stands. These areas currently have little to no advanced oak regeneration in the understory and non-commercially thinning the midstory/understory in them now will promote suitable conditions for the establishment of natural regeneration needed prior to removing the overstory. It will also increase ground level herbaceous vegetation that will improve wildlife forage conditions. Control in stands nearing or at maturity would open the forest floor to sunlight, increase nutrient flow to existing desirable stems and create a seedbed to establish natural regeneration. Advanced regeneration would be on site to replace aging stands that are poor quality and exhibit slow growth and vigor.

The effects of CUS and wildlife forage burning will encourage oak seedling/sapling survival and increase the volume and quality of browse produced within reach of ground-dwelling animals in pine and hardwood areas for several years. The abundance of the present vegetation will return within 5 years; however, the composition will hopefully be modified toward more fire-tolerant species such as oak and pine.

The effects of creating 17 small wildlife ponds (0.5 ac. each = 8.5 acres) will be negligible to non-existent from a vegetation standpoint while providing useful water sources for wildlife.

The effects of maintaining 3 existing wildlife openings (3 ac. each = 9 acres) will provide a variety of grasses and forbs that will be suitable for forage by ground-dwelling animals.

The effects of prescribed burning in the remainder of the project area to promote Oak Woodland restoration will be the replacement of brushy and woody vegetation in the understory to a more grass and forb composition, benefitting quail, deer, and neotropical migratory birds.

Temporary road construction would convert a forested condition to a grassy condition. Following sale activities, these roads would be blocked and seeded for erosion control. Woody vegetation would be allowed to reclaim these corridors. Road reconstruction that includes widening of the roads will remove existing trees. These corridors will become part of the roadway and may include grasses on the edges of the road.

Forest fragmentation created by this alternative would total 444 acres (including wildlife openings), which equates to 3% of the Federal land in this project area.

Non Native Invasive Species (NNIS) and Non-Desirable Woody Vegetation Control: Currently the biggest threat from an invasive species is the widespread native Red Oak borer. Other invasive species are more localized across the South Fork landscape. They include the non-native Chestnut Blight fungus, which threatens the sensitive Ozark Chinquapin; the non-native *Sericea Lespedeza* which is overwhelming native grasses in wildlife openings; the native Rattan, non-native Japanese Honeysuckle and Privet which can overwhelm pine or hardwood regeneration, particularly in bottomland stands, Dogwood Anthracnose, which threatens the larger/older Flowering Dogwood, Multiflora Rose, Fescue and many others.

The Proposed Action would improve native vegetation by suppressing, containing or eradicating NNIS on treatment areas. It would assist the re-establishment of native plant communities by removing dominant and aggressive NNIS as well as controlling competition where woody stems encroach into openings or as support in restoring savannahs and woodlands. With this action, there would be a noticeable decline in NNIS overall, and an increase in native plant abundance and vigor. As NNIS are removed and the bare soil fills in with native plants, the plant community would become more resistant to re-establishment of NNIS.

Manual or mechanical methods when used in conjunction with selected herbicide treatments would enhance the effectiveness of treatments to some species (e.g. mowing *Sericea Lespedeza* before it goes to seed and then spraying it with herbicide when it re-sprouts). The herbicide used will be selected depending on the specific site as well as the intended target species. In no case will different herbicides be mixed. Where herbicides are applied, individual, non target ground cover plants or small patches of native plants (if they are interspersed with NNIS) may be impacted. However, the loss of native plants would be temporary and small relative to the area treated. These temporary reductions in native plants would vary primarily by the NNIS treatment method used. Applications at prescribed rates should not eliminate any native populations from the plant community. Herbicides constitute a short-term disturbance to plant communities that have evolved to withstand and recover from long-term changes and disturbances. If infestations remain untreated, they could expand and reduce native vegetation through competition. Once the dominant NNIS are removed or killed, community diversity is expected to be re-established from the existing seeds in the soil and seeds from adjacent areas. It is expected that at least the grasses or other early-seral plants would recover within treated areas within the first growing season.

(typical for recovery on most sites), and abundance and diversity of native plants would increase over the following few years. Re-establishment of vegetative cover is key in prevention of NNIS reinvasion when restoring native plant communities. Treating NNIS prior to or in conjunction with other actions proposed would help contain infestations while they are relatively small and prevent spreading NNIS into uncontaminated areas by vehicles, equipment, foot traffic etc.

Under Alternative 1 (no herbicide), NNIS eradication with herbicide application would not be implemented. Herbicides have proven to be the only method to successfully eradicate the presence of NNIS.

Based on the above analysis and the mitigation measures to be applied, there should be no long-term or cumulative negative effects on vegetation diversity from implementation of these Actions.

Alternative 2 – No action

Direct and Indirect Effects

The effects of the no action alternative would perpetuate the current growth and vegetation patterns which would be subject to modification by only natural forces and the dynamics of plant succession. The health of stands needing treatment would continue to decline.

Species succession would occur through natural processes and would favor the more shade-tolerant tree species present in the understory. These species are not considered as beneficial for wildlife habitat. This dense midstory will limit oak & pine regeneration, affecting the future of these stands. In the stands which are presently considered mature/over-mature, there would be a loss in growth rates and a higher rate of mortality. Some of the old fields that have been planted with pine and the naturally-occurring pine areas would eventually be replaced in the distant future by the young hardwood that exists in the understory/midstory of these stands and climax hardwood or hardwood/pine vegetation would eventually dominate the area if all fire or other site-disturbing activities were excluded. As trees age, the large mature/over-mature trees would be more susceptible to damaging agents such as insects, disease, and windthrow. Mortality of oak trees due to Red Oak Borer and oak decline, would continue and possibly increase. Ground vegetation would decrease, with those species more tolerant of shade predominating. Catastrophic events like a major windstorm or intense fire may occur that would kill the overstory canopy, allowing development of early- and mid-level successional habitats (i.e. openings, young growth).

Hazardous fuel accumulations would continue to increase and any occurrence of wildland fire would be more difficult to suppress. Non-native invasive species occurrences would continue and their negative impact to regeneration, existing forested stands, and visuals and wildlife values would increase.

Most of the timber and wildlife outputs identified in the Revised Ozark-St. Francis National Forests Land and Resource Management Plan (RLRMP-2005) would not be gained in the South Fork project area under this alternative.

i. Minerals

Current Conditions

The majority of the federal land in the project area is currently under lease to private individuals for mineral (gas) exploration. There are currently eight well sites on private property near the project area with three of them actually in the project watersheds. These three sites have had partial rehabilitation and are not producing sedimentation into any streams. The District has received no Applications for Permit to Drill (APD) at this time, but are expecting to start receiving them soon.

Cumulative Effects

It is likely that additional requests to drill will be received by the Forest Service for existing leases. As an Application for Permit to Drill is received, it will be evaluated on its own merit to minimize impacts to the area, including cumulative impacts. Whenever possible, the existing access roads and gas pipelines will be utilized by multiple drilling areas. This is the practice that has been followed in the past and reduces the number or linear miles of roads and pipelines on the ground. As wells become unprofitable, they are generally abandoned by the producer, at which time the area is rehabilitated to meet Forest Service standards.

As gas wells within the project area are plugged and abandoned, the surface areas are restored to meet Forest Service standards. The specified end result varies based on the specific site and desired outcome. Various outcomes of the areas have been as wildlife openings, dispersed recreation areas, or returned to the natural contours and vegetative types. In following the Presidents Energy Initiative, the Forest Service must continue to honor access to the minerals under existing leases and look at potential areas that can environmentally accommodate additional leases.

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

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

Proposed Action and Alternative 1

Requests for surface occupancy through an APD to withdraw minerals that are legally entitled to the leaseholder within the project area shall be approved. Prior to approval, an on-site meeting with the Operator, Bureau of Land Management, and Forest Service Specialists shall take place. The APD will be reviewed for compliance with all Federal regulations. Road, pad, pit, and pipeline locations shall be determined based on the surrounding area, existing roads, topography, and existing pipeline. The best location for these items will be chosen that will address environmental concerns as well as accommodate the operator's right to entry for mineral withdrawal under the lease. The acreage for each new site shall be less than five acres of new ground disturbance. This will include any new construction of roads, the pad area, the pit area, and any other areas that are cleared of vegetation. The rehabilitation of areas shall be done in a timely manner with direction given individually for each site. Rehabilitation measures could include restoration to original conditions, maintenance as a wildlife opening or as a dispersed recreation area.

Alternative 2

Under the "no action" alternative all requests for surface occupancy for gas exploration would be reviewed and analyzed on an individual basis with an Environmental Assessment and Decision Notice prepared for each request. This would impact time and personnel resources in order to continue to follow the Presidents Energy Initiative in responding in a timely manner to all Applications for Permit to Drill.

j. Wildlife, Fisheries, MIS

Wildlife

This analysis will focus upon the Management Indicator Species (MIS) to assess the potential impacts of this project on wildlife by the actions described in Chapter 2. The foundation for MIS can be found in the National Forest Management Act and Planning regulations (36 CFR 219.19). Briefly, MIS were selected because "their population changes are believed to indicate the effects of management activities" and they were used to help

meet the Forest’s legal requirement to “preserve and enhance the diversity of plants and animals consistent with overall multiple-use objectives.” It is important to remember that MIS are a planning and monitoring tool that reflects a way to analyze a change in conditions. The Forest completed a report assessing the population and habitat trends for 17 MIS (USFS 2001) and has since completed annual Monitoring & Evaluation Reports on the Forest evaluating the status of MIS.

A more complete description of the habitat relationships for these species can be found in the process file and reference section of the EA and are tiered in part to the Nature Serve database: <http://www.natureserve.org/> , Bird Conservation Report: <http://www.rmbo.org/pif/pifdb.html> and a Land Manager’s Guide to Birds of the South: <http://www.srs.fs.usda.gov/pubs/2702>

Management Indicator Species Analysis

The management Indicators will be divided into two groups: Low Disturbance Species (LDS) and High Disturbances Species (HDS). Low disturbance species are species that occupy habitats that require low intensity and/or frequency of disturbances to maintain their habitats. An example would be a closed canopy forest. Habitats of HDS species require high intensity and/or frequency of disturbance to maintain them. Examples of these habitats are oak woodlands and 0 to 10 year old regeneration stands. The table below will identify the classification of each of the Terrestrial MIS species. Potential effects of activities proposed in the proposed action and 2 alternatives in this EA will be analyzed using COMPATS. COMPATS is a model that was developed by the Ozark National Forest in partnership with species experts from U. S. Fish and Wildlife Service, Arkansas Game and Fish Commission, Arkansas State University, Arkansas Tech University and other organizations. COMPATS is designed to describe theoretical population changes for six MIS species caused by various forest management practices: two LDS species; Scarlet Tanager and Pileated woodpecker and four HDS species; Prairie Warbler, Bob-white Quail, Whitetail deer, and Wild Turkey. Outputs from this model are only designed to compare alternatives for a species and should not be used to compare magnitude between or among species.

Table 11: Classification of MIS

Common Name	Classification (LDS or HDS)
Northern Bobwhite	HDS
White-tailed Deer	HDS
Black Bear	HDS
Wild Turkey	HDS
Prairie warbler	HDS
Brown-headed Nuthatch	HDS
Northern Parula	LDS
Cerulean Warbler	LDS
Ovenbird	LDS
Red-headed Woodpecker	HDS
Pileated Woodpecker	LDS
Scarlet Tanager	LDS
Acadian Flycatcher	LDS
Smallmouth Bass	NA
Largemouth Bass	NA

Of the National Forest lands in the project, the majority of the forested stands are dominated by Oak hickory species (80%) with the rest of the stands dominated by shortleaf pine. In addition there are 4 acres of wildlife openings and approximately 50 acres of glade habitats. Private land comprises less than 21percent in the project

area. Most of this land is in forested habitats, but there are some openland habitats around residences which has very little value to most wildlife species. Table 10 in the vegetation section displays the breakout of the oak/hickory and pine stands by age class for the National Forest portion. As can be seen, most of the stands fall in the 71+ year old category. The amount of acres that reflect late-successional characteristics in hardwood and pine stands equals 94 and 26 % of the National Forest acreage, respectively. Conversely, pine and hardwood stands have <1 % in early seral stages (<10). Age Class distribution is unknown for private land.

Wildlife Ponds and Water Sources

Currently within the analysis area, there are 26 small wildlife ponds. In addition the South Fork of the Little Red, which is the main stream course through the area, holds pools of water in several locations during the dry summer season and has partial flow year round.

Proposed Action

Direct and Indirect Effects

As seen in Table 1, both LDS species carrying capacity declined with the implementation of the proposed action. This decline is primarily due to the reduction of mature forest habitat from regeneration harvest, and savanna restoration cuts. After implementation, the project area will maintain 26% of pine stands and 89% of hardwood stands in mature forest habitats (71 years and older). Although these activities negatively affect these species initially, they will help stabilize the amount of mature forest in the project area over the longer term by maintaining a more balanced age class. Even with these regeneration cuts, most of the hardwood is in the 71 to 100 year old age class (75%). These unbalanced age class distributions increase the potential for significant shifts in habitats from mature forest to early successional habitats. In addition, hard mast production will become more veritable overtime.

Table 12: Results from the COMPATS model.

All units given as individuals per square mile		Species					
		Scarlet Tanager	Prairie Warbler	Pileated Wood Pecker	Quail	Deer	Turkey
Baseline		67	1	82	15	17	11
Proposed Action	Implementation	61	280	51	422	44	21
	% change over baseline	-9	+27,900	-38	+2713	+158	+91
	10 years	61	212	53	529	34	36
	% change over baseline	-9	+21,100	-35	+3,426	+100	+111
Alternative 1 No Herbicides	Implementation	61	280	51	422	44	21
	% change over baseline	-9	+27,900	-38	+2713	+158	+91
	10 years	61	212	53	529	34	36
	% change over baseline	-9	+21,100	-35	+3,426	+100	+111
Alternative 2 No Action	Implementation	67	1	82	15	17	11
	% change over baseline	0	0	0	0	0	0
	10 years	69	1	85	15	17	17
	% change over baseline	+2	0	+4	0	0	0

There is some variation in effects to the LDS species from activities such as TSI, Release, Mid-story, WSI and Thinning. Scarlet Tanager would benefit from these activities that occur in stands greater than 21 years of age but maximum benefit would occur in stands older than 70 years. The Pileated Woodpecker is negatively impacted by these activities. This variation would hold true among LDS species. The effects of prescribed fire on these species will vary across the landscape. Typically the more mesic habitats are less impacted by fire than xeric habitats but the model treats all acres above 20 years of age as a negative impact for both species. Effects from the thinnings, WSI, and silvicultural activities to the pileated woodpecker will be prolonged due to the repetitive prescribed burning. This trend is reflected by the model. Predicted carrying capacity for scarlet tanager and the pileated woodpecker 10 years after implementation will remain close to the same.

Cedar Removal, TSI, Release, and understory removal that occur in stand 20 years old or younger will have no effect on these LDS species.

Pond construction could reduce the mature forest by 18 acres but will not affect the overall structure of the mature forest habitats as it relates to LDS species. Pond construction will benefit amphibians and many bat species.

Dozer line construction could affect up to 12 acres to excluded private lands if no Steven's or Wyden agreements are signed by private land owners to use existing roads and natural features on their property. As the roads, these lines are narrow and will not affect the overall structure of the adjacent stands.

All four HDS species carrying capacity improved tremendously with the implementation of the proposed action. The reason for this type of increase is due to the lack of suitable habitat currently existing for these species. None are more pronounced than the prairie warbler which primarily uses early successional habitats and open forest habitats. Regeneration harvest, cedar removal, TSI and Release in stands 20 years old or less will improve the habitat for all the HDS species especially for species such as prairie warbler. Mid-story, WSI, Thinning and prescribed fire will primarily benefit species that utilize open forest habitats such as oak and pine woodlands. These activities along with repetitive prescribed fire will improve the conditions for species that utilize woodlands and glades and the disturbance frequency in this alternative should be adequate to restore the herbaceous component of these habitats; as a result, the benefits to these species should be maximized.

Pond construction will primarily improve conditions for HDS species such as turkey, deer, and quail. Maintaining the plots and openings by brush hogging, seeding, fertilizing, and/or liming will perpetuate the benefits of the food plot for these species. Pond maintenance will prolong the life of the ponds in the project area by keeping tree species off of the pond dam which would degrade dam's integrity. Species such as prairie warblers that primarily utilize shrub/brush habitats and are not limited by water sources would not benefit from these activities.

Road closure and obliteration would also benefit the HDS species by decreasing human disturbance especially for the demand species (deer and Turkey).

Road construction and reconstruction will affect up to 70 acres of forested lands, but these roads will be relatively narrow and would not change the overall structure of the adjacent forest in these areas. As a result, HDS species may utilize some of the area adjacent to the road but will have little effect on their overall populations.

Surface rock collection could affect both LDS and HDS species. The amount of rock removed varies depending on the type and quality of rock, but permits typically allow up to 80% of loose surface rock to be removed. Species that use crevices or burrows such as rodents, amphibians, insects, and bats could be negatively affect by this activity. Rock collection will be restricted to areas that have commercial harvest prescribed and all BMPs

that protect caves and blufflines will be followed. In addition, we expect no more than 250 acres per year to be affected. These standards should minimize the effects to the area.

The proposed use of herbicides to control undesirable non-native species and noxious weeds will improve wildlife habitats for both LDS and HDS species. Noxious weeds are displacing native plant species. Species such as *Serecea* are also prone to spread into areas where disturbances occur that have no established herbaceous understory. The proposed herbicide treatments would impede the expansion of the noxious weeds in the project area and potentially eliminate some of the source populations.

All herbicides proposed in this alternative pose a low to no risk to wildlife. The Human Health and Ecological Risk Assessments completed by the USDA, Forest Service (See individual SERA references within text and also in the Reference section in the EA) indicate that the proposed formulations of herbicides are either nontoxic or of low toxicity to birds, mammals, and insects. The risk assessments also indicate that none of the herbicide formulations proposed for use have been shown to cause cancer, birth defects, genetic defects, or problems with fertility or reproduction.

The herbicides proposed for use, when used at the application rates and concentrations listed on the labels, following label directions and incorporating Forest standards would have a very low risk of causing harm (short or long term) to wildlife species.

Specific Herbicides

Glyphosate is strongly adsorbed to soil particles, which prevents it from excessive leaching or from being taken up from the soil by nontarget plants. It is degraded primarily by microbial metabolism, but strong adsorption to soil can inhibit microbial metabolism and slow degradation. Photo and chemical degradation are not significant in the dissipation of glyphosate from soils. The half-life of glyphosate ranges from several weeks to years, but averages 2 months. In water, glyphosate is rapidly dissipated through adsorption to suspended and bottom sediments, and has a half-life of 12 days to 10 weeks. Glyphosate by itself is of relatively low toxicity to birds, mammals, and fish; however, formulations that include surfactants have shown high impacts to aquatic systems affecting amphibians in particular. Such formulations are not proposed for use in aquatic systems (SERA 2003a). See also the herbicide discussion in the Vegetation section of Chapter 3.

Triclopyr – The formulation of Triclopyr proposed for use is an amine or salt compound. Salt formulations are relatively nontoxic to terrestrial vertebrates and invertebrates.

The quantitative risk assessment for mammalian wildlife is based on the same data as used in the human health risk assessment. For birds, the most relevant data for this risk assessment are the standard dietary and bird reproduction studies required for registration as well as the acute oral LD50 studies. The acute oral LD50 values of triclopyr range from 849 mg/kg to 2055 mg/kg, similar to the range seen in experimental mammals.

Based on studies evaluating this, the U.S. EPA/OPP (1998a) has classified triclopyr acid as being practically non-toxic to slightly toxic to birds and triclopyr in its amine formulation as practically non-toxic to birds.

Little information is available on the toxicity of triclopyr to terrestrial microorganisms. Very high concentrations of triclopyr have been shown to cause growth inhibition in bacteria and fungi in laboratory bioassays.

In addition to the laboratory bioassays and field observations on single species or related groups of species, there are a number of field studies that have assessed the effects of triclopyr on terrestrial organisms, both animal and plant. There is very little suggestion in any of the field studies that triclopyr had any direct adverse effect on terrestrial species and most reported effects may simply reflect changes in habitat secondary to vegetation management practices.

The risk characterizations for aquatic organisms for triclopyr in its amine formulation are low over the entire range of application rates that may be used in Forest Service programs. Ester formulations (not proposed for use) have higher risk levels for toxicity (SERA 2003b).

Metsulfuron methyl - Metsulfuron is water-soluble and remains in the soil unchanged for varying lengths of time, depending on soil type and moisture availability. The half-life can range from 120 to 180 days. Soil microorganisms and chemical hydrolysis break it down (SERA 2000, Infoventures 1995d). Metsulfuron methyl is practically nontoxic to birds, mammals, invertebrates, and bees (SERA 2000).

Several acute toxicity studies and two reproduction studies are available on the toxicity of metsulfuron methyl to birds. These studies indicate that birds appear to be no more sensitive than experimental mammals to the toxic effects of Metsulfuron methyl, with the major effect again being decrease body weight gain (SERA 2004d).

Metsulfuron methyl has very low toxicity to aquatic organisms. LC50 (96 hour) for rainbow trout and bluegill sunfish are both >150 mg/L. A LC50 (48 hour) for *Daphnia* was also >150 mg/L (EXTOXNET 1996c).

The available data suggest that metsulfuron methyl is more toxic to aquatic plants than to aquatic animals. Clear toxic effects in fish are not likely to be observed at concentrations less than or equal to 1000 mg/L. Aquatic plants are far more sensitive to these effects, with macrophytes appearing more sensitive than algae (SERA 2004d).

Metsulfuron methyl appears to be relatively nontoxic to aquatic invertebrates based on acute bioassays in *Daphnia* with an acute LC50 value for immobility of 720 mg/L and a NOEL for reproduction of 150 mg/L (SERA 2000/2004b).

Imazapyr – Imazapyr is strongly adsorbed by soils, found only in the top few inches of the soil. Imazapyr is broken down by exposure to sunlight and soil microorganisms (USDA, 2004). As such, it has a low potential for leaching to ground water, but may reach surface water during storm events over recently treated land.

Most toxicity studies have failed to demonstrate any significant or substantial association between imazapyr exposure and toxicity. Only a limited number wildlife species that possibly might be exposed to non-target effects have been studied. Bearing this in mind, imazapyr appears to be relatively non-toxic to terrestrial or aquatic animals. No hazards associated with the direct toxic action of this herbicide can be identified for either terrestrial or aquatic animals (SERA 2004e).

Imazapyr is relatively non-toxic to soil microorganisms, aquatic invertebrates, and fish.

Imazapyr is not expected to bio-accumulate in the food chain. In terrestrial animals and birds, imazapyr is practically non-toxic. Aquatic macrophytes appear to be more sensitive to imazapyr than unicellular algae. Peak concentrations of imazapyr in surface water could be associated with adverse effects in some aquatic macrophytes. Longer term concentrations of imazapyr, however, are substantially below the level of concern (SERA 2004e).

Hexazinone - Based on classification schemes developed by the U.S. EPA, hexazinone is *practically nontoxic* to birds, fish, and aquatic invertebrates. Most of the information on the toxicity of hexazinone to mammals as well as other species comes from unpublished bioassays submitted to the U.S. EPA for the registration of hexazinone. The most consistent effect of hexazinone in mammals is weight loss, an effect that has been seen in acute and longer-term toxicity studies by multiple routes of exposure. While this effect often appears to be attributable to decreased food consumption, decreased food conversion efficiency has been noted in some instances. Based on a single acute gavage LD50 value, birds may be somewhat less sensitive to hexazinone than mammals.

Relatively little information is available on the toxicity of hexazinone to insects. Based on an acute topical application to honey bees, the LD50 value is greater than 1075 mg/kg.

Field studies of the effects on microorganisms have been conducted on hexazinone at application rates of up to about 7 lbs/acre and no adverse effects have been noted on soil bacteria or fungi (Chakravarty and Chatarpaul 1990).

The overall risk assessment for hexazinone varies depending on formulation (Granular or liquid). Granular formulations of hexazinone appear to pose a very low risk to any terrestrial or aquatic animal. The application of liquid formulations will result in much higher concentrations of hexazinone in terrestrial vegetation than will comparable applications of granular formulations. This has a major impact on the potential for adverse effects in mammals. Over the range of application rates used in Forest Service programs, adverse effects are plausible in mammals consuming contaminated vegetation after the application of liquid formulations and adverse reproductive effects in some mammalian species could occur. There is no indication that substantial numbers of mammals would be subject to lethal exposure to hexazinone. Consequently, adverse effects such as weight loss and reproductive impairment could occur but might not be readily apparent or easy to detect. Birds appear to be much more tolerant to hexazinone than mammals and adverse effects on birds do not seem plausible. Similarly, there is no indication that direct toxic effects are likely in aquatic animals.

Alternative 1

This action is similar to the proposed action except no herbicides would be used and all actions using herbicides in the proposed action would use repetitive mechanical methods to control undesirable vegetation. Even though the proposed herbicides are low risk to wildlife, this alternative eliminates those risks. The issue will be mechanical means are typically less effective on controlling many NNIS species and will decrease our ability to control or inhibit the expansion of these species. This will decrease the overall suitability of the project area and decreases the potential benefits to both LDS and HDS species. In addition, cost and man power needed for mechanical methods to control woody species are typically higher which will diminish our ability to effectively treat the entire area proposed for these treatments. This will limit the benefits to many of the HDS species especially the species that use woodland habitats. The model does not reflect this difference because it was assumed that all acres could be treated.

All other effects would be the same as Proposed Action.

Alternative 2

The No action alternative would be the best alternative for the LDS species based upon COMPATS but the project area would continue to have marginal habitat and low carrying capacities for HDS species such as the prairie warbler. In ten years, 97% of the hardwoods will be 71 years or older. Age classes in the hardwood will become less balanced; therefore, more susceptible to large scale tree mortality as seen with the red oak bore epidemic. This more homogeneous forest condition decreases the overall species diversity in the project area.

Noxious weed would continue to expand and decrease species diversity. As these noxious weeds become more established, they also become harder to control or eliminate.

Fisheries

Existing Condition

The fishery analysis area for this project is the South Fork of the Little Red River watershed. Two main tributaries are in the project area: Main stem of the South Fork of the Little Red River and Brushy Fork. These

streams are typical of perennial streams within the Boston Mountain physiographic region. The stream originates in Van Buren County flowing through the Ozark National Forest and into the main stem of the Little Red River East of the National Forest Boundary.

Pools alternate with riffles and the substrate is generally a combination of gravel, cobble, boulders and bedrock. Runoff is rapid following storm flow events, followed by periods of low flow, especially during the summer months. Lowest flow is usually during August and September. For more detail on stream habitat characteristics, see table 13 below.

During low flow periods isolated pools are connected by intragravel and marginal surface flow in riffles. The watershed is primarily forested. Non-forestland is for the most part in private ownership and is typically in small farms and recreational dwellings. For more detail on land use practices, see the soil and water section.

The South Fork supports a viable sport fishery with smallmouth bass (*Micropterus dolomieu*), Long ear (*Lepomis megalotis*) and green sunfish (*Lepomis cyanellus*) being the most popular species. A less common predatory fish is the grass pickerel. Brushy Fork supports a similar species assemblage but due to its smaller size, only supports a limited sport fishery.

Table 13: Habitat description of the tributaries in the project area.
(Numbers in the table are averages from the samples taken in those tributaries.)

Parameters	Stream Reaches		
	S. F of Little Red	Brushy Fork	West Prong of Brushy Fork
Number of Samples	1	3	2
Percent Pool	74	55	27
Percent Riffle	26	46	74
Number of Pool per km	13	19	12
Number of Rifles per km	9	11	8
Average Depth pool (cm)	54	34	30
Average Depth Riffle (cm)	14	12	7
% Pools inventoried as glides	12	18	25
Mean Bankfull Channel Width (m)	15	7	4
Gradient	3	3	2

Fish assemblages in the South Fork were determined from surveys conducted by the Center for Aquatic Technology Transfer Section of the Southern Research Station (CATT) out of Blacksburg, Virginia during the summer of 2006.

A total of 17 species of fish in seven families were identified in these tributaries in the project area. The Index of Biotic Integrity from the Arkansas Department of Environmental Quality was used to classify the three main tributaries in the project area. The South Fork, Brushy Fork and West Prong classified as excellent, good, and fair, respectively. The differences in the classification for these tributaries are due to the watershed size. The South Fork is the largest of the three followed by Brushy Fork and then West Prong of the Brush Fork. The West Prong is an upper watershed that has relatively small streams. The mean bankfull channel width is 4

meters wide and with only 27% in pool habitats. These streams at this watershed size in the Boston Mountains are typically dominated by minnow species such as creek chubs and stonerollers and have one or two darter species. Most of these areas have few if any bass and sunfish. This assemblage describes what is found in the West Prong of the Brushy Fork and is expected for this size watershed which drives the Fair IBI classification. The streams and fish assemblages in the project area are currently in good shape due to the IBI classification increasing with watershed size and the largest watershed has a classification of Excellent. See Table 13 for specific information on the Fish assemblages.

Table 14: Description of the fish assemblages in the tributaries in the project area. Information can be found in a 2006 Report from CATT.

Common Name	SF Little Red River		Brushy Fork		West Prong of Brush Fork	
	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals	Relative Abundance	Total Individuals
Grass Pickerel	<1	1				
Central Stoneroller	3	10	16	60	15	2
Bigeye Shiner	38	112	14	54		
Bluntnose Minnow	<1	2	<1	3		
Creek Chub	3	9	18	70	31	4
Creek Chubsucker	<1	1	<1	3		
Black Redhorse	<1	1				
Ozark Madtom	<1	1				
Slender Madtom	7	20	8	29		
Blackspotted Topminnow	<1	1	<1	1		
Green Sunfish	2	5	2	7	8	1
Longear Sunfish	15	45	4	17		
Smallmouth Bass	<1	1				
Greenside Darter	3	9	2	9		
Rainbow Darter	25	72	23	89		
Stippled Darter			5	19	8	1
Redfin Darter	<1	2	5	20	38	5
Total Species/Total Individuals	16	292	13	381	5	13
IBI Score	28		24		12	
IBI Rating	Excellent		Good		Fair	

Effects/Fisheries

Proposed Action, Alternative I, & Alternative II

Timber harvesting has been shown to destabilize stream banks, alter flow regimes and nutrient cycles, and change the morphology of stream channels (Burns 1972; Scrivener and Andersen 1984; Murphy et al 1986; Armour et al. 1991). These changes in the stream environment may alter fish communities found in the stream (Chutter 1969; Burns 1972; Schlosser 1982; Berkman and Rabeni 1987; Fleischner 1994). The majority of impacts from timber harvesting are caused by road building activities. The project has 4.3 miles of Temporary Road construction and 13.21 miles of road reconstruction. In addition, the project may have up to 10 miles of Fireline construction using a dozer. These fire lines can have similar impacts as roads. Implementation of resource protection and mitigation measures will help reduce this sediment yield and the potential for impacts on aquatic organisms.

Closure of 2.4 miles of system roads, Decommissioning of 3.0 miles of roads and eliminating 7 road crossings would reduce erosion and sediment yield, and contribute to the protection of riparian vegetation. Another significant factor that is contributing sediment to local streams is the condition of the existing roads in the project area. Many of these roads have become incised due to the lack of appropriate ditching and wing ditches. This project would repair and maintain 33 miles of roads in and adjacent to the project area which will further reduce erosion and sediment yield to these streams. Vegetative filter strips, canopy closure, and BMP for Silviculture will be implemented to reduce the impacts to soil and water resources within the project area.

There would be no new crossings of permanent or intermittent streams. The improvement of three road crossings should improve water quality and fish assemblages.

The 3 acres of wildlife opening maintenance should have no impact of sediment yield or the hydrology of the project area. These areas are on ridges away from any streams.

Pond construction could slightly affect sediment yield and hydrology. The primary concern with pond construction is during construction of the pond. During this time, there is no vegetation on the dam or spillway. These areas will be mulched with straw and seeded to speed up the revegetation process. As far as changes in run off, these ponds will have approximately 1/2 of an acre which will not reduce run off significantly. These changes should not impact the aquatic biota in the local streams.

Vegetation removed by prescribed fire would not increase sedimentation into the stream channels. Prescribed fire execution provides ample vegetative cover remaining to slow the overland flow of water and allow for the deposition of sediment prior to it reaching a channel.

Based upon the sediment yield model, all of these activities would produce little sediment and would be considered low risk to the aquatic biota. See the soil and water write up.

Site preparation, release, and woody stem and invasive species control would be accomplished with herbicides (the Proposed Action only). Given the resource protection measures that minimize herbicide movement into sensitive surface waters, there would be no significant effect to the fishery from herbicide use. No herbicide would be used with Alternatives 1 or 2; therefore none would be available to leach into area streams.

The toxicity and potential risk associated with these herbicides used in this project are discussed in the wildlife section.

Alternative 2 (NO Action) would not have the potential increase in sediment yield during implementation but in the long term would have higher sediment yields. The reason for the higher sediment yields would be the continued deterioration of the road crossings and the road systems in the project area. In addition, there will not be a reduction of roads in the riparian areas and most of the sediment control structures will continue not to function properly, where they do exist.

Wildlife/Fisheries Cumulative Effects for the Proposed Action and All Alternatives

There are different scales of consideration in discussing cumulative effects for MIS depending on the species: the analysis area for all MIS and either Forest-wide or within the Conservation Region for this physiographic area where breeding birds are concerned. Cumulative effects consider past, present, and reasonably foreseeable future actions. The analysis area is important because it reflects a geographic area that encompasses potential home ranges for individual MIS. The Forest-wide and/or Conservation Region reflect the size of area necessary to adequately speak to MIS populations and trends.

At the Forest-wide scale, the population trends for the MIS species listed below, known or suspected of occurring in the area; were determined to be generally stable to slightly upward (USFS 2001). Table 15 illustrates the trends for those MIS discussed in that analysis (USFS 2001). Subsequent annual Monitoring and Evaluation Reports done to evaluate Forest programs and projects continues to support that general trend (USFS 2002, 2003). The trends for the other MIS selected for this project are illustrated in Table 16. These trends general indices of populations for the Central Hardwoods Area which the Forest forms a portion thereof (further details on interpreting this data can be found at: <http://www.mbr-pwrc.usgs.gov/bbs/>)

Table 15: Trends, OSNF (USDA,2001)

MIS	Population Trend
Black bear	Up
Eastern wild turkey	Slightly up
White-tailed deer	Slightly up
Pileated woodpecker	Slightly up
Yellow-breasted chat	Slightly up
Smallmouth bass	Up

Table 16: Bird Conservation Region for the Central Hardwoods Area. Trend information provided from USGS Breeding Bird Survey Results (USGS, 2006)

MIS	BCR Population Trend
Northern Bobwhite	Somewhat Down
Prairie Warbler	Somewhat Down
Northern Parula	Somewhat Up
Cerulean Warbler	Slightly Down
Ovenbird	Slightly Up
Red-headed Woodpecker	Somewhat Down
Scarlet Tanager	Somewhat Up
Acadian Flycatcher	Slightly Up

At the forest level, COMPATS were run to determine potential effects from implementation of the forest plan on the 6 MIS species. Scarlet tanager was stable over a projected 50 year period and Pileated Woodpecker declined slightly. This decline is probably due to the increase use of prescribed fire in this forest plan. All HDS species increased over the same time period. It is likely that all MIS species will maintain their populations at the Forest level.

Table 17: Results from COMPATS at the Forest Plan Level.

All units given as individuals per square mile		Species					
		Scarlet Tanager	Prairie Warbler	Pileated Wood Pecker	Quail	Deer	Turkey
Baseline		30.9	16.5	35.1	22.2	10.9	9.7
Forest Plan	10 Years	30.9	29.7	33.3	26.3	12.0	9.9
	% change over baseline	0.0	44.4	-5.4	15.6	9.2	2.0
	50 years	31.1	28.7	34.4	26.5	12.3	10.5
	% change over baseline	0.6	42.5	-2.0	16.2	11.4	7.6

The lack of impacts the proposed action and alternatives would have on water quality is typical of the Forest Practice on the Ozark National Forest. The aquatic resources on the Forest have remained in a high quality condition over the years. The EPA's Index of Watershed Indicators (IWI) is designed to describe broadly the condition and vulnerability (sensitivity) of aquatic systems across the U.S. For the Forest, the watersheds were ranked as either "better water quality, low vulnerability" (highest ranking) or "less serious water quality, low vulnerability" (second highest ranking) (USFS 1999). These rankings demonstrate the high quality of the watersheds and how well they compare to the rest of the nation.

One concern in these watersheds is the construction of numerous gas wells and gas lines in the watersheds encompassing the project area. This activity has the potential to significantly affect sediment yield and the aquatic biota in the watershed. The sediment models show that the addition of these gas wells will move these watersheds from low risk which includes implementation of our proposed forest management activities to a high risk.

k. Proposed, Endangered, Threatened, and Sensitive Species (PETS)

Table 18: Terms Used in PETS Analysis

Biological Evaluation - a document that discloses the effects of management activities on PETS species and their associated habitat that occur or are likely to occur in the analysis area.

Endangered Species - Any species (plant or animal) which is in danger of extinction throughout all or a significant portion of its range and listed as such by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

Threatened Species - Any species (plant or animal) that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and one that has been designated as a threatened by the Secretary of Interior in accordance with the Endangered Species Act of 1973.

Sensitive Species - Those plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Existing Conditions

A biological evaluation (BE) has been completed that examines all known occurrences of Proposed, Endangered, Threatened and Sensitive (PETS) species that occur on the Regional Forester's Sensitive Species list and applicable to the Ozark-St. Francis National Forest. In addition, the 19 federally proposed, endangered and threatened species identified through informal consultation with the USFWS (Forest Plan BA) were also considered. All but 12 of the PETS species were eliminated from further evaluation due to one or more of the following factors:

- The Project Area is not within their known, documented geographic range.
- The species has never been documented within the 12 digit watersheds that are adjacent to or encompass the project area or its sphere of influence in field surveys, monitoring activities, reports, or the scientific literature.
- The treatment area does not provide habitat conditions known to be needed or used by the species.

Table 19: PETS species known to occur or which may occur within project treatment areas or area of influence

COMMON NAME	SCIENTIFIC NAME	CLASSIFICATION
Gray Bat	<i>Myotis grisescens</i>	Endangered
Indiana bat	<i>Myotis sodalis</i>	Endangered
Speckled Pocketbook	<i>Lampsilis strekeri</i>	Endangered
Ozark Big-eared Bat	<i>Corynorhinus townsendii ingens</i>	Endangered
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Sensitive
Bachman Sparrow	<i>Aimophila aestivalis</i>	Sensitive
Ovate Leaved Catchfly	<i>Silene ovata</i>	Sensitive
Ozark Chinquapin	<i>Castanea pumila ozarkensis</i>	Sensitive
Southern Lady’s Slipper	<i>Cypripedium kentuckiense</i>	Sensitive
An isopod	<i>Lirceus bicuspidatus</i>	Sensitive
Small headed pipewort	<i>Eriocaulonn koernickianum</i>	sensitive
Moore’s Larkspur	<i>Delphinium newtonianum</i>	sensitive

The BE considered the actions and alternatives proposed and is hereby incorporated by reference. The BE made use of internal expertise, earlier discussions with the US Fish and Wildlife Service (Conway, AR Office), conversations and species data from the Department of Arkansas Heritage, field reviews by District personnel and collected inventory data on the District and field surveys conducted within the project.

No critical habitat for any PET species has been identified within the analysis area. For a complete description of each species needs and habitat conditions, reference the BE found in the process file for this project.

Yellowcheek darter (*Ethoestoma moorei*), a candidate species for listing as an endangered species, is in the South Fork of the Little Red River drainage, but has not been found within the project area. Suitable habitats are down stream of the Forest.

Effects

Effects Common to the Proposed Action and All Alternatives

The action alternatives could improve potential habitats for all four T&E and the candidate species. The Indiana Bat and Ozark Big eared bats would benefit from the woodland restoration activities which will improve the suitability of the habitat in the project area. The Indiana Bat, gray bat and speckled pocket book would benefit in the long term from improved water quality. The action alternatives would reduce the potential long term sediment yield by reducing roads, maintenance of existing roads, reduction of road/stream crossings, improvement to other road/stream crossings, repair and maintenance of sediment control structures (ditches and wing ditches), and reducing roads in the riparian areas.

Herbicide use in the proposed action does have some inherent risk but due to the low toxicities and or low risk of exposure, these herbicides represent a low risk to these species. Herbicides give managers the best chance of controlling NNIS species and reducing the potential of these NNIS species affecting plant diversity which would affect the prey base for the bat species.

The No action alternative reduces some of the risks associated with the proposed action and alternative 1 but does not address water quality issues. These issues could affect all of these species.

Neither the proposed action nor alternatives are likely to adversely affect the Indiana bat, Speckled Pocket book, Gray bat, or Ozark Big-eared bat. Arkansas State Forestry Commission’s Best Management Practices and all

standards identified in the Revised Forest Plan and project will be applied regardless of alternative selected. These measures should minimize or eliminate any potential effect to these species.

The proposed action and alternative 1 could benefit *Lirceus bicuspidatus* Bachman Sparrow, Ozark Chinquapin and Small-headed pipewort. While the no action alternative would allow conditions for these species to continue to degrade. For the other sensitive species, the Arkansas State Forestry Commission's Best Management Practices and all standards identified in the Revised Forest Plan should minimize any impacts to these species. Individuals may be impacted by the proposed action or alternative 1 but are not likely to cause a trend to federal listing or loss of viability.

Cumulative Effects

Based on the BE and contact with the USFWS, including all cumulative effects (past, present and foreseeable future actions), findings result in a "may affect -not likely to adversely affect" determination for the Indiana bat, Speckled pocket book, gray bat, and Ozark Big-eared bat.

Of the sensitive species identified as occurring within the analysis area, Ozark chinquapin will likely continue to decline overall due to the effects of the chestnut blight across its known range. Because of the protection measures identified, sensitive species are not likely to be affected. For these sensitive species identified there is a determination that actions may impact individuals but are not likely to cause a trend to federal listing or loss of viability.

I. Human Health Factors

Effects of the Proposed Action

The public and employee safety is of utmost importance to the Forest Service. Accidents directly and indirectly related to vegetation management requiring the care of a doctor were reported. There were no vegetation management-related fatalities during the 5-year period. Traumatic injuries to the back,, hand, and skin predominate in accidents involving vegetation management. Vegetation management activities with the greatest risks to the average worker in a 25-year career are those connected with site preparation. No data exists to determine occurrence rates of other health problems. Such things as loss of hearing due to loud tools, cancers resulting from inhaling fumes from gasoline engines or gasoline contacting skin, and secondary infection of a wound from vegetation management are not reported in a way which allows analysis. All could occur, but frequency of occurrence is not known. There would be no effect to the forest visitor from manual methods of site preparation and release since the visitor would not be present when this work is done. There is a possibility of an accident or spill of herbicide. This would pose the greatest threat to public health. However, mitigation measures described in the RLRMP would reduce this possibility.

Other health risks occur to employees when conducting prescribed burning such as exposure to thick smoke, danger of snags falling, or accidents associated with using chainsaws and / or heavy equipment. Every attempt to minimize or mitigate the exposure to these risks is made before implementation of a prescribed burn begins. Members of the public would not be present during the implementation of these burns so the public's exposure is reduced to being an irritant proportionally as the distance from the prescribed burn is increased. As illustrated in Table 9, the EPA required concentration levels of PM₁₀ and PM_{2.5} were not exceeded during a landscape scale burn of 1096 acres conducted two years ago in the project area.

Effects Alternative 1

Those implementing the project would be subject to increased exposure to hazards inherent to timber work i.e. increased exposure to working with chainsaws, working around heavy equipment, outside elements (hot and cold), and the possibility of a tree falling on them. The injuries associated with this type of work could range

from very minor (a yellow jacket sting) to critical (causing death). The increased use of chainsaws would increase the risk of serious injury to workers. No exposure should occur to members of the public as they would not be present at the time the timber would be harvested.

Employees conducting prescribed burning would be exposed to risks inherent to that type of work. Every attempt to minimize exposure to those associated risks would be made.

Effects of Alternative 2

The risk to timber workers would not exist if this alternative were chosen.

Cumulative Effects

Cumulative effects are not likely to occur because none of the proposed herbicides are persistent in the environment or in the human body, so no member of the public is likely to be chronically exposed through the Forest Service's program nor receive simultaneous exposures from these same herbicides in any other program.

There are instances when it would be argued that cumulative doses would occur. If an area is resprayed with an herbicide before herbicide from the previous spraying has been totally degraded, or if another use of the same herbicide occurs in the same area and overlaps its degradation in time, then it is possible for larger herbicide doses to occur than from a single application. Cumulative exposure also could occur in individuals who use one of the herbicides in their lawn or garden work or are exposed to a herbicide from nearby agricultural areas and then exposed to the same herbicides as a result of the Forest Service application program.

Since the stands proposed for chemical treatment have not been treated with herbicides in the past. No risk of cumulative doses or exposure would occur.

There would be no effect to the forest visitor from manual methods of site preparation and release since the visitor would not be present when this work is done.

VIII. AGENCIES CONSULTED

United States Fish and Wildlife Service

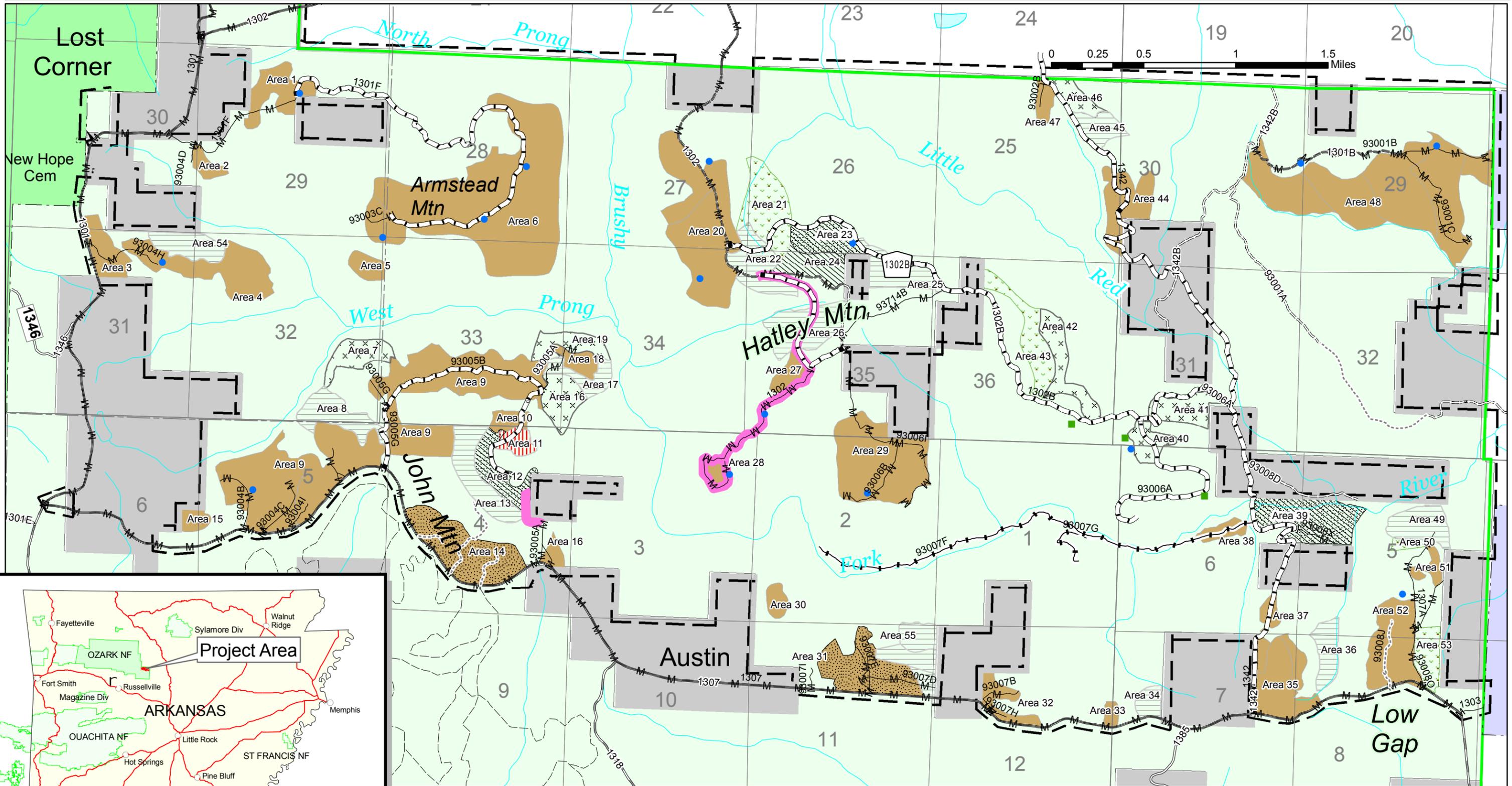
Arkansas State Historic Preservation Office

Arkansas Game and Fish Commission



OZARK-ST. FRANCIS NATIONAL FORESTS

Big Piney Ranger District South Fork Project

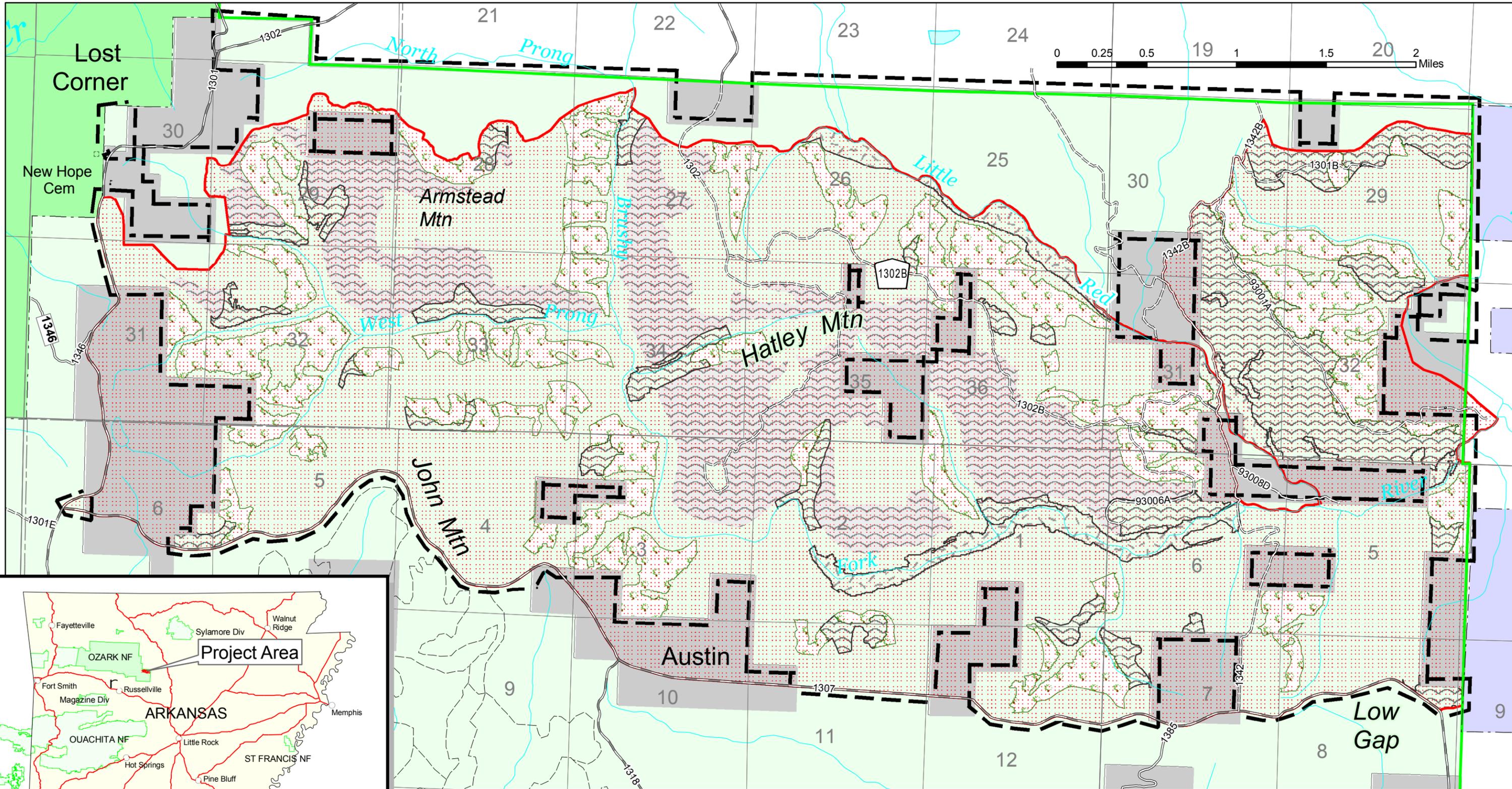


- | | | | |
|--|---|-----------------------------------|----------------------------------|
| Timber Stand Improvement - 141 acres | Pine Thinning & Manual Understory Treatment - 1,950 acres | Road Maintenance - 30.97 miles | Proposed OHV Routes - 2.31 miles |
| Hardwood Shelterwood with Chemical Site Prep, Burning, Planting & Chemical Release - 420 acres | Additional Chemical Understory Control - 310 acres | Road Obliteration - 4.37 miles | Project Area Boundary |
| Hardwood Thinning & Manual Understory Treatment - 181 acres | Pre-Harvest Chemical Treatment - 200 acres | Road Realignment - 0.55 miles | Private Land |
| Pine Shelterwood with Chemical Site Prep, Burning, Planting & Chemical Release - 15 acres | | Road Reconstruction - 18.10 miles | Opening Maintenance |
| | | Level 1 Closed Road - 2.4 miles | Pond Construction |



OZARK-ST. FRANCIS NATIONAL FORESTS

Big Piney Ranger District
South Fork Project



- Cane Restoration - 303 acres
- WSI with Manual Understory Control - 1,975 acres
- WSI with Chemical Understory Control - 1,108 acres
- WEP WSI with Chemical Understory Control - 1,787 acres
- Prescribe Burning - 12,500 acres
- Project Area Boundary
- Private Land