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# Final Environmental Assessment High Mountain Project

**Pope and Johnson Counties, Arkansas**

**Ozark-St. Francis National Forests  
Big Piney Ranger District**

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# Chapter I.

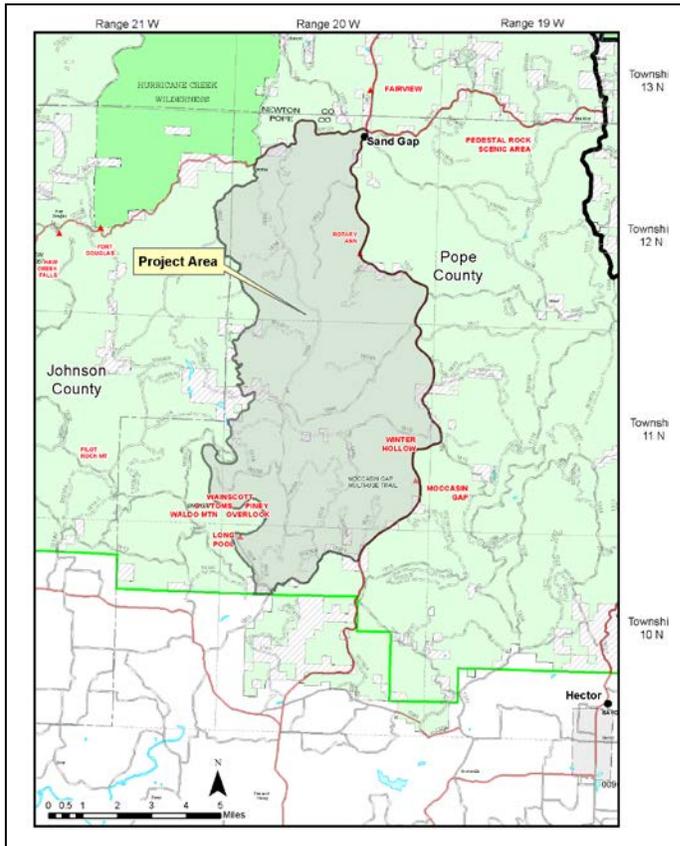
## Purpose and Need for Action

This chapter describes the project location, the purpose and need for action, and proposed action. This chapter also references direction from the Revised Land Resource Management Plan (RLRMP) and includes decisions to be made, other issues, concerns and opportunities.

### A. Location of Project Area

- The High Mountain project area contains portions of the following townships, and ranges:
  - Township 12 North, Range 21 West, Sections 13, 24, 25
  - Township 12 North, Range 20 West, Sections 3-5, 7-10, 20-29, & 32-36
  - Township 11 North, Range 20 West, Sections 1-29, & 32-36
  - Township 10 North, Range 20 West, Sections 2-9

The High Mountain project area is located southwest of the community of Pelsor, east of the community of Treat, and includes the Moccasin Gap Trail System. The project area is bounded on the north by State Highway 123, on the East by State Highway 7, on the south by Old Highway 7, and on the west by Big Piney Creek. The High Mountain project area is located in, northwest Pope and northeast Johnson counties.



## **B. Purpose and Need**

### **The primary developmental forces for this project are as follows:**

The actions proposed for this project attempt to address the following current conditions within the project area:

- The area is currently comprised of aging overstocked stands with too many trees for optimum growth which has created an unhealthy overall condition. Timber management (thinning, shelterwood, and seed tree) would attempt to address these conditions. Road management would be needed to facilitate timber management.
- Some of the project area was thinned to woodland densities within the past 10 years on xeric and dry sites. Past projects have restored 224 acres of woodlands, but comprise less than 1% of the area. Proposal of additional restoration of woodlands and glades along with prescribe fire on a periodic basis would attempt to meet the desired future condition for this area described in the RLRMP. Some control (Dozer) line construction would be needed to accomplish prescribed burning activities.
- Stream surveys have indicated remnants of native cane along stream banks and a lack of large woody debris within streams. The RMRLP includes direction to place large woody debris in streams to address these deficiencies. Proposed cane restoration and placement of large woody debris in streams would attempt to address these conditions.
- Biological inventories have identified numerous Non-Native Invasive Species (NNIS) throughout the project area. Some actions proposed are needed to reduce the spread and/or eradicate NNIS species. Without these treatments NNIS will continue to spread and replace native species this would require a much larger investment in the future to control these expanded populations of NNIS.
- Limited rock collection is proposed to address public need.

### **1.) Management Areas:**

Contrasts between current and desired conditions illustrate the need for the proposed management activities within this 37,826 acre project area. The Revised Land and Management Plan (RLRMP or Forest Plan) for the Ozark- St. Francis National Forest describes Desired Conditions for the Management Areas (MAs) and the ecological systems that occur within these MAs. The following describes the desired conditions of the Management Areas within this project area:

MA 3E High Quality Forest Products – 71% of the project area. These lands support a balanced age class distribution of forest stands containing native tree species capable of sustained, high-value timber production. Tree growth rates and vigor are high. Incidence of insect and disease outbreaks is low.

The landscape character is naturally appearing with mixtures of hardwood, mixed hardwood/pine and pine/hardwood, and pine forest communities. Management activities may be visually evident in portions of these areas. Evidence of management activity may include active timber harvest operations, tree stumps, temporary roads, skid trails, and log landings. Layout of timber sale boundaries, retention of individual trees and clumps, and seeding of exposed soil reduce visual impacts.

High quality, well-maintained roads through the MA are designed to facilitate timber removal and protect water quality. Designated roads through the area also provide recreation opportunities for OHV and passenger-vehicle travel. These areas provide a variety of motorized and non-motorized recreation opportunities including hunting, fishing, hiking, bicycling, berry picking, dispersed camping, driving for pleasure, and viewing scenery and wildlife.

MA 3B Oak Woodland – 13% of the project area. The desired future condition of MA 3B is an area characterized by a mosaic of woodland and forest with oak woodland occupying approximately 60% of xeric and dry sites. Patches of oak woodland are well connected incorporating other fire dependent communities such as glades. Oak woodlands have open canopies (10-60% canopy closure), sparse midstories, and well developed understories dominated by grasses and forbs. Evidence of fire is common and results in a variety of vegetation conditions across the landscape. The abundance of oak woodlands provides optimal habitat for many indicator and rare species, and species in demand for hunting such as wild turkey and whitetail deer. Where rare communities are present, they support healthy populations of associated species and are free from threats that would degrade their integrity.

MA 3I Riparian Corridors- Less than 1% of the project area. This management area is identified based on landform, vegetation, soils, and hydrology characteristics of the landscape. They are managed to retain, restore, and enhance the inherent ecological processes and functions of the components within the corridors. The desired condition for these areas reflects function and value. The vegetative communities, predominately forest, are productive and diverse providing for a rich variety of organisms and habitat types. Timber and vegetation (dead and alive) have the appropriate structure needed to provide shade, food, shelter, and microclimate for riparian-associated flora and fauna, especially threatened, endangered, sensitive (TES) and locally rare species. Prescribed fire may be used within the corridor to create or maintain the composition and vitality of fire-dependent vegetative communities (e.g., canebrakes). Management activities take place to provide diversity and complexity of native vegetation; rehabilitate both natural and human caused disturbances; provide for visitor safety; or accommodate appropriate recreational uses.

MA 1C Designated Wild and Scenic Rivers – 4% of the project area. (Big Piney Creek) This MA is managed to enhance and protect the outstandingly remarkable values and unique qualities of each river and its surroundings. The landscape character is "naturally appearing" or "pastoral" with high scenic integrity. Natural processes (floods, windstorms, and fires) would be the primary cause of disturbances. Lands are classified as unsuitable for timber production, although management of vegetation is permitted within the river corridor to maintain outstandingly remarkable values. Vegetation management may be used for scenic enhancement or rehabilitation to provide wildlife viewing opportunities; maintain developed recreation facilities; improve threatened, endangered, sensitive, and locally rare species habitat; restore native vegetative communities; restore riparian ecosystems; reduce unnatural fuel buildups; or control non-native invasive vegetation.

MA 1G Special Interest Areas – Less than 1% of the project area. (Buzzards Roost) SIAs are managed for their unique geological, botanical, biological, zoological, scenic, or cultural features. The features are unique enough that they are not found on large areas anywhere else on

the Forests, or they provide the best representation of similar areas on the Forests. These areas are designated as SIAs because of their unique features, complexity, and degree of interest. They are managed for their unique recreational and educational values, and are intended for public use and interpretation. Each SIA will have a comprehensive management plan completed before capital investments are implemented. These areas are unsuitable for timber production.

MA 1H Scenic Byway Corridors 7% of the project area. (Hwy 123 and Hwy 7) These areas are characterized by a predominance of mid- and late-successional forests. Forest structure varies according to ecological factors, but largely consists of a mature overstory; a fairly open midstory; and a well-developed herbaceous and shrubby understory. Understory vegetation includes a variety of native deciduous and evergreen flowering trees, shrubs, and wildflowers. Even-aged, two-aged, and uneven-aged forest communities along with medium and small patches of late successional to old-growth forest communities continue to develop throughout the area. Exceptional opportunities for motorized recreation, especially scenic driving exists in this MA. The views along the different byways vary, and include a variety of landscape characters, ranging from natural appearing to pastoral, historic, and cultural. They provide colorful accents and interesting textures, which change with the seasons. Road corridor improvements and interpretive facilities are evident changes to the natural environment. These man-made alterations fit well with the character of the surrounding landscape. Other management activities are not evident to the average visitor.

Vegetation is influenced both by natural processes and humans. Biological communities are maintained or improved to provide an attractive setting for visitors while providing for the protection of rare communities and threatened, endangered, sensitive, and locally rare species. Forest management activities maintain the natural characteristics that make the area scenic. Commercial timber harvest is appropriate to maintain the long-term goals of a diverse and vigorous forest with sensitivity to dispersed recreation and scenic values. Timber harvesting operations focus on what is retained in the stand, not on wood fiber production. Timber harvest practices are visually subordinate to the surrounding landscape. The MA is suitable for timber production. Prescribed fire and other management treatments are appropriate vegetative management tools available to be used to enhance the byway corridors in conjunction with other resource values.

3% of the project area is privately owned.

## **2.) Areas of Concern or Special Emphasis identified by Leadership:**

Former Forest Service Chief, Dale Bosworth delineated four threats to the health of the National Forest and Grassland system and subsequent Chiefs have emphasized other concerns. Where opportunity exists, this EA will attempt to address these issues within the project area. The identified concerns include:

**Fire and Fuels:** The natural role of fire has been withheld from the National Forests for many years. Research shows that National Forest System (NFS) areas at high risk from wildland fire and ecological degradation (Class 3) come to 51 million acres, or 26 percent of the NFS. Areas at moderate risk (Class 2) amount to 80.5 million acres, or 41 percent. Areas currently within their historical range (Class 1) come to 65 million acres, or 33 percent. On the NFS, 73

million acres in Classes 2 and 3 were identified as the highest priority for fuels reduction and ecosystem restoration treatments. Treatments to reduce fuels and restore ecosystems involve various techniques, including thinning, prescribed burning, and clearing forest debris.

**Invasive Species:** Invasive species are major threats to our Nation's aquatic and terrestrial ecosystems. Invasives destroy fish and wildlife habitats, alter nutrient cycling and natural fire regimes, and can reduce biodiversity and degrade native ecosystem health. Invasive aquatic species pose a significant risk to the 220,000 miles of streams, over 2 million acres of lake, and 15,000 miles of coastline cross the National Forest System. There are more invasive species per unit of aquatic eco-systems than in terrestrial ecosystems. All invasives combined cost Americans more than \$137 billion a year in total economic damages and associated control costs. Infestations of invasive plants have reached epidemic proportions, spreading rapidly over hundreds of millions of acres, across all landscapes and ownerships. Invasive forest diseases, such as Chestnut Blight, wiped out entire forest species in the East (i.e., the American Chestnut) and Dutch Elm disease virtually eliminated an urban forest tree- the American Elm. Invasive species have been found distributed throughout the project area. There is a need to conserve the native biological diversity of plant communities, species and populations. It is necessary to prevent the displacement of native species and the disruption of plant communities through the introduction of aggressive, persistent, self-replicating, long lasting non-native vegetation into managed or natural plant communities.

**Loss of Open Space:** America is losing important working forests and rangelands to development across the Nation at a rate of more than 3 acres a minute. Loss of open space (1) affects our air, water and vegetation, (2) degrades wildlife habitat, and (3) reduces outdoor based economic opportunities. Loss of open space is a result of the division of forested landscapes into smaller, more isolated patches. This is of concern because it poses a threat to the health, sustainability, and viability of ecosystems and rural communities, and impacts biodiversity.

**Unmanaged Recreation:** The number of off highway vehicles (OHV) users has climbed seven fold in the past 30 years, from approximately 5 million in 1972 to 36 million in 2000. Unmanaged OHV use has resulted in unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. Compaction and erosion are the primary effects of OHV use on soils. Riparian areas and dependent species are particularly vulnerable to OHV use. Studies indicate that the survival and reproduction of some wildlife species may be affected by excessive noise and disturbance. Local forest designation of roads, trails, and areas for OHV use provides forest visitors with opportunities to enjoy recreation experiences while protecting natural and cultural resources. Use of OHVs in the national forests is addressed through the forest plans or through separate access and travel management plans. Management of OHV impacts include use of designated roads, trails, and areas for recreation; closure of sensitive areas; user education; enforcement; and use monitoring. Within the project area, there is a need to protect resources by providing better management of OHV roads and trails as well as a need to provide for recreational opportunities.

### **3.) Other Developmental Forces:**

Protection of watersheds was one of the driving forces behind the establishment of the National Forests, and, as human populations increase, both the quality and quantity of water itself become more important. Development that permanently removes forest cover can impact both by increasing sedimentation and/or speeding runoff and reducing groundwater recharge.

Forest products resulting from achieving desired future conditions within this area contribute to the social and economic well-being of the people living in the surrounding areas, as well as meeting the need for timber products.

This project area was once a fire-dominated ecosystem (Guyette, Spetich, Stambaugh, 2006). Frequent fires eliminated shade tolerant species from the understory and provided ample forage for many species of wildlife. Past forest management practices have created a situation where shading and buildup of duff or needle layers has reduced or possibly eliminated grasses and forbs. The loss of these grasses and forbs is reducing the number of small mammals, seed eating birds, as well as some species such as deer and wild turkey. In addition, this build-up of duff, needle, debris from recent ice storms, and understory has created a condition that could result in a damaging wildfire situation (Federal Register, vol.66 160, Friday, August 17, 2001). To address these conditions, fire needs to be reintroduced into the ecosystem.

The project area contains many open roads that are currently used to access the area. Some of these roads are used by the public but create an unfavorable situation for wildlife through unnecessary disturbance and added soil loss through erosion. To remedy these problems, some open roads need to be seasonally or permanently closed. The roads that are closed to motorized traffic are closed with mounds. In areas where OHVs go over these mounds to access the area, gates may be installed. The district has found that the installation of gates tends to reduce the number of violations, and occurrences of the disturbance to soils and wildlife.

#### **RLRMP objectives that support the need of this project:**

- 1) Restore and maintain at least 22,000 acres of oak woodland over the first decade, with a long-term objective of 110,000 acres (RLRMP page 2.10)
- 2) Across all community types, maintain a range of 3.8 to 6.8 [percent of the total forest and woodland acreage in regeneration forest conditions (0-10 years old). (RLRMP page 2.10)
- 3) Across all community types, annually burn an average of 120,000 acres under prescribed burn conditions. Burn approximately one-third of this acreage within the growing season (April 1 through October 15) (RLRMP page 2.11)
- 4) Reduce the risk of oak and pine mortality events by thinning and regenerating at least 150,000 acres within the first decade (RLRMP page 2.12)
- 5) Treat at least 200 acres per year for reduction or elimination of non-native, invasive species (RLRMP page 2.12)
- 6) Improve and maintain bobwhite quail habitat on 5,000 acres per year for the first decade (RLRMP page 2.13)
- 7) Improve and maintain habitat for whitetail deer on 10,000 acres per year for the first decade (RLRMP page 2.13)

- 8) Improve and maintain habitat for eastern wild turkey on 10,000 acres per year for the first decade (RLRMP page 2.13)
- 9) Improve and maintain habitat for black bear on 8,000 acres per year for the first decade (RLRMP page 2.13)
- 10) Maintain or restore Large Woody Debris (LWD) levels in perennial streams/ivers at 75 to 200 pieces per mile for all LWD larger than 3.3 feet long and 3.9 inches in diameter in the first decade
- 11) Maintain or restore LWD levels in perennial streams/ivers at 8 to 20 pieces /mile for all LWD larger than 16.4 feet long and 19.7 inches in diameter in the first decade. (RLRMP page 2.16)
- 12) In conjunction with designing low-maintenance, standard roads develop a system of motorized trails that address the needs of OHV enthusiasts (RLRMP page 2.19).
- 13) Evaluate historic sites for appropriate management. Develop site management plans for noteworthy heritage resources wherever they occur. (RLRMP page 2.21)
- 14) Decommission roads and trails unnecessary for conversion to either the road or trail system through the roads analysis process (RAP) (RLRMP page 2.24)
- 15) Identify by the first decade all system roads that should be obliterated (RLRMP page 2.24)
- 16) Within 15 years, restore 15 to 20 percent of all ecological communities into Fire Regime Condition Class 1 (RLRMP page 2.26)
- 17) Annually complete 50,000 to 100,000 acres of hazardous fuel reduction (RLRMP pg 2.26)
- 18) Provide 731 MMBF (146MCF) per decade of saw timber and pulpwood (RLRMP pg 2.28)
- 19) In MA3E (High Quality Forest Products) and appropriate portions of other MAs, apply appropriate silviculture prescriptions to provide the following forest products: 18” to 20” saw-timber with grade 1 or 2 butt logs and /or yellow pine 18’ saw-timber. (RLRMP page 2.28)
- 20) Treat up to 300 acres per decade to meet the habitat needs of riparian area species groups. (RLRMP page 2.76)

### **C. The Proposed Action (PA)**

The Ozark-St. Francis National Forest, Big Piney Ranger District, is proposing the following management activities in the 37,826 acre High Mountain area of the district.

The specific proposed activities include:

- Pine seed tree regeneration harvest on 871 acres
- Pine seed tree Removal on 111 acres
- Pine shelterwood regeneration harvest 980 acres
- Hardwood Shelterwood harvest on 822 acres
- Pine and Hardwood shelterwood preparation harvest on 285 acres
- Commercial thinning on 5,237 acres (Pine 3,326 acres, Hardwood 1,911 acres)
- Hardwood thinning for firewood on 99 acres
- Pre-commercial thinning on 684 acres
- TSI thinning with herbicides on 578 acres
- Seedling release and pre-commercial thinning on 521 acres

- Existing Woodland Release on 224 acres
- Woodland Management on 407 acres
- New construction of 75 acres of openings
- Enlarge existing openings on 330 acres
- Management of 11 acres of existing openings
- Drop and reforest 49 acres of existing openings
- Non-Native Invasive Species (NNIS) control throughout the project area (up to 500 acres annually)
- Construction/reconstruction of 25 wildlife ponds
- Native cane restoration on 323 acres
- Placement of large woody debris in streams
- Prescribed burning as needed on 751 acres
- One time prescribed burning 1,657 acres
- Within the Moccasin Gap Trail System construct and designate 1.5 miles of new trail, realign 1.7 miles of trail, and decommission and rehabilitate 3.3 miles of existing trail.
- Construction of Emergency closure gates and turnaround on Long Pool entrance road
- Construct 2.5 miles of Hiking Trail near Long Pool Campground.
- Construct two parking areas and 1.5 miles of OHV trail to access Buzzard Roost Special Interest Area (SIA).
- Minerals surface rock collection within some timber sale units
- Reconstruction of 18 miles of roads
- Maintenance of 52 miles of existing roads
- Maintenance and closure of 24 miles of existing roads
- Decommission 24 miles of existing roads
- Closure of 14 miles of existing roads

Included in this proposal are associated activities such as clearing slash and debris, brush hogging, and planting of various grasses and forbs. Firewood collection would also be allowed.

#### **D. Objective of the Proposed Action**

The purpose of this project is to move the existing conditions of the project area toward the desired conditions as referenced in the Revised Land Resource Management Plan.

#### **E. Related Documents That Influence the Scope of This Proposed Action**

Vegetation management may include the use of prescribed burns, manual, chemical, and mechanical treatments of plants in the service of ecosystem management objectives. The Final Environmental Impact Statement for the forest compares and analyzes the impacts of a variety of treatments needed to achieve the desired future conditions identified in the RLRMP (pages 1.18-1.49). This EA tiers to the following documents:

- The Revised Land Resource Management Plan and accompanying Environmental Impact Statement for the Ozark St Francis National Forest (2005)
- Biological Evaluation for the High Mountain Project
- Heritage Resource Report for the High Mountain Project
- Region 8 Scenery Treatment Guide (2008)

The Revised Land and Resource Management Plan identifies Forest Wide Standards (pages 3.1-3.21) and MA Standards (pages 3.22-3.38) that will be applied to all methods of vegetation management. This direction is incorporated into this EA's design criteria.

#### **F. Issues Eliminated From Further Study**

These issues were identified through scoping and are addressed, but are not considered as "issues studied in detail". The following are the reasons for which they were eliminated from further study.

**Jurisdictional Wetlands-** Analysis conducted by district personnel has concluded that there are no documented wetlands within or adjacent to the project area and therefore would not be impacted. If wetlands are encountered during project implementation the implementation would cease and the Forest Hydrologist would be consulted.

**Civil Rights and Minority Groups-** The proposed actions would impact minority groups in the same manner as all other groups in society. The proposed actions would not violate the civil rights of consumers or minority groups.

#### **G. Issues Studied in Detail**

To help develop the "issues studied in detail" necessary to focus the analysis, the ID Team sought comments from within the agency, the general public, adjacent landowners, other agencies, and Tribal governments (See Appendix C for further details). This process led to the identification and development of "issues studied in detail" to be addressed in the subsequent analysis. The issues studied in detail are:

##### **1.) Herbicide Use**

Herbicide use has been identified as an important issue with the public. For this reason a no herbicide use alternative has been studied and included. The environmental consequences of herbicide use are disclosed throughout Chapter 3.

#### **H. Other Concerns and Relevant Effects**

**Economics-** There is a concern about the economic outcome that management actions like those in the proposed action could have within the community, and whether the National Forest is utilizing taxpayer dollars for a positive cost benefit to implement management actions. The economic analysis summary is included as Appendix D. The economics analysis is contained in the process file at the Jasper office. *Source: ID Team*

**Soil Productivity-** There is a concern that management actions (road construction, skidding, timber harvest, release treatment, site preparation, prescribed burning, etc.) may cause unacceptable levels of erosion, sedimentation, compaction, and/or nutrient loss and, as a result, a decrease in long-term soil productivity within the Project Area. *Source: ID Team*

**Water Quality-** There is a concern that management actions, namely timber harvest, road construction, prescribed burning, wildlife pond construction, and construction of large openings may cause a decrease in water quality in the watershed which the High Mountain project area occurs. *Source: ID Team*

**Air Quality-** There is public concern that smoke generated from prescribed burning may degrade air quality. This could cause health problems to those living downwind of the project area. *Source: ID Team and scoping comments*

**Recreation-** There is a concern that timber harvest, road construction, site preparation, opening construction, and prescribed burning may degrade the recreational experience of forest visitors within the project area. *Source: ID Team*

**Visual Resources-** There is a concern that timber harvest, road construction, site preparation, construction of openings, and prescribed burning may compromise the scenic integrity of the project area. *Source: ID Team*

**Vegetation-** There is a lack of early seral habitat within the watershed. Forest health and stand vigor is declining or at risk due to advanced stand age and overcrowded or densely stocked stands. Several non-native invasive species (NNIS) are present throughout the project area. *Source: ID Team*

**Wildlife and Fisheries-** There is a concern that management actions such as timber harvest, road construction, and prescribed burning may cause unacceptable impacts to wildlife and fisheries populations or habitats. *Source: ID Team and scoping comments*

**Threatened, Endangered, and Sensitive (TES) Species and Habitats-** There is a concern that management actions such as timber harvest, road construction, and prescribed burning may impact populations of TES or their habitats. *Source: ID Team*

**Climate Change-** There is a concern that management actions such as prescribed burning and timber harvest may cause or contribute to greenhouse gas (GHG) emissions and contribute to increased climate change. There is also a concern about the effects of climate change on the High Mountain Project. *Source: ID Team*

**Human Health Factors-** There is a concern that management actions, specifically prescribed burning and the application of herbicides may cause hazards to human health and safety. *Source: ID Team and scoping comments*

**Heritage Resources-** There is a concern that management actions could impact both historic and prehistoric sites through project implementation and by exposing workers or forest visitors to areas containing sensitive cultural sites. *Source: ID Team and scoping comments*

## **I. Decision to Be Made**

The District Ranger will select one of the following and determine if the selection would or would not significantly affect the quality of the human environment.

1. Select management action described in the Proposed Action (PA).
2. Not to implement any action by selecting Alternative 1 (the No Action alternative).
3. Select management actions described in Alternative 2 (the No Herbicide alternative).
4. Select management actions described in the PA with some modifications or an alternative with some modifications

**J. Noted Changes Between the Pre-Decisional and Final EA**

Listed below are specific changes which were made between the Pre-Decisional and Final EA. Some of the changes were where numbers were transposed, words were misspelled or grammar was incorrect. Other changes were made to improve the understanding of the analysis of potential effects. They are as follows;

- In Chapter I the order of the Proposed Action and the Purpose and Need were switched to explain the need for the proposed action.
- Every section in Chapter III, the environmental section, included minor changes to some sentences in order to improve the disclosure of the effects and make them more clear to the reader.
- A discussion of specific effects to the Big Piney Wild and Scenic River was included in the Recreation / Visuals section.
- The map in the Pre-Decisional EA page III-7 showing the water analysis boundary in has been removed.
- A map was added to Appendix A showing the analysis boundary for the water section.
- Updated the reference section. Appendix B
- Comments received and agency responses to those comments have been attached as Appendix G.

There were no changes to the alternatives nor were any of the findings of the analyses changed; therefore, there is no need to undergo a new public comment period.

## Chapter II

### Alternatives Including the Proposed Action

The Big Piney Ranger District IDT (interdisciplinary team) initiated internal scoping for the High Mountain project on February 16<sup>th</sup>, 2012. External scoping was initiated on June 1<sup>st</sup>, 2012. Scoping letters requesting comments on the proposal were mailed to 177 tribes, agencies, groups, or individuals. The legal notice was posted in Russellville's, *The Courier*, on June 1<sup>st</sup>, 2012. The project was also published in the Ozark- St. Francis National Forest Schedule of Proposed Actions and on the Forest planning website.

#### A. Process Used to Develop the Alternatives

The IDT represents the range of resources across the forest, such as recreation, timber, wildlife, soils, and water. The IDT considered the following elements when they developed the alternatives for this analysis:

- The goals, objectives, and desired future conditions for the project area as outlined in the Revised Land and Resource Management Plan (RLRMP) for the Ozark–St. Francis National Forest.
- Comments received from the public, State and other agencies during the scoping process.
- The laws, regulations, and policies that govern land management on national forests.

#### B. Alternatives Considered

One alternative along with the alternative of taking No Action was developed in this environmental analysis. Each action alternative was designed to be consistent with RLRMP direction and respond to “Key” issues as outlined below:

##### The Proposed Action (PA)

The following tables and descriptions display the proposed activities and treatments in detail.

##### **Pine seedtree regeneration harvest on 871 acres**

The seed tree timber harvesting method is designed to regenerate aging pine stands, create early serial stage habitat, balance age classes, improve forest health, and encourage a mixed pine and hardwood community. Approximately 10-20 square feet of residual pine and hardwood basal area (10-15 trees per acre) per acre are retained in the overstory after harvesting is complete. Following pine regeneration harvests, competing vegetation would be reduced to create an adequate seedbed for regeneration using an herbicide application (see herbicide use table). Some areas would be regenerated naturally by the seedtrees left on the area. Within these areas, if an adequate amount of pine regeneration (300-500 trees per acre) is not established within 5 years of harvest, the area would then be replanted with pine seedlings to meet target stocking levels. Regeneration areas outside burning areas are not suitable for natural regeneration efforts because of the absence of periodic prescribed burning to control brush and other competing vegetation.

These areas would be planted with shortleaf pine seedlings following site preparation activities to a stocking level of approximately 680 trees per acre. Herbicide release of established regeneration (young trees) is also included in this action (see herbicide use table). Residual seed trees may be removed once adequate regeneration has been established. These areas may be utilized for public firewood sale.

Area	Acres	Area	Acres
94	79	100	30
95	80	101	53
96	79	102	28
97*	109	103	11
99	71	104	21

Area	Acres	Area	Acres
105	29	110	7
106	50	111	21
107	41	112	14
108	79	113	13
109	56		

**\*Note: Area 97 exceeds the maximum acreage limit for a regeneration cut of 80 acres. Final harvested acres will not exceed 80 acres.**

**Pine shelterwood regeneration harvest on 980 acres**

The shelterwood timber harvesting method is designed to regenerate aging pine stands, create early serial stage habitat, and encourage a mixed pine and hardwood community. Approximately 20-35 square feet of residual pine and hardwood basal area per acre are retained in the overstory after harvesting is complete. These areas have a higher hardwood component (more hardwood tress) per acre than the seed tree areas and need the additional residual basal area to help retard the development hardwood competition by reducing sunlight. This will allow for better establishment of planted short leaf pine and promote a mixed (both pine and hardwood) stand after harvest. Following pine regeneration harvests, competing vegetation would be reduced to create an adequate seedbed for regeneration using an herbicide. Areas would be planted with shortleaf pine seedlings following site preparation activities to a stocking level of approximately 680 trees per acre (see herbicide use table page II-12). Herbicide release of established regeneration (young trees) is also included in this action. Residual seed trees may be removed once adequate regeneration has been established. These areas may be utilized for public firewood sale.

Area	Acres	Area	Acres
114	29	119	5
115	74	120	43
116	44	121	80
117	26	122	65
118	56	123	51

Area	Acres	Area	Acres
124	31	129	79
125	73	130	42
126	27	131	28
127*	133	132	56
128	32	133	6

**\*Note: Area 127 exceeds the maximum acreage limit for a regeneration cut of 80 acres. This area will be split into two areas each of which will not exceed 80 acres.**

**Pine seedtree removal harvest on 111 acres**

These areas have been harvested in the past leaving approximately 20 square feet of residual pine and hardwood basal area (10 – 15 trees) per acre in the overstory after harvesting. Following the original harvest these areas were planted with shortleaf pine seedlings following site preparation activities and have reached a stocking level of approximately 680 trees per acre. Because these areas are stocked the pine seedtree removal harvest method will remove (harvest) the 20 square feet of residual pine and hardwood basal area (10 – 15 trees) per acre left after the regeneration harvest. A release (thinning) of young seedlings from overtop/competing vegetation using hand tools (chainsaws or brush saws) or an herbicide application would also be a part of this action (see herbicide use table page II-12). This will increase the growth and development of the young seedlings. Following the release treatment, 3-7 years, a pre-commercial thinning treatment would be done using the same methods as outlined above.

Area	Acres	Area	Acres
<b>215</b>	51	<b>216</b>	60

Area	Acres	Area	Acres

**Hardwood shelterwood harvest 822 acres**

The shelterwood timber harvesting method is designed to regenerate aging hardwood stands, create early serial stage habitat, balance age classes, and encourage a mixed hardwood and pine community. This harvesting method would remove trees from selected stands in order to create an environment for the development and growth of advanced regeneration. Approximately 20-40 square feet of hardwood basal area per acre (15-30 trees per acre) are retained in the overstory after harvesting is complete. This harvesting method would be used in hardwood species followed by manual or herbicide site preparation (see herbicide use table), prescribed burning, planting (if natural regeneration doesn't develop), and herbicide release (see herbicide use table) of established regeneration (young trees). The minimum stocking level for hardwood species is 250 trees per acre following harvest operations. Residual shelterwood trees may be removed once adequate regeneration has been established. These areas may be utilized for public firewood sale.

Area	Acres	Area	Acres
<b>7</b>	40	<b>14</b>	39
<b>8</b>	31	<b>15</b>	40
<b>9</b>	40	<b>16</b>	36
<b>10</b>	40	<b>17</b>	40
<b>11</b>	30	<b>18</b>	40
<b>12</b>	40	<b>19</b>	34
<b>13</b>	40	<b>20</b>	23

Area	Acres	Area	Acres
<b>21</b>	9	<b>28</b>	37
<b>22</b>	32	<b>29</b>	27
<b>23</b>	37	<b>30</b>	18
<b>24</b>	39	<b>31</b>	23
<b>25</b>	32	<b>32</b>	18
<b>26</b>	23		
<b>27</b>	14		

**Pine Commercial Thinning 3,326 acres**

Stands would be thinned to improve the growth and health of the stands and the development of higher quality trees. Currently the project area is overstocked (too many trees per acre) reducing

health and vigor and creating susceptibility to catastrophic fire, insects and disease. Trees selected for removal would be those that were damaged, diseased, suppressed, and poorly

formed. Spacing of remaining trees would then serve as the determinant for removal. Applying this treatment would leave a healthier and more vigorous stand of trees.

Area	Acres	Area	Acres
134	50	152	46
135	12	153	14
136	32	154	89
137	33	155	13
138	84	156	139
139	51	157	39
140	116	158	11
141	263	159	65
142	35	160	20
143	7	161	11
144	20	162	22
145	59	163	21
146	47	164	86
147	74	165	53
148	34	166	222
150	80	167	34
151	42	168	87

Area	Acres	Area	Acres
169	61	186	42
170	64	187	7
171	19	188	33
172	9	189	9
173	49	190	10
174	205	191	11
175	234	193	43
176	78	194	7
177	5	195	5
178	94	196	62
179	39	197	49
180	24	198	8
181	62	199	19
182	13	200	19
183	10	201	8
184	14		
185	3		

**Hardwood commercial thinning on 1,911 acres**

These areas would be commercially thinned to improve the growth and health of the stands and the development of higher quality trees. Currently these areas are overstocked (too many trees per acre) reducing health and vigor and creating susceptibility to catastrophic fire, insects and disease. Trees selected for removal (harvest) would be those that were damaged, diseased, suppressed, and poorly formed. Spacing of remaining trees would then serve as the determinant for removal. Applying this treatment would leave a healthier and more vigorous stand of trees. These areas may be utilized for public firewood sale.

Area	Acres	Area	Acres
33	15	46	34
34	34	47	75
35	13	48	7
36	21	49	33
37	32	50	62
38	10	51	11
39	97	52	65
40	31	53	55
41	11	54	62
42	20	55	24
43	87	56	45
44	48	57	73
45	57	58	39

Area	Acres	Area	Acres
59	104	73	14
61	223	74	6
62	18	75	39
63	44	76	25
64	9	77	10
65	31	78	47
66	4	79	22
67	19	80	39
68	28	81	69
69	12	82	34
70	24		
71	19		
72	10		

**Existing woodland management on 224 acres**

Within the project area there are approximately 224 acres of existing woodlands that have previously been thinned by various methods to promote the development of native grasses and forbs. Currently the desired future conditions are not being reached because competition from woody species is hampering the growth and development of native grasses and forbs. In order to reach the desired condition, herbicides would be used to control woody species in these areas (see herbicide use table). The goal is to have mature open woodland dominated by native grasses and forbs in the understory. Additional spot treatments would be needed to reach the desired future condition in some areas. In conjunction with prescribed burning, treatments would increase overall habitat diversity.

**Woodland management on 407 acres**

Within the project area there are approximately 407 acres of stands would be thinned commercially, manually (chainsaw), and with herbicide to permit sunlight to reach the forest floor to promote the development of native grasses and forbs. Thinning would reduce tree cover to 40-80 feet of basal area per acre, based on site specific conditions. In order to reach the desired condition, herbicides would be used to control woody species in these areas. This would be done manually (chainsaws or brush saws only) or by a basal spray, stem injection, or cut surface herbicide treatment on brush more than 6 feet in height and using herbicide foliar spray treatment on brush less than 6 feet to control competition. The goal is to have mature open woodland dominated by native grasses and forbs in the understory. In conjunction with prescribed burning, treatments would increase overall habitat diversity.

**Hardwood thinning for firewood on 99 acres**

These areas are typically on poor soils that produce smaller diameter trees and low volumes making them uneconomical to thin commercially, but still have too many trees per acre for best

growing conditions. To accomplish the need for thinning in these areas and meet the demand of providing firewood to the public they would be thinned to a residual basal area of 50-60 square feet or basal area per acre based on the average stand diameter. This would improve the growth and health of these areas and reduce their susceptibility to catastrophic fire, insects and disease. Trees selected for removal (harvest) would be those that were damaged, diseased, suppressed, and poorly formed. Spacing of remaining trees would then serve as the determinant for removal. Applying this treatment would leave a healthier and more vigorous stand of trees.

Area	Acres	Area	Acres
<b>1</b>	27	<b>2</b>	47

Area	Acres	Area	Acres
<b>3</b>	25		

**Pine and hardwood shelterwood preparation cutting on 285 acres.**

These areas have been identified as future (within 10-15 years) regeneration areas. They are currently overstocked (too many trees per acre) for adequate sunlight to reach the forest floor. Because they are overstocked the canopy is closed which retards the development of advanced regeneration (young trees). The shelterwood preparation cut method would reduce the number of trees per acre allowing sunlight to reach the forest floor. This will increase the overall health and vigor of the remaining trees and promote the development of advance hardwood and pine regeneration. An herbicide application in the form of foliar spray, stem injection, basal spray and/or chainsaw fell and cut surface spray would also be used to aid in controlling understory species and promoting the establishment, development, and growth of advanced regeneration.

Area	Acres	Area	Acres
<b>4</b>	43	<b>5</b>	83

Area	Acres	Area	Acres
<b>6</b>	41	<b>98</b>	118

**Seedling release and pre-commercial thinning on 521 acres**

These areas have been harvested in the past and have established seedlings (young trees) that are crowded (too many trees per acre) reducing tree health and vigor. Seedlings would be released (thinned) from overtop/competing vegetation using hand tools (chainsaws or brush saws) or a herbicide application in the form of foliar spray, stem injection, basal spray, and/or chainsaw fell and cut surface spray (see herbicide use table for details). Following the release treatment, 3-7 years, a pre-commercial thinning treatment would be done using the same methods as outlined above. The areas that this treatment will be applied to are as follows:

Area	Acres	Area	Acres
<b>202</b>	50	<b>206</b>	33
<b>203</b>	20	<b>207</b>	35
<b>204</b>	25	<b>208</b>	37
<b>205</b>	35	<b>209</b>	40

Area	Acres	Area	Acres
<b>210</b>	42	<b>214</b>	44
<b>211</b>	30		
<b>212</b>	64		
<b>213</b>	66		

**Pre-commercial thinning on 684 acres**

These areas consist of trees that are approximately 30-70 years old that are crowded (too many trees per acre) reducing tree health and vigor. Trees would be released (thinned) from overtop/competing vegetation using hand tools (chainsaws or brush saws). Trees selected to be cut would be those that were damaged, diseased, suppressed, and poorly formed. Spacing of remaining trees would then serve as the determinant for removal. Applying this treatment would leave a healthier and more vigorous stand of trees. These areas may be utilized for public firewood sale. The areas that this treatment will be applied to are as follows:

Area	Acres	Area	Acres
<b>83</b>	8	<b>86</b>	15
<b>84</b>	37	<b>87</b>	28
<b>85</b>	25	<b>88</b>	44

Area	Acres	Area	Acres
<b>89</b>	42	<b>92</b>	225
<b>90</b>	72	<b>93</b>	29
<b>91</b>	66	<b>228</b>	93

**Timber stand improvement thinning with herbicides on 578 acres**

These areas consist of trees that are approximately 30-70 years old that are crowded (too many trees per acre) reducing tree health and vigor. Trees would be released (thinned) from overtop/competing vegetation using hand tools (chainsaws or brush saws) or a herbicide application in the form of foliar spray, stem injection, basal spray, and/or chainsaw fell and cut surface spray. Trees selected to be cut/treated would be those that were damaged, diseased, suppressed, and poorly formed. Spacing of remaining trees would then serve as the determinant for removal. Applying this treatment would leave a healthier and more vigorous stand of trees. These areas may be utilized for public firewood sale. The areas that this treatment will be applied to are as follows:

Area	Acres	Area	Acres
<b>217</b>	150	<b>220</b>	10
<b>218</b>	17	<b>221</b>	29
<b>219</b>	15	<b>222</b>	124

Area	Acres	Area	Acres
<b>223</b>	51	<b>226</b>	20
<b>224</b>	52	<b>227</b>	13
<b>225</b>	97		

**Non-Native Invasive Species (NNIS) control on approximately 500 acres (Annually)**

An herbicide treatment (see herbicide use table) would be used to control identified non-native invasive species (NNIS) and roadside woody vegetation on up to 500 acres annually. These non-indigenous plant species degrade the diversity of wildlife habitat in forest openings, primarily along roads, but will be treated elsewhere where they occur. Control of existing infestations will aid the reestablishment of native vegetation.

The table below identifies the NNIS believed to occur in the project area and the herbicides that would be used to control them.

NNIS/ Herbicide treatment Table

Non-Native Invasive Species Treated	Herbicide Treatment
Privet - <i>ligustrum spp.</i>	Glyphosate or Metsulfuron methyl
Paulownia- <i>paulownia tomentosa</i>	Imazapyr (large stems) Triclopyr (sprouts)
Tree of Heaven- <i>Ailanthus altissima</i>	Imazapyr (large stems) Triclopyr (sprouts)
Exotic Lespedezas- <i>cuneata</i> and <i>bicolor</i>	Metsulfuron methyl or Triclopyr
Japanese Honeysuckle- <i>Lonicera japonica</i>	Triclopyr
Nonnative Rose- <i>Rosa multiflora</i>	Imazapyr or Metsulfuron methyl
Mimosa- <i>Albizia julibrissin</i>	Imazapyr (large stems) Triclopyr (sprouts)
Japanese stiltgrass- <i>Microstegium vimineum</i>	Glyphosate

Recommended controls are those provided by:

*Invasive Plant Responses to Silvicultural Practices in the South* - Evans, Moorhead, Bargeron and Douce and *Nonnative Invasive Plants of Southern Forests* – James H. Miller

As new NNIS are found, they would be treated using appropriate methods, following application rates on herbicide labels. Application rates will be in accordance with manufacture’s label.

**Management of wildlife openings (total of 465 acres) for improved forage by new construction of approximately 75 acres of openings, enlarge existing openings on 330 acres, management of 11 acres of existing openings, and dropping/reforesting 49 acres of existing openings** – New construction and enlargement of openings are proposed in some areas where the slope of the land will allow for the creation and management of openings. New construction would include short sections of roads for access as part of this proposal and all roads providing access to openings would be closed with gates following management. The opening size would range from approximately 2 to 10 acres depending on the terrain. For the opening construction and enlargement all trees would be harvested and the area prepared for planting of grasses and forbes using a dozer or other heavy mechanical equipment to remove the stumps and clear the debris from harvested trees. The openings would further be prepared for planting of warm and /or cool season native and non-invasive non-native species that provide good forage and cover for wildlife by mechanical equipment. Management of these openings would be accomplished by mowing, haying, liming, seeding, fertilizing, prescribed burning, and /or the use of herbicides to control invasive, woody or encroaching species of vegetation. The 49 acres of openings to be dropped are located in poor rocky soils or in areas where it is not economically feasible to continue maintaining them. These openings would receive an herbicide treatment for any NNIS , if needed, then would be planted with a hardwood species similar to what is existing around the area of the opening.

**Construction/reconstruction of 25 wildlife ponds**

The construction/reconstruction of wildlife ponds (< ½ acres) would be implemented in order to improve wildlife habitat in the vicinity. These ponds provide permanent water sources to allow for a more even dispersal of wildlife throughout the project area. Pond locations would be identified during implementation when test pits can be dug to determine suitable sites.

### **Native cane restoration on 323 acres**

Areas of native cane were once more prevalent along Big Piney creek and its tributaries. Due to agricultural clearing and fire suppression, populations of native cane have been reduced in this area. Commercial/non-commercial thinning of overstory and understory trees within the native canes' range would be done to restore and promote the expansion of existing communities. In order to reach the desired condition, herbicides would be used to control woody species in these areas. This would be done manually (chainsaws or brush saws only) or by a basal spray, stem injection, or cut surface herbicide treatment on brush more than 6 feet in height and using herbicide foliar spray treatment on brush less than 6 feet to control competition. Cane would also be planted in strategic locations to promote the further expansion of this community.

### **Placement of large woody debris in streams**

To improve overall stream habitat up to 10 larger trees, typically 12 inches in diameter at breast height (DBH) and greater per mile would be felled into streams within the project area. These streams include perennial, intermittent and larger ephemeral streams.

### **Two onetime site preparation prescribed burns 1,657 acres**

The two site preparation burns would encompass several regeneration areas and additional area to take advantage of existing open roads and trails to utilize as control lines minimizing the need to construct control line with heavy equipment. The regeneration areas would be burned after timber harvest is complete to reduce the amount of fuel and competing vegetation in advance of planting so the seedling trees would have a better opportunity to survive and grow. Prescribed burn control lines 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. As a result, approximately 2 miles of control line construction would be done to accomplish this goal.

### **Prescribed burning as needed on 751 acres**

Prescribed burning is proposed on 224 acres of existing woodland, 407 acres of proposed woodland, and 120 acres to improve visuals near Long Pool Campground. 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. Prescribed burn control lines 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. As a result, approximately 6 miles of control line construction and 3 miles of control line maintenance would be done to accomplish this goal. In addition, mechanical treatments would be used in various locations (areas of heavy fuels, WUI areas, hard to access areas, etc.) to facilitate burning operations. After burns are completed, these control lines are water barred and may be seeded with native grasses and forbs where needed to restore vegetative cover. In order to minimize control line construction, some burn blocks extend to natural or existing man-made fuel breaks, such as streams or roads. Prescribed burning would be done on National Forest system lands, during dormant or growing season.

-Dormant season burning- takes place in fall and winter months, (generally Oct. 1 – April 30) and involves the application of controlled, low to moderate intensity fire to reduce

accumulated fuels, stimulate growth of native vegetation, and improve wildlife habitat. Some duff is retained for soil protection. Vegetation 1 ¼ inches or less in diameter would be targeted for reduction to create an open understory, stimulating growth of native grassed and forbs, and increasing forage for browsing animals.

-Growing season burning- takes place in spring and summer months (generally May 1 – Sept. 30 and involves application of controlled, low to moderate intensity fire to control competing vegetation, prepare sites for seeding, and perpetuate fire dependant species. These burns are implemented during the time between leaf emergence and leaf fall. Vegetation 3 inches and less in diameter would be targeted. This will result in less competition for seedlings and other fire dependant species, while creating an open understory. Other added benefits would include reducing accumulated fuels, stimulate growth of native vegetation, and improve wildlife habitat.

### **Minerals**

Public need would be met by allowing surface rock collection (over no more than one percent of the total project area) in commercially harvested timber units in the project area where Biological Evaluations, Heritage surveys and other permit requirements have been completed.

There are currently no proposed gas wells within this project area, although exploration activity has increased elsewhere on the Forest. Any future proposals will receive site-specific analysis and decisions in separate documents.

### **Improvement of the Moccasin Gap Trail system- Construction and designation of 1.5 miles of new trail, realign 1.7 miles of poorly located trail and decommissioning 3.3 miles of existing trail**

This would expand multi-use recreation opportunities and work toward meeting the recreational needs of our forest users. New trail construction and realignment would make the trail system more sustainable by locating the trails in areas where they would require less maintenance and provide better connectivity. The decommissioning of 3.3 miles of existing trails would be to close and stabilize soil movement from poorly located trails which are not maintainable. The result would be the trail system would be safer and soil erosion would be measurably reduced.

### **Construct 2.5 miles of hiking trail looping to the south from Long Pool Campground**

Construction /designation of a short hiking trail system near Long Pool would provide both day and overnight users with the opportunity to hike on designated hiking trails from this recreation area. This would provide greater dispersed recreation opportunities for forest visitors and campers at Long Pool Recreation area.

### **Construction and installation of emergency closure gate(s) and a turnaround area along the entrance road into Long Pool recreation area.**

These gates would provide a way to close off the recreation area during any kind of emergency incident such as a flood event or land slide which could potentially endanger the public. Public safety would be increased by providing a way to keep people out of the Recreation area during an emergency incident.

### **Construction of 2 parking areas and 1.5 miles of OHV/multiuse trail to access The Buzzards Roost SIA**

Currently the public is accessing this SIA via an existing road that crosses two pieces of private property for which no Rights of Ways have been obtained. Efforts are underway to obtain these Rights of Ways, but if these efforts are unsuccessful, the above proposal would address the access issue by closing/gating the current access road being used and constructing a trail around the private land to access the SIA. The trail would stop short of the SIA boundary and access would be by foot traffic only from that point.

**Reconstruction of 18 miles, maintenance of 52 miles, and maintenance and closure of 24 miles of existing roads**

System roads would be constructed or reconstructed to facilitate access and hauling of timber from stands proposed for commercial harvest. Work includes, but is not limited to, widening of roads, improving alignment, providing natural turnouts, and improving sight distance that improve the standard to which the road was originally constructed. There are existing roads that would require road maintenance prior to timber hauling. This maintenance includes slide and slump repair, surface blading, spot surfacing with gravel, maintenance of drainage structures, ditch cleaning, and the clearing the roadside of vegetation. The Travel Analysis Report in the process file contains specific information about which roads will have activities on them.

**Decommission 24 miles and closure of 14 miles of existing roads, as recommended by Travel Analysis Process (TAP) Report**

The decommissioning of existing roads no longer needed for the transportation system in this area would occur. Methods of decommissioning range from blocking the road entrance to full obliteration, and may include re-vegetation, water-barring, fill and culvert removal, establishing drain-ways, removing unstable road shoulders, and restoring natural slopes. The project area contains many open roads that are currently used to access the area. Some of these roads are used by the public but are creating problems due to soil loss and erosion. Other roads being used in the area also create an unfavorable situation for wildlife through unnecessary disturbance. Signs, gates, and/or earthen berms would be used to seasonally and/or permanently close some existing roads to resolve a number of these problems. For road specific information the Travel Analysis Process table is attached as Appendix F the whole Travel Analysis Process Report is contained in the process file at the Jasper office.

## Herbicide Use Table

The following table shows number of acres, herbicides used, and method of application for the treatments proposed in the PA :

Treatment	Glyphosate	Metsulfuron methyl	Triclopyr (ester)	Triclopyr (amine)	Imazapyr	Triclopyr & Fluroxypyr	Acres
Wildlife opening Management	Foliar	Foliar		Foliar		Foliar	465
Woodland Management	Cut surface		Basal Spray	Foliar &/or stem injection	Stem Injection		631*
NNIS Control	Foliar	Foliar		Foliar &/or stem injection	Stem Injection		500 annually
Pine Seedtree, Shelterwood, and Seedtree Removal	Cut surface			Foliar &/or cut surface	Foliar &/or Stem Injection		1,962**
Hardwood Shelterwood	Cut surface			Foliar &/or cut surface	Foliar &/or Stem Injection		822
Timber Stand Improvement and Release and pre-commercial Thinning			Basal Spray	Foliar &/or cut surface	Foliar &/or Stem Injection		1,099***
Cane Restoration	Cut surface			Foliar &/or cut surface	Stem Injection		323
Pine and Hardwood Shelterwood Prep.	Cut surface			Foliar &/or cut surface	Foliar &/or Stem Injection		285
Total							6,087

\* - Includes 224 acres of existing woodlands and 407 acres of proposed woodland.

\*\* - Includes 980 acres of pine shelterwood, 111 acres of pine seedtree removal, and 871 of pine seedtree.

\*\*\* - Includes 578 acres of timber stand improvement and 521 acres of release and pre-commercial thinning.

Notes: Tank mixes and adjuvants (such as Cide-Kick) may be added to the herbicide to improve effectiveness and control of target species. All herbicides will be applied at rates and use only application methods specified on the label. Additional spot treatments would be needed to reach the desired future condition in some areas.

## Alternatives to the Proposed Action

### Alternative 1: No Action

This alternative would not implement any part of the proposed action. Ongoing Forest Service permitted and approved activities would continue.

### Alternative 2: No Herbicide Use

Herbicide application totaling 6,087 acres, as outlined in the previous herbicide use table would not occur. These activities would be accomplished manually by mechanical means. All other activities would be the same as outlined in the Proposed Action.

### Past, Present and Reasonably Foreseeable Future Actions

Within the project area there are some past, present, and reasonably foreseeable treatments that are **NOT** part of the proposed action **nor** any part of the alternatives to the proposed action, but have occurred or are expected to occur within the foreseeable future. The table below shows the treatments considered in this EA as cumulative effects:

Table showing past and present and future management activities

Treatments (On USFS Land)	Acres/ Miles	Year Treated
Pine salvage (Pear tree Tornado)	31ac	2011
Tornado Event	959ac	2011
Whaley Knob Exploratory Gas Well	7.6ac	2011
Whaley Knob Exploratory Gas Well New Construct Access Road	1.5ac	2011
Moccasin Gap Trail Maintenance	24mi	2011
Moccasin Gap Trail Relocation/New Construction	15mi	2012
Moccasin Gap Trail Obliteration	12mi	2012
Indian Creek Road ERFO Project	4.5mi	2012
Future Actions	Approx. Acres or Miles	Approx. Year
Moccasin Gap Day-use parking area construction (3) areas	5.0ac	2013/2014
Indian Creek Road ERFO Project	4.5mi	2012
Highway 7 Passing Lane Project	3.0ac	2014

Note:

Gas well development is increasing on private land south of the project area along with exploratory activity elsewhere on the Forest.

## C. Comparison of Alternatives

This section provides a summary of the actions involved in implementing each alternative.

Table showing comparison of alternatives

<b>Treatments and Acres</b>	<b>PA</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
<b>Recreation</b>			
Horse/ATV trail Construction/Relocation (mi.)	3.2	0	3.2
Horse/ATV trail Decommission/Obliteration	3.3	0	3.3
Multiuse Trail Construction for Buzzard Roost Access (mi.)	1.5	0	1.5
Construction of 2 Day Use Parking areas for Buzzard Roost access (Acres)	2.0	0	2.0
Construction of Hiking Trail South from Long Pool Rec. Area (mi.)	2.5	0	2.5
Emergency closure gate(s) and turnaround on Long Pool entrance road (Acres)	1.0		1.0
<b>Wildlife</b>			
Field Mgt for Improved Forage	465*	0	465
Non-Native Invasive Species Control	500*yr	0	500 yr
Wildlife Ponds (no.)	25	0	25
Native Cane Restoration	323	0	323
Placement of Large Woody Debris	Yes	0	Yes
<b>Forestry</b>			
Existing Woodland Management	224*	0	224
Woodland Management	407*		407
Pine Seed Tree Regeneration Harvest	871*	0	871
Pine Shelterwood Harvest	980*	0	980
Pine Seed Tree Removal	111*	0	111
Hardwood Shelterwood Harvest	822*	0	822
Hardwood Commercial Thinning	1,911	0	1,911
Pine Commercial Thinning	3,326	0	3,326
Hardwood Thinning for Firewood	99	0	99
Pine and Hardwood shelterwood preparation cut	285*	0	285
Seedling Release and Pre-commercial Thinning	521*	0	521
Pre-commercial Thinning	684	0	684
Timber Stand Improvement Thinning	578*	0	578
One time Site Preparation Burning for Planting	1,657	0	1,657
Prescribed Burning as needed	751	0	751
<b>Road Management</b>			
Temporary Roads (mi.)		0	
Road Reconstruction (mi.)	18	0	18
Road Maintenance (mi.)	52	0	52
Maintenance and Road Closure (mi.)	24	0	24
Road Decommissioning of (mi.)	24	0	24
Road Closure of (mi.)	14	0	14

Note: \* Herbicides would be used as part of these treatments

#### D. Effects Comparison of Treatments to Alternatives

Effects Table Comparing Treatments to Alternatives

Treatments	Proposed Action	Alternative 1	Alternative 2
Soil Productivity Reduction	10%*	0	10%*
Sediment Created (tons)	(291.31)**	1.76	(291.31)**
Herbicide Use (acres)	6,087	0	0
Early Successional Habitat%	10%	0	10%
New & Reconstruct trail (mi.)	7.2	0	7.2
Rehab/close trail (mi.)	3.3	0	3.3

\* RLRMP states not more than 15% of an activity area can sustain a reduction in soil productivity.

\*\*Indicates net improvement to overall watershed due to closing roads and other treatments.

#### E. Protective Measures

In order to protect the environment and lessen possible negative impacts, the measures contained in the Forest Wide (FW) Standards of the RLRMP and management area standards for the Ozark/St-Francis National Forest (OSFNF) would be applied to the PA and Alternatives and are incorporated in this EA. Best Management Practices (BMP) Guidelines for Silviculture Activities in Arkansas would also apply as standard protective measures for all proposed actions.

#### F. Project Designs

A project design is a direction that is applied to similar areas on all projects and is not site specific to one project area, stand, road, or area. A list of applicable project designs is incorporated into this document as Appendix E and is taken directly from the Ozark-St Francis Revised Land Resource Management Plan.

#### G. Monitoring

- 1) Monitoring would be accomplished through harvest and contract inspections conducted by certified timber sale administrators and contract inspectors. Appropriate standards and guidelines would be implemented and maintained through active treatment to protect soil productivity, water quality and all other resources.
- 2) In order to determine how well treatments are achieving the desired future conditions, baseline monitoring would be established prior to or concurrent with treatments to evaluate selected habitat. This would include species that are likely to benefit from habitat changes as well as those that may receive impacts. It may also include invasive species in order to evaluate their response to treatments.
- 3) 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.

- 4) A review of all known occurrences of proposed, endangered, threatened or sensitive species (PETS) has been conducted. In addition, field surveys have been made on all stands to be impacted. If any new proposed, threatened or endangered species are discovered, the activity will be halted and the District Biologist will be contacted to determine what, if any, consultation with the US Fish and Wildlife service is needed, and what specific measures to implement to avoid any adverse effects.

## H. Site Specific Project Designs

The following areas have been identified by a Landscape Architect as needing site specific project designs to minimize the recreational and scenic impacts created from the proposed action's vegetative treatments. Each of the areas listed, with one exception (Area 216), are within management areas where the RLRMP goals are to change, promote or enhance the landscape character/setting within that management area. The measures are designed to eliminate obtrusive edges, shapes, patterns and blend the alterations to repeat natural form using line and textures of the natural landscape. The project designs below are site specific for the following areas:

**Areas 21, 22, 25, 63, 181, 182 & 210 – Various Silviculture Treatments –** All silviculture treatments in Sections 21, 22, 27, 28, 29, 32, 33 are included in the view-shed having its point of origin at the Rotary Ann overlook on Highway 7 in Pope County. Planned silviculture treatments include Hardwood Thinning, Pine Thinning, some Hardwood Shelterwood and Release & PCT. All treatments in this viewshed should strive to retain a cohesive canopy due to the areas scenic sensitivity with the exception of Areas 21, 22, 25, 63, 181, 182 & 210 located within Sections 21, 28 & 33. In an effort to blend planned treatments with already existing conditions due to recent wind storm damage and in order to repeat natural form using line and textures of the natural landscape, it is recommended that these specific areas be treated in a more sensitive manner.



Figure 1 for site specific project designs - Rotary Ann Overlook Viewshed – Plan View



Figure 2 for site specific project designs– Rotary Ann Overlook Viewshed – Vertical Section



Figure 3 for site specific project designs–Rotary Ann Overlook Viewshed – Visual of Damage Area and Silviculture Treatments

- **Area 21, 22 & 25** located on the left side in photo above (highlighted in light green) – Hardwood Shelterwood –it is recommended that the treatment NOT break the canopy.
- **Area 63** bottom right stand in photo above (highlighted in white) – Hardwood Thinning – In an effort to mimic the already existing pattern of open canopy left in the wake of tornado activity top stand in photo above (highlighted in blue) and thus blending the damaged area into a planned forest management objective and lessening the impact of the damage to the viewshed, it is recommended that the typical basal requirements per acre be reduced to match the ratio of canopy to open area already existing in the northeast part of Section 32. It is also recommended that the previously proposed treatment perimeter be shifted to flow visually from the ridge in Section 32 to the east-facing slope of Section 28.
- **Area 181 & 182** – Pine Shelterwood – In an effort to mimic the already existing pattern of open canopy left in the wake of tornado activity and thus blending the damaged area

into a planned forest management objective and lessening the impact of the damage to the viewshed, it is recommended that the typical basal requirements per acre be reduced to match the ratio of canopy to open area already existing in the northeast part of Section 32.

- **Area 210** – Release & PCT – It is recommended that the edges of this area blend a 50 ft perimeter into the surrounding area requiring Hardwood/Pine Thinning and that the ratio of open area be similar.

**Area 92** – PCT – Leave canopy intact directly west of Rotary Ann Overlook Area and pull the eastern perimeter of area away from the edge of the private property to provide a buffer.

**Area 89** – PCT - Pull the northern perimeter of area away from the edge of the private property to provide a buffer.

**Area 91** – PCT – Pull the northern perimeter of area away from Highway 7 and private property to the east in order to provide an open view down through to Still Hollow.

**Area 90** – PCT – Provide a gradual transition from Freeman Springs Cemetery into the treatment area.

**Area 179** – Pine Thinning – Continue treatment up to meet west side of Highway 7.

**Area 156 & 149** – Pine Thinning – Preserve the stand of small pines near Highway 7. Treatment on the west side of the highway this should consist of graduated thinning from no treatment within 100 ft of the highway to partial thinning for an additional 200 ft then to typical Pine Thinning. Provide slash disposal up to 50 feet on either side of any trail. The typical Pine Thinning would open up some nice views to the north of the Mocassin Gap Campground.

**Areas 143 & 97** – It is recommended that the south east perimeter of the Pine Seedtree treatment Area 97 be pulled back 300 feet off the Overhead Transmission Corridor in order to create a buffer between this visually distracting corridor and the Scenic Class 1 Byway. A 50 foot strip of moderate thinning should be adjacent to and just west of the corridor then a 200 foot buffer of undisturbed forest. Another 50 foot strip of moderate thinning would then transition into the Pine Seedtree area. The overhead transmission line as well as the imposing corridor already disturb the natural character of the Scenic Byway and special care should be taken to avoid adding to the distraction.

**Area 96 & 7** – Pine Seedtree – Provide slash treatment as buffer 50 feet either side of Maupin Flat Rd (also known as Treat Rd).

**Area 117** – Slash disposal and understory removal for 50 feet into area along Maupin Flats road.

**Area 99** – Pine Seedtree – Provide 50 foot Pine Thinning as a buffer west side of road.

**Areas 128 & 130** – Should be designated as Pine Shelterwood w/ Seedtree Removal.

**Areas 76 & 78** – Release & PCT – Provide 150 foot slash treatment buffer preserving flowering trees on west edge of Coleman Cemetery.

**Area 216** – Proposed for Chemical TSI treatment. A section of hiking trail is proposed to go through a portion of this area. For a tree length on either side of the hiking trail, only treat mid and understory trees leaving the larger diameter trees.

## Chapter III

### Environmental Consequences

#### Introduction

Unless stated otherwise, the spatial bound for cumulative effects analysis is the 37,826-acre project area boundary (see Appendix A). The project area boundary has portions of 3 watersheds at the 6 level Hydrologic Unit Code (HUC). The temporal bound is 10 years.

#### A. SOILS

##### Existing Condition

The analysis area for soils will be the proposed activity areas within Compartments 180, 182, 183, 194, 195, 196, 197, 213, 214, 215, 227, 228, 229, 230, 681, 683, 689, 690, 691, 700, 701, 706, 707, 708, and 756. The Project Area is located in a heavily dissected section called the Boston Mountains. Project Area elevation varies from about 2,022 feet on the northeastern corner of the project area on Solly's Knob to 500 feet above mean sea level on the floodplain of Big Piney Creek in the southwestern part of the project area. Several types of topography exist in this Boston Mountain section. Most of the timber harvest would occur on a common Stair-Stepped landform, called "Bluff-Bench" topography, that developed from the long term weathering/erosion of sedimentary layers of different hardness, mainly shales and sandstones. The remainder of the topography varies from nearly level to rolling mountain tops that developed from weathering of level bedded sandstones to narrow to very narrow alluvial areas along Indian Creek, Moccasin Creek, Still Hollow, Gunter Branch and Big Piney Creek. Most of the mountain tops and creek bottoms and some wider benches now or have been under cultivation or in pastures, and some are still under private ownership. Project area topography varies from 0-3% slope on mountain tops, benches, and creek bottoms, to fairly steep 40-60% on the 200 to 300 foot slopes between the benches and just above the stream bottoms.

The soils in the project area are mostly stable, except for those in sections of the stream bank along Indian Creek. Sections of the stream banks along Indian Creek are unstable and are eroding probably due to historic land use practices. Jacobsen (1997) believes that stream banks in the Missouri Ozarks were destabilized by historic land use and cattle grazing in the stream bottoms based on oral history, historic photographs, and geomorphic evidence. Soils are mostly well drained and range from shallow to deep. There are some small areas of poorly drained hydric soils in depressions included in the Dardanelle silt loam, and Spadra sandy loam soil map units on the floodplains along Indian, Moccasin, and Big Piney Creeks

There are some stumps in previously harvested stands, but there is little to no evidence of detrimental soil disturbance. Most of the soils have 100% cover consisting of leaf litter, twigs, limbs, logs, gravel, stones, have vegetation growing on them, and have an intact root mat. The potential disturbance for the soil resource was estimated using coefficients developed from soil disturbance monitoring done on the Ozark St-Francis N.F.s during 1993-2002.

Estimates of temporary loss of soil productivity assume that all the proposed activities would occur within one year. This is a worst case assumption which is highly unlikely to occur, but it does demonstrate the maximum potential soil productivity loss for the project area.

## **The Proposed Action**

### Direct/Indirect Effects

Approximately ten percent (880 acres come from multiplying the acres of each harvest type by the coefficients based on Forest soil disturbance monitoring) of the harvested area would sustain a temporary reduction in soil productivity (20-25 year recovery period based on monitoring done in 1981 and 2001 on the Magazine R.D.) due to harvesting operations. Soil productivity would be lost on approximately nine acres due to road reconstruction. Additionally soil productivity would be lost on approximately three acres due to the construction of three miles of trails, realignment of 1.7 mile of trails, and small parking areas. Approximately three acres of the harvested area would sustain a temporary reduction in soil productivity due to fireline construction and maintenance. Twenty-four miles of road and 3.3 miles of trail are proposed for decommissioning which would return approximately 42 acres of soil to a productive state.

Total expected temporary reduction of soil productivity would be 895 acres (10% of the activity area), including skidding, road reconstruction, trail realignment and construction and fireline maintenance and construction. Road and trail decommissioning would reduce the net acreage of soil disturbance to 853 acres (about 9% of the activity area). Temporary roads, primary skid trails, and landings would be disked, seeded and closed following harvesting to speed the recovery of the soil productivity. Firelines would be bladed and seeded when prescribed burning is completed to speed recovery of soil productivity and to prevent erosion. Road reconstruction would stabilize roads and prevent loss of productivity on soils adjacent to these roads and would reduce erosion and sedimentation. Road maintenance also prevents the loss of productivity on soils adjacent to the roads by helping to control runoff. Less than 15% of an activity area can sustain a reduction in soil productivity, according to the RLRMP standard. If more than 15% of the activity area sustains a reduction in soil productivity, mitigation measures must be installed. The documentation for temporary reduction in soil productivity can be found in the analysis file.

Construction of new wildlife openings, construction and reconstruction of ponds and enlargement of existing wildlife openings would cause some on-site soil erosion until plants become established. Soil productivity is not expected to be impacted by the construction and reconstruction because seeding and fertilization follow these activities.

Cane restoration along Indian Creek is expected to stabilize the unstable eroding sections of stream bank and to add to the stability of the remaining sections by adding an extensive root mat and by providing soil cover.

The use of herbicides would have no impact on soil disturbance because stems and roots of treated plants would remain in place until they decay. Soil microbes will break down any herbicide residue that reaches the soil.

### Cumulative Effects

There was no evidence of past or current loss of soil productivity in the stands that are proposed for shelterwood and seedtree harvest. The proposed harvest is likely to cause a temporary loss in soil productivity that would last an estimated 20 to 25 years. The follow-up shelterwood, and seed tree removal harvests that are planned a few years into the future are expected to overlap the initial temporary loss in soil productivity in space and time which will result in cumulative effects. Two hundred sixty-six acres of these units are estimated to sustain a temporary loss in soil productivity due to the initial harvest. One hundred eighteen acres of additional temporary loss of soil productivity is estimated for these units due to the follow-up shelterwood and seed tree removal harvests. The existing and estimated additional temporary loss in soil productivity equals 384 acres, which is 13 percent of the shelterwood and seed tree harvested area. The cumulative effects are not considered substantial because the existing and estimated temporary loss in soil productivity is expected to be within the RLRMP standard. Erosion control would be done on skid trails in the harvested areas to speed the recovery of soil productivity.

### **Alternative 1: No Action**

#### Direct/Indirect/Cumulative Effects

The roads and the adjacent area proposed for reconstruction, maintenance, closure and decommissioning would continue to deteriorate and erode. Roads that are proposed for closure would not be closed which would lead to erosion and compaction of the road bed and adjacent areas and make more area available for creation of illegal OHV trails and potential soil impacts. Improvements to the Moccasin Gap Trail system would not be done. The 1.7 miles of trail to be realigned and the 3.3 miles of trail to be decommissioned would continue to erode. Sections of the stream banks along Indian Creek would continue to erode because cane restoration work would not be done.

### **Alternative 2: No Herbicide Use**

The effects would be the same as those for the Proposed Action because manual treatments used to control vegetation would cause little to no detrimental soil disturbance.

## **B. Water Quality**

### **Existing Condition**

Watersheds in the United States are divided into progressively smaller units known as hydrologic units, recognized by the U.S. Geological Survey (USGS) as regions, sub-regions, basin, and sub-basin units. This hierarchical division of watershed boundaries is useful for assigning address-like codes to drainage basins. This project area falls within the Arkansas-White-Red region (11), the Lower Arkansas sub-region (1111), the Lower Arkansas-Fourche La Fave basin (111102), and the Dardanelle Reservoir sub-basin unit (11110202) ( U.S. Geological Survey, 2003). The Ozark-St. Francis National Forest further classifies land areas into two progressively smaller units: watersheds and sub-watersheds. The proposed project falls into the Lower Big Piney Creek (1111020208) watershed. At the smallest scale, the proposed project is located within three sub-watersheds as noted in the table below. These sub-watersheds or 6th level HUC areas

will serve as the analysis area for the proposed project with respect to water resources. The figure on the following page shows the project area within the associated sub-watersheds.

Watershed Table

Watershed Number	Watershed Name	Total Acreage	Project Area Acreage Included
111102020801	Moccasin Creek	11,574	11,473
111102020802	Indian Creek	21,029	20,446
111102020804	Mill Creek	30,206	5,204

There are approximately 91 miles of streams within the project area, which falls within the analysis area that contains approximately 149 miles of streams. The primary streams found in the project area include Indian Creek, Gunter Branch and Moccasin Creek plus several unnamed tributaries to these streams. Big Piney Creek, a designated Extraordinary Resource Water (ERW), borders the southwestern edge of the project area for a distance of approximately 9.6 miles. An ERW may be defined as a combination of the chemical, physical, and biological characteristics of a water body and its watershed characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential, and intangible social values. Tributaries to Big Piney Creek also extend into the project area.

This portion of the Forest is located primarily in the Boston Mountain eco-region with deeply dissected drainages into the Bloyd Formation (McFarland, 2004). Approximately 4,600 acres of the Mill Creek sub-watershed are located within the Arkansas River Valley eco-region, which is associated with Arkansas River alluvium.

Precipitation for the project area averages approximately 46 inches annually. Mid-winter and late summer are found to be the driest portions of the year, this combined with high summer temperatures suggests that stream flow would typically be lowest during the late summer.

Within the 6th level watershed analysis area, approximately 83% of the land is administered by the Forest Service. This leaves a sizable portion of the land within the watersheds as privately owned. Land use within these sub-watersheds is approximately 93% forested. The balance of the land uses are mainly pastures.

Forested land uses indicate a stable landscape that results in minimal amounts of natural or background erosion, especially for Arkansas (Miller and Liechty, 2001). For many parts of the Ozark-St. Francis NF, the prevalent soil cover contains many rocks and rock fragments that ultimately limit the erosive susceptibility of the soils. Measured erosion for minimally disturbed forestlands rarely exceeds 0.25 tons per acre. Soil erosion from cropland has been estimated at 3.8 tons per acre (Patric et al., 1984; U.S. Department of Agriculture – Soil Conservation Service, 1989).

Within the analysis area, roads exist both within the forest boundary and outside the forest boundary. There are approximately 367 miles of roads within the analysis area and 210 miles of roads within the project area. Within the project area, there are approximately 13 stream crossings where the current road system crosses or intersects a stream.

According to the National Wetland Inventory Database, there no mapped wetlands located within the project area. Small, unmapped wetlands may exist along the edges of streams, especially at lower elevations where floodplains have developed. These inclusions are likely less than one half acre in size and are directly associated with the adjacent stream. If any are located, appropriate measures will be taken to protect these resources.

Floodplains are identified on the forest within the project area. These features were mainly found to occur along Big Piney Creek and the lower reaches of Indian and Moccasin Creeks. Floodplains and any associated riparian areas occur in narrow strips near the stream channels.

The proposed project is located in the Boston Mountain ecoregion as identified by the Environmental Protection Agency (EPA) as a revision of work produced by Omernick (1987). These are the same ecoregion divisions recognized by the state for use in defining water quality standards. Thus, water quality standards for the project area, and the Arkansas Pollution Control and Ecology Commission Regulation 2 – Water Quality Standards for Surface Water (2011), determine the sub-watershed analysis areas for this project. The designated uses assigned to the surface waters in the project area are as follows: for all waters, secondary contact recreation, domestic, industrial and agricultural water supply. For surface water where the watershed is greater than 10 square miles, and all lakes and reservoirs, the designated uses are the same as above but include primary contact recreation and perennial Arkansas River Valley fishery. There are no 303d listed streams (impaired water bodies) within these watershed analysis area boundaries.

The U.S. Geological Survey's Ozark Plateaus National Water Quality Assessment Program has studied existing land uses in the region and their impacts on water quality. Trends show increased nitrogen, phosphorous, and coliform bacteria concentrations occur with increases in agricultural and urban land uses but forested land use has a much lower concentration of these constituents (Davis and Bell, 1998).

Changes in land use and other disturbances can be modeled with respect to estimated increases in sediment. The Water Resource Analysis for Cumulative Effects (WRACE) model estimates current conditions 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 for different ecoregions. The model analyzes watersheds individually adding effects from activities of other projects to the estimated effects of the proposed project.

## **Proposed Action and Alternative 2**

### Direct/Indirect Effects

Activities, which could cause effects, are those of vegetation management, silvicultural site preparation, road, parking lot, trail construction, dozer line construction, and prescribed burning.

In a study of silviculture activity effects in the Ozark-Ouachita Highlands, Lawson (1986) documented the undisturbed erosion from small watersheds and the amount of sediment produced due to vegetation management practices. The undisturbed sites produced about 13.8

lbs/acre of sediment with 70% of this amount attributed to large precipitation events. A seedtree harvest produced three times this amount of sediment during the first year after harvest with 31.3 lbs/acre. Three years after the treatment, the erosion rates were similar to the undisturbed state. This is roughly equivalent to a 5-gallon bucket of soil. Another study by Lawson and Hileman (1982) investigated the effects of seedtree removal and site preparation burning. The results indicated that there were no substantial differences in stream turbidity between seedtree removal sites and undisturbed control sites. Thus, seedtree silvicultural practices in Arkansas would result in the production of sediment, but at levels below those found on typically managed forestlands of the eastern United States. Therefore, the vegetation management practices proposed for this project would result in temporary increases of sediment but at relatively low levels for a short duration.

Using paired watershed studies for regions of the United States Stednick (1996) depicted effects of silviculture practices on annual average stream discharge. In this study, the actions necessary for producing measurable increases in water yield from forests in Arkansas was determined to be a 50% reduction in basal area across an entire watershed. This level of vegetation harvest would result in an increase of roughly six inches above normal runoff values for the first year. The recovery period for water yield to return to pretreatment level was found to be a function of vegetation re-growth. For Arkansas, this means that water yields should return to pretreatment level within three years (Van Lear et al., 1985); however; changes to peak flow and storm flow timing may continue if drainage patterns are altered by activities such as road construction. Any changes to runoff timing should not result in impacts to current water uses or quality.

Because the model predicts no difference in cumulative effects to water quality between the proposed action and the No Herbicide alternative, discussion applicable to the use of herbicides is presented in this section. Herbicide use under the proposed action would not be broadcasted but applied by direct injection, cut surface, or foliar spray. For these purposes, herbicide use in forestry would occur only once or twice over 25 to 75 years, and direct application methods, as opposed to broadcast spraying, would minimize off-site movement. Forest-wide Standards and specific herbicide label rates for herbicide application would be followed as well as appropriate BMPs designed to limit risk to water quality. Monitoring for herbicides used on the forest has been a continuous policy on Ozark-St. Francis National Forests for over 10 years. Results from this monitoring have not documented any substantial concentrations of herbicides off-site from their application (unpublished reports). Other monitoring suggests that subsequent to runoff producing precipitation events, concentrations of herbicide (triclopyr) in ephemeral streams with BMP protections were very small and well below any sizeable risk concentration (unpublished report). When herbicide fate is measured in runoff water, two common outcomes are apparent. First, measured peak concentrations are of short duration and may be measured in hours depending on precipitation concentration. Second, the highest concentrations occur when buffer strips are not used on streams (Neary and Michael, 1996).

Exposure is determined by such things as application rate, chemical behavior in the environment and biological factors. Herbicides for forestry applications occur annually in amounts roughly equivalent to ten percent of their use in agriculture settings and at application rates of less than 2 kilograms per hectare (Neary and Michael, 1996). Chemicals can enter streams through a variety of mechanisms - by direct application, drift, mobilization of residues in water, overland flow, and

leaching. The most noteworthy transport pathways would be direct application, drift, and mobilization during periods of heavy precipitation and overland flow. The most effective means for reducing this likelihood is to maintain a buffer between the area for use and waterbodies, and to plan appropriately for application periods.

Herbicide applications to control competing vegetation do not disturb the nutrient rich topsoil layer, do not create additional bare soil, and do not adversely affect watershed condition when used responsibly (Neary and Michael, 1996). By utilizing herbicides, the organic matter is left in place and off-site soil movement does not increase the loss of nutrients following harvest activities compared to the other types of management practices. Maxwell and Neary (1991) concluded in a review that the impact of vegetation management techniques on erosion and sedimentation of water resources occurs in this order – (from least to greatest) herbicides, fire, then mechanical. They also concluded that sediment losses during inter-rotation vegetation management could be sharply reduced by using herbicides and moderate burning instead of mechanical methods and heavy burning.

Forestry use of herbicides poses a low pollution risk to groundwater because of its use pattern. Herbicide use in forestry is likely to occur only once or twice over rotations of 25 to 75 years (Neary and Michael, 1996). The greatest potential hazard to groundwater comes from stored concentrates, not operational application of diluted mixtures (Neary and Michael, 1996). Regional, confined, groundwater aquifers are not likely to be affected by silviculture herbicides (Neary, 1985). Surface unconfined aquifers in the immediate vicinity of herbicide application zones have the most potential for contamination. These aquifers are directly exposed to leaching of residues from the root zone.

The only known long term potential effects of proposed use of herbicides to water resources are groundwater contamination incidents of importance (contamination of bedrock aquifers, persisting more than 6 months, concentrations in excess of the water quality standard, etc.) in the southeastern United States, where higher amounts of forestry herbicides are used, involved extremely high rates of application, or spills of concentrates. In these situations, herbicide residue was detected in ground water four to five years after the contamination. These situations are definitely not typical of operational use of forestry herbicides. Proper handling precautions during herbicide transport, storage, mixing-loading, and clean-up are extremely important for preventing groundwater contamination (Neary and Michael, 1996).

Although short term, low-level stream contamination has been observed for ephemeral to first order streams draining studied sites, levels of herbicides in these streams have been neither of sufficient concentration nor of sufficient residence time to cause observable impacts on aquatic ecosystems (Michael et al., 2000). These studies have confirmed, with a few exceptions, the absence of measurable contamination of surface water. Thus, herbicides used properly can help protect water quality in the reduction of sediment in streams while accomplishing forest management goals.

From a review of literature surrounding herbicide application and use on forest lands, and monitoring conducted on the Ozark-St. Francis National Forest, it has been determined that the selection of the proposed action could potentially result in low levels of herbicide residues

entering waterbodies within the project area (SO unpublished reports). However, the levels found in the past and those anticipated for the future, are expected to be very small, and not in excess of the levels of concern established by the EPA. The Ozark-St. Francis National Forests utilize standards for herbicide application that require buffers between treated vegetation and waterbodies, as well as standards to ensure that drift and direct application to waterbodies does not occur. The proposed action includes the use of BMP practices and monitoring to ensure environmental quality is maintained.

Roads are generally considered to be the major source of sediment to water bodies from harvested forest lands. They have been found to contribute up to 90 percent of the total sediment production from forestry activities (EPA, 2005). Road-generated sediment may result from the erosion of cut and fill slopes, ditches, road surfaces, and road maintenance operations. Unpaved roads paralleling and crossing streams pose specific risks to water quality as they often maintain direct linkages with the stream channel. Roads result in three primary effects on forested lands. They can intercept rainfall directly, concentrate flow, and divert or reroute water from traditional hydrologic pathways. Through these actions, road systems mimic the stream channel network, effectively increasing the drainage density of streams in the landscape by constructing new pathways that intercept surface runoff. This may result in modifications to the timing of water delivery to stream systems; however, this is not expected to produce a substantial nor measurable difference from current conditions. The activities of the proposed action and alternative 2 would work toward ‘disconnecting’ the road system from the stream network.

Road work activities planned for this project include road reconstruction, road maintenance, road closure, and road decommissioning. These activities, when properly conducted, should result in a net decrease in sediment production by correcting or preventing erosion issues and allowing some open roads to revert to a vegetated state, thus a benefit. Guidance provided in the RLRMP and the Arkansas Forestry Commission’s Best Management Practices for Water Quality Protection outline the mitigation measures necessary to conduct these activities while controlling contributions to non-point source pollution.

Approximately 6.5 miles of multi-use trails, 2.5 miles of hiking trails, and 1.5 miles of Off Highway Vehicle (OHV) trails would receive work including construction/designation, realignment, and decommissioning for all but the No Action alternative. All construction and decommissioning would follow appropriate standards for protection of the trails and to minimize accelerated erosion. It should be noted that, due to the amount of road and trail closure, sediment yield to streams is predicted by WRACE calculations to decrease with implementation of the proposed action or alternative 2.

The effects of prescribed fire on water yield and timing, erosion, and nutrient cycling depend on fire severity, fuel characteristics, soil moisture, and recurrence interval, and primarily the amount of ground cover removal. Less intense fires result in effects of less magnitude than moderate to severe fire intensity (Marion, 2004). Controlled burns designed to meet fuel reduction, wildlife, recreation, watershed, or ecological objectives are typically planned to be less intense than a wildfire. There is little evidence that water yield increases measurably following prescribed burns.

Erosion following a prescribed burn depends on soil erodibility, slope, precipitation timing, volume, intensity, fire severity, and soil cover remaining. For low intensity fires that avoid complete consumption of the organic layers, sediment has been found to not leave the treated site or be transported to stream channels (Fulton and West, 2002). The organic layer and root mat remains intact after low severity fires.

Erosion from prescribed burning is typically less than road and skid trail construction or intensive site preparation (Golden et. al 1984). Erosion following prescribed fire is primarily caused from plowed fire lines as opposed to the general treatment area (Van Lear et al., 1985). Minor increases in stormflow and nutrients return to pre-treatment levels within 3 years (Van Lear et al., 1985).

According to results from the WRACE model, the direct and indirect impacts from this project are not expected to contribute to degradation of the current water quality. Implementation of the activities associated with the proposed action and alternative 2 would result in some of the above mentioned effects to water quantity and quality; these effects have been shown from past research to be minimal and last less than three years (Van Lear et al., 1985). The most likely effects from the proposed action and alternative 2, beyond current conditions, are a short-term increase in sediment resulting mainly from road activities and minimal increases in water production. With the application of the Arkansas Forestry Commission's Best Management Practices for Water Quality Protection, current Forest Plan standards, and any other site specific protection measures noted in this EA, the activities of the proposed action or the no herbicide alternative should not result in sizeable effects to the water resources. Road stabilization through maintenance and reconstruction, erosion control through re-vegetation of disturbed ground, and streamside management zones around surface water features are typical measures used to ensure the mitigation of negative effects that could occur.

Long-term implications of nutrient loading after timber harvest for streams in the south were described in a study by Lynch and Edwards (1991). In this study best management practices were used that include 100 foot wide perennial buffers, logging slash removed from streams, sale units were monitored by a responsible party, operations ceased during wet weather, roads laid out by professionals, roads not exceeding 10% grade, culverts used to cross perennial streams and removed when done, water bars utilized, roads gated, and filtration strips maintained. The results indicated that nutrients would not exceed water quality standards and that only during the treatment year would nutrients show a measurable increase. An important conclusion was the demonstration of the effectiveness of BMPs for controlling nutrient export.

The activities described in the proposed action or alternative 2 are not expected to affect wetland areas or floodplains due to implementation of practices such as those discussed above.

### Cumulative Effects

The cumulative effects analysis estimates sediment yield from both public and private lands, the existing road network, and from expected current and future activities. Current and future

sediment yield, estimated from past, present, and planned projects, is compared to estimates of an undisturbed landscape (or past condition). An undisturbed landscape is described as an entirely forested watershed without roads. Sediment increases are then calculated as a percent above the undisturbed amount. This value is compared to potential risk values for identifying levels of concern for watershed conditions. These risk indicator values were empirically determined using a relationship between sediment values and the condition of the fisheries from select locations across the analysis area.

The cumulative effects analysis assumes that particular activities occur on public and private lands. The assumption is made that all the activities on public lands as described under each alternative, would occur during a one year time frame, or as an instantaneous event. In practice, these activities are usually spread over a number of years, thus amortizing the potential effects over the life of any resulting projects. Assumptions are included in the determination of the potential risk indicator values; these values were determined on a smaller-scale, ecoregion basis, using community based fish information. Different guilds within the fish communities were analyzed for predictive patterns of response to sediment loading. The most responsive patterns were used to set the risk level values. This allows for a determination of the 'worst case' scenario, providing a conservative understanding of effects to the water resources and designated use fisheries.

There are two risk values for every 6th level watershed; the first separates the low and moderate concern level and the second separates the moderate and high concern level. A low concern indicates a minimal risk to water quality, or no expected adverse effects to water resources or the designated uses. A moderate concern indicates that care should be taken designing and implementing the project to avoid adverse effects and that additional aquatic monitoring should occur prior to project implementation. Proper application of all forest plan standards and Arkansas Forest Commission BMPs should be verified for implementation. Assuming these guidelines are correctly applied; this project would result in minimal risks to water quality; if these standards are not applied then a greater risk to water quality results. A high concern signals that the water resources may be threatened by the current or future state of the watershed. Proposed activities should only be conducted with the application of appropriate forest plan standards and BMPs. Short-term adverse effects to water resources may result from activities captured in the effects analysis, both on public as well as private lands. Additional monitoring is necessary to determine that no adverse effects to the water resources are the result of Forest Service activities; this includes monitoring for adequate BMP compliance. Under high-risk concerns, projects should seek a no net increase of sediment levels through restoration opportunities throughout the watershed.

The water resource cumulative effects analysis was completed based on the activities described in this document. The results of this analysis are displayed in the table below. All three of the affected sub-watersheds are currently determined to have a low concern level. The concern level for the proposed action and each alternative is estimated to remain low for the future watershed condition.

Table showing results of cumulative effects

	Percent increase of sediment above undisturbed conditions							
	Current		Future					
	% Increase	Concern Level	Proposed Action		No Action		No Herbicide	
% Increase			Concern Level	% Increase	Concern Level	% Increase	Concern Level	
Sub-Watershed Analysis Area								
Moccasin Creek	193	Low	149	Low	193	Low	149	Low
Indian Creek	159	Low	130	Low	159	Low	130	Low
Mill Creek	327	Low	318	Low	329	Low	318	Low

The activities proposed by the Forest Service for the proposed action would result in an overall decrease in sediment yield compared to current conditions due to road and trail maintenance and closures. It is most likely that the proposed activities would take place over a 3 to 5 year period instead of instantaneously as predicted by the analysis, thus reducing acute effects. The use of RLRMP standards and Arkansas Forestry Commission BMPs is expected to reduce the impacts of the proposed activities. Monitoring in the form of subsequent fisheries evaluation and BMP compliance checks should be adequate to discern any adverse effects that may result from the implementation of the proposed action or alternative 2.

### Alternative 1

#### Direct/Indirect/Cumulative Effects

There would be no direct effects from this alternative because no activities would result from the selection of this alternative. The current trends and conditions would be expected to continue. Indirect effects would continue to result from the existing conditions of the project area. The effects of vegetation on water yield within the watershed would continue through evapotranspiration processes. Roads that do not receive necessary maintenance would continue to pose a chronic threat to water quality as problem erosion areas would continue to exist, or worsen.

Roads are the most common source of accelerated erosion on National Forest lands. Roads generate sediment from the erosion of excavated surfaces, ditches, and road maintenance operations. Raw ditch lines and roadbeds would be a continual source of sediment, usually due to lack of maintenance, inadequate maintenance, excessive ditch line disturbance, or poorly timed maintenance. As a result of Alternative 1, roads in need of maintenance and reconstruction would not receive the necessary upgrades to minimize resource conditions. Unpaved roads paralleling and crossing streams would continue to pose specific risks to water quality as they often maintain linkages with the stream channel.

## C. Air

### Existing Condition

Air pollution can impact both human health as well as the environment. The Clean Air Act established standards on six pollutants (carbon monoxide; CO, sulfur dioxide; SO<sub>2</sub>, particulate matter 10 microns is size; PM<sub>10</sub>, nitrogen dioxide; NO<sub>2</sub>, ozone and lead. In recent years air quality standards have refined the particulate matter size to 2.5 microns (PM<sub>2.5</sub>). The reason for this is PM<sub>2.5</sub> is the size of particles which when breathed in by humans will lodge deep in the lung tissue potentially causing respiratory disease. 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, and forest burning; cooking exhausts from restaurants; and other activities.

For the purpose of this analysis the two main air pollutants of concern on the Ozark-St. Francis National Forests are ozone and fine particulate matter. This is because when prescribed burn activities are implemented ozone and fine particulate matter are the 2 greatest pollutants released into the air. At elevated ambient concentrations, ground level ozone can cause respiratory distress in sensitive populations, and can cause negative growth impacts to vegetation. Fine particulate matter (PM<sub>2.5</sub>) causes cardiopulmonary symptoms in certain individuals, and significantly contributes to regional haze. Because of these concerns, the U.S. Environmental Protection Agency (EPA) has established national air quality standards, called the NAAQS, for these two pollutants. There are both primary and secondary NAAQS. Primary standards set limits to protect public health, particularly the health of sensitive populations such as children and the elderly. Secondary standards are set to protect public welfare, including visibility, crops, vegetation, animals and buildings.

State air quality agencies monitor for both ozone and PM<sub>2.5</sub> across the state including one station in Deer, Arkansas within the Ozark-St. Francis National Forests. Measured concentrations are compared to the NAAQS for each of the pollutants. There is both a 24-hour and an annual NAAQS for PM<sub>2.5</sub>. Currently, there is one NAAQS for ozone, based on 8-hour average concentrations. Areas that exceed the NAAQS are designated nonattainment, and a State Implementation Plan (SIP) must be prepared to demonstrate how the area will come back into attainment with the NAAQS.

Additionally, air quality agencies issue an air quality forecast in the form of the Air Quality Index (AQI) for both pollutants. The AQI is color coded in the following manner. An AQI of code orange or worse means that air quality in the area is predicted to exceed the NAAQS.

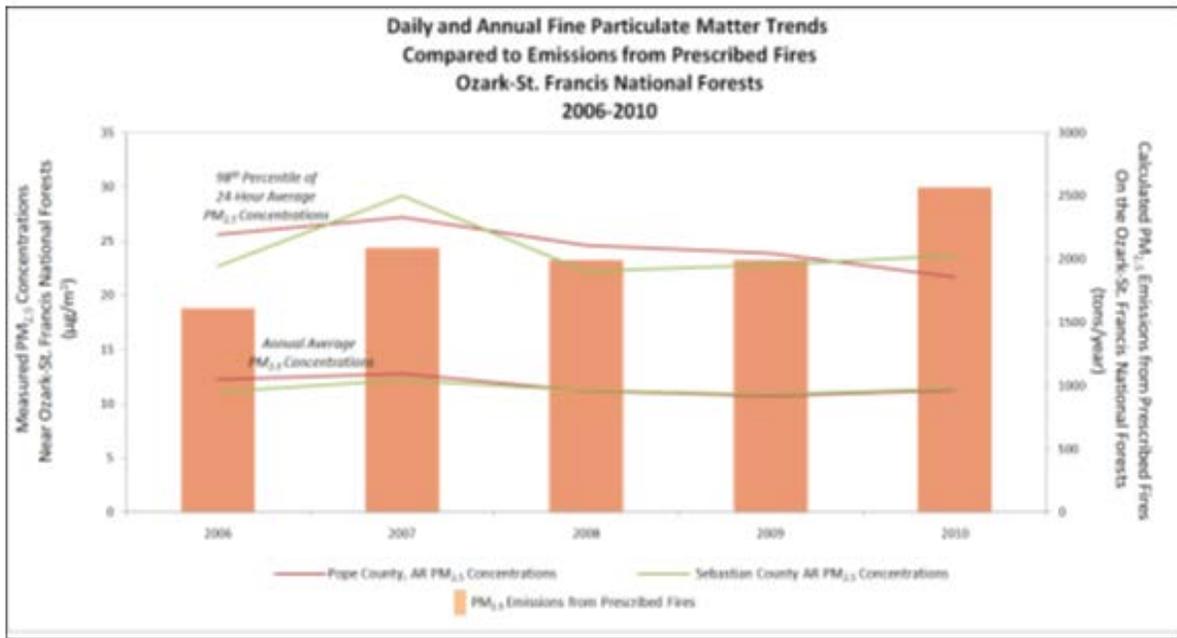
Air Quality Index Table

<i>AQI Code</i>	<i>Description</i>
Green	Good
Yellow	Moderate
Orange	Unhealthy for Sensitive People
Red	Unhealthy
Purple	Very Unhealthy
Maroon	Hazardous

As of 2011 there were no counties in Arkansas in non-attainment for ozone or fine particulate matter.

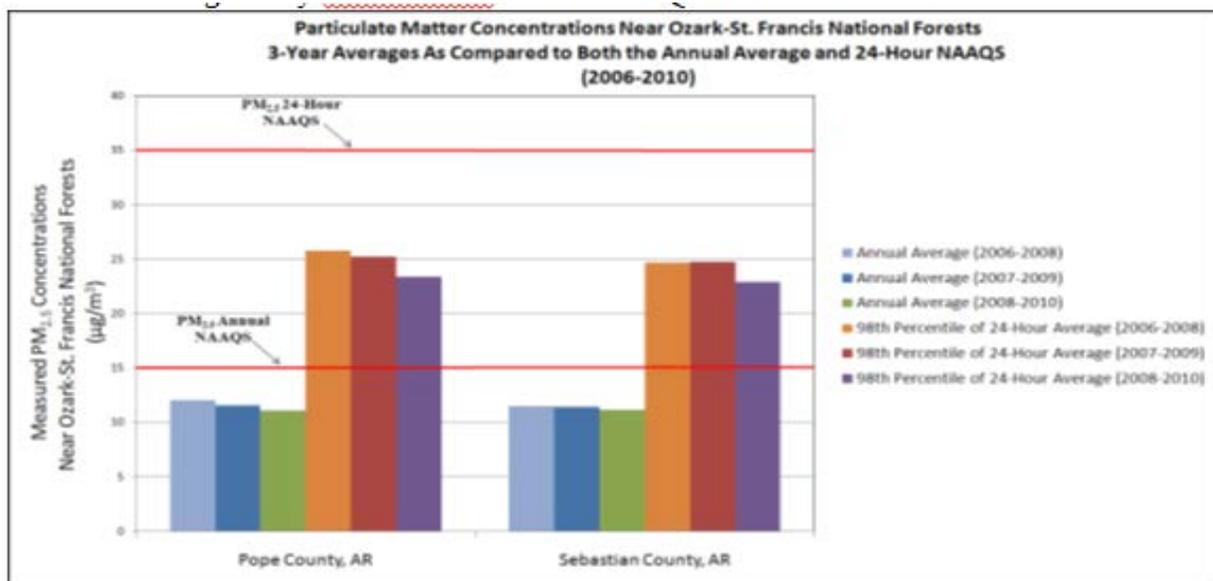
Air quality is recognized in the RLRMP for Ozark-St. Francis National Forests as an important parameter to measure forest health. The plan lists the following forest-wide standards relating to air quality.

- FW93: Prescribed burning will be conducted in, or adjacent to, counties with forecasted high Air Quality Index (AQI) values (AQI equals orange or higher) only if meteorological conditions indicate that smoke will be carried away from the high AQI area.
- FW94: Conduct all National Forest management activities in a manner that does not result in (1) a significant contribution to a violation of National Ambient Air Quality Standards (NAAQS) or (2) a violation of the applicable provisions in the State Implementation Plan (SIP). Standard FW93. The use of prescribed fire emits PM2.5, along with other pollutants. With the growing prescribed fire program, it is important for the National Forests to be aware of downwind concentrations of fine particulate matter to ensure that prescribed fire emissions are not contributing to any violations of the NAAQS. There are three PM2.5 monitors near or in the Ozark-St. Francis. As the graph below shows, there does appear to be a correlation between prescribed fire emissions and measured fine particulate matter concentrations near or in the Forest.

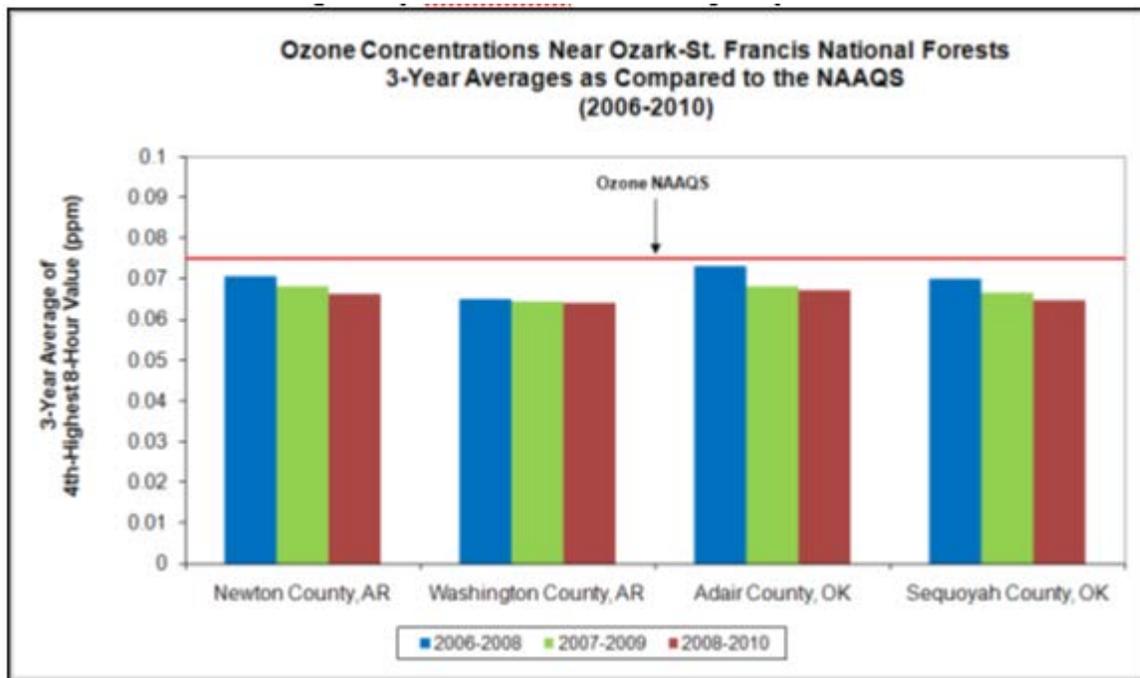


However, the concentrations of fine particulate matter, both on a daily and an annual basis are not higher than the PM2.5 NAAQS, which are 35 and 15 µg/m<sup>3</sup>, respectively. Thus, while prescribed fire is contributing to nearby concentrations of PM2.5, the area is still meeting the NAAQS for this pollutant.

Standard FW94. The National Ambient Air Quality Standards are based on three-year averages of the measured concentrations. Using 2006 through 2010 data, the measured concentrations near the Ozark-St. Francis National Forests were compared to the 24-hour and the annual PM2.5 NAAQS. As shown on the graph below, these monitors have not documented any that surpass the PM2.5 NAAQS over the past several years. Thus, it can be concluded that forest management activities are not exceeding the NAAQS for PM 2.5.



Ozone concentrations are also measured at several locations near or in the Ozark-St. Francis National Forests. The NAAQS is based on a three year average of the 4th highest 8-hour ozone concentration. The graph below shows the nearby ozone concentrations as compared to the NAAQS. As shown, ozone levels are not exceeding the NAAQS, and thus no forest management activities are contributing to exceeding the air quality standards.



Class I Air Quality Related Values (AQRVs). The Clean Air Act and its Amendments designate specific wilderness areas and national parks as mandatory Class I areas, and these areas are provided special protection against degradation of air quality related values such as visibility. The Ozark-St. Francis National Forests manage one Class I area, the Upper Buffalo Wilderness. The Clean Air Act requires federal land managers with the ‘affirmative responsibility’ to protect the air quality related values at these Class I areas, and to consider whether a proposed new or modified source of air pollution may adversely impact these values. The Ozark-St. Francis National Forests work with state regulatory agencies in Arkansas and Oklahoma to determine if new or existing industry would impact air quality at Upper Buffalo Wilderness through the Prevention of Significant Deterioration (PSD) permitting process. No permit actions in the past five years have been shown to cause an adverse impact to the Upper Buffalo Wilderness.

Effective fire control, beginning in the early 1900’s influenced the existing vegetation. Accounts of early travelers through northern Arkansas frequently describe wildfires and large burned over areas. Dendrochronology studies conducted on the Big Piney Ranger District also indicate that fire has long been a part of the landscape (Guyette 2006). Due to the removal of fire over the last 100 years, the fuel composition has changed from a grass fuel model to a brush fuel model (Guyette 2006). Fires in grass fuels can be easier to suppress and respond quicker to weather influences such as relative humidity. Models such as LANDFIRE indicate that this landscape is in Condition Class II and III, meaning it has departed from a reference condition for vegetation, fuels, and disturbance regimes.

The community of Pelsor which is located in the northeast corner of this project was listed in the Federal Register dated August 2001 as Urban Wildland interface Communities within the vicinity of federal lands that are at high risk from wildfires.

## **Proposed Action and Alternative 2**

### Direct Effects

Burning would be implemented multiple times, on 751 acres for multiple purposes and would continue moving the landscape toward Condition Class 1. Of these acres, approximately 225 are within a 4,215 acre block of the Rotary Ann portion of the Woodland Ecosystem Project (2004), and could be burned separately, or as a part of a larger landscape scale burn. In addition, 1,657 acres would be burned one time, with site preparation for tree planting being the primary purpose. For the proposed action and alternative 2 the prescribed burn acres would remain the same. The PA would not have an effect on the class I air shed due to the distance (17 miles north west) of the project area. Based off of local observations, rarely do the predominate winds blow from the southeast which is what would be required to put smoke in the direction of the class I air shed from the project area. When similar burns have been implemented closer to the class I air shed the NAAQS have not been exceeded. Community protection and firefighter safety would be enhanced by decreasing fuel loading by an estimated 1.5 tons per acre. Emissions from burns would produce PM-10 and PM 2.5 particulate matter during the burns. PM-2.5 is particularly important because this size of particle when ingested remains in the body. Herbicides may be used within burn blocks (except Alternative 2). The manufacturer's label recommendations would be followed to determine when it is appropriate to burn following herbicide application so there would be no negative effects to air quality from herbicide. There is a Forest Wide standard (#153) which states; no treatment area will be prescribed burned sooner than 30 days after herbicide application. Burns would be conducted during both the growing and dormant seasons, and each season would have different effects on the vegetation. From my experience as a Fire Management Officer for 10+ years, dormant season burns typically top-kill smaller diameter woody plants, 1 inch or less in diameter, while growing season burns will top-kill slightly larger woody plants, from 1 to 3 inches in diameter.

### Indirect Effects

The public could be exposed to low concentrations of drift smoke, which would create a nuisance rather than a health problem. There is potential for roadways to be impacted by smoke, which could decrease visibility and cause traffic on roadways to slow down. Monitoring of smoke is standard on every prescribe burn implemented. If smoke starts becoming thick enough to impede traffic the prescribed burn plan would implement traffic control measures. There would be no indirect effect on the class I air shed from the PA.

Based on the nature of the proposed management activities in the proposed action and alternative 2 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 air borne). 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 localized 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 models are used to estimate effects such as the Simple Approach Smoke Estimation Model (SASEM).

For the proposed action and alternative 2 the potential exists for smoke to cause temporary local effects on private homes and farms, and to the rural communities. 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 Burn Plan would be applied. These measures are designed to ensure that state smoke management guidelines, 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 burn plan prior to implementation that considers wind direction and other smoke dispersal factors. The burn plan would be prepared for each burn to ensure that the combustion products (smoke) to minimize effects in smoke-sensitive areas. Burning would only occur when conditions are right for adequate smoke dispersal. Proposed burn areas proposed in the PA and alternative 2 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. With these measures, effects from smoke for the proposed action and alternative 2 are expected to be small and localized within acceptable levels.

Based upon this most recent EPA-air quality data; potential emissions being below the lower limit acceptable by EPA; our compliance with NAAQS; and our meeting general conformity and meeting the intent of the Regional Haze regulation, the prescribed treatments should not detrimentally impact the quality of air in the proposed project area or in the Class 1 air shed.

#### Cumulative Effects

Burning will continue by other state and Federal agencies as well as private landowners. Based on the IMPROVE monitoring station in Deer Arkansas the air quality in and around the project area is good and there are no areas in threat of reaching non-attainment status or exceeding air quality standards. There would be no cumulative effects on the class I air shed from the PA.

#### **Alternative 1 (No Action)**

##### Direct Effects

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.

The no action alternative would have no direct effect on the class I air shed.

##### Indirect Effects

The public could be exposed to lower concentrations of drift smoke, which would create a temporary nuisance rather than a health problem. There is still potential for roadways to be impacted by smoke, which could temporarily decrease visibility.

Potential would exist for a more serious wildfire in the acres that would not be prescribed burned. If a wildfire did occur within these areas smoke concentrations would be higher. Roads could be temporarily closed leading to an inconvenience for local people living in the communities close by. There would be no indirect effects on the class I air shed.

### Cumulative Effects

Burning will continue by other state and Federal agencies as well as public landowners. Based on the IMPROVE monitoring station in Deer Arkansas the air quality in and around the project area is good and there are no areas in threat of reaching non-attainment status or exceeding standards. Over time without moving the landscape toward the reference Condition Class, fuels would continue to build up and potential increases for a serious wildfire to occur in this area. The no action alternative would have no cumulative effect on the class I air shed.

Burning could continue to be implemented on the 4,215 acres previously analyzed in the Woodland Ecosystem Environmental Assessment for multiple purposes and would continue moving the landscape toward Condition Class 1. Community protection and firefighter safety would be enhanced on these acres by decreasing fuel loading by an estimated 1.5 tons per acre. Emissions from burns would temporarily increase production of PM-10 and PM 2.5 particulate matter during the burns. Burning would help meet objectives 55, 56, and 57 of the Revised Land and Resource Management Plan. Fuel loading on 7,135 acres would not be decreased, Condition Class on these acres would remain the same, and there would be no contribution to objectives 55, 56, and 57 of the Revised Land and Resource Management Plan. There would be an increased risk of a more serious wildfire in and around the community listed above as WUI areas at high risk.

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. Recreation/Visual Quality**

### **Existing Conditions**

The High Mountain project area is located southwest of the community of Pelsor, east of the community of Treat, which includes the Moccasin Gap Trail System and Long Pool Recreation Area. The project area is bounded on the north by State Highway 123, on the East by State Highway 7, on the south by Old Highway 7, and on the west by Big Piney Creek. The High Mountain project area is located in, northwest Pope and northeast Johnson counties.

The proposed actions lies within the following Management Areas as defined in the Forest Plan, which guides its management direction toward multiple uses, among which are wildlife, range, timber, aesthetics and recreation. Pages; 2-35 to 2-71

- 1.C Designated Wild and Scenic Rivers – 1,419.49 acres
- 1.G. Special Interest Area – 62.36 acres
- 1.H. Scenic Byway Corridors – 2,742.92 acres
- 2.C. Developed Recreation Areas – 27.77 acres
- 3.B Oak Woodland – 4,953.88 acres

- 3.C Mixed Forest – < 1.0 acre
  - 3.E. High Quality Forest Products – 26,979.27 acres
  - 3.I Riparian Corridors – 319.57 acres
  - Private – 1,320.48 acres
- Total – 37,825.78 acres**

From Terrell Hope’s (District Recreation Program Manager) past 20 years of experience this portion of the Ozark National Forest receives moderate to heavy pressure of several types of recreational use. These uses include: camping, (both developed and dispersed) hunting (deer, squirrel, turkey, and bear), pleasure driving, hiking, horseback riding, OHV use (dirt bikes and ATVs), and paddling on Big Piney Creek. The area users are mainly visitors within a day’s drive; however visitors from adjacent states also frequently visit the area.

Even though the previous LRMP and the Revised LRMP restricted OHV use from general forest and closed roads, evidence of motorized use has remained moderate to heavy. Under the current RLRMP guidance has been imposed following the National direction associated with unmanaged recreation and the OHV National policy to use designated routes only, attempting to focus the recreational motorized use on specific routes and trails. The opportunities within the project area for OHVs are better than average due to the Moccasin Gap Trail system and the number of routes that was identified in the 2012 Travel Management Map. Even though motorized use in the High Mountain project is good (more miles than most project areas on the district) The Travel Management Rule has limited OHV opportunity below the historic use of the area.

Additional opportunities include approximately 28.0 miles of the Moccasin Gap trails with a campground and Long Pool Campground with day use area including designated swimming area. General dispersed recreation abounds within and adjacent to the project area involving hunting, sight-sightseeing, hiking, floating and horseback riding cross country in addition to the following designations;

Hurricane Creek Wilderness is immediately north of the project area across highway 123 Big Piney Creek Wild and Scenic River (portion within the project area and southern most Western boundary of the project)

Buzzard Roost Special Interest Area (SIA) in the northern half of the project area.

Wainscott Bottoms and Waldo Mountain SIA in the southwest portion of the project area

State designated Scenic 7 Highway and Forest designated Highway 123 Scenic Byway  
Developed Recreation Areas include Long Pool Campground and Day Use Area, Rotary Ann Road Side Rest Area and Moccasin Gap Campground and Trail system

Hunting for whitetail deer, squirrel and eastern wild turkey is a popular dispersed recreational activity in the general forested area. Evidence of dispersed camping can be found mostly from hunters, hikers or visitors seeking solitude with some sites 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 in passenger vehicles and ATVs, wildlife viewing and firewood gathering within the project area.

Equestrian use has a historical foundation within this area. Numerous local landowners ride throughout the project area on existing roads and cross country. Annually a local group sponsors

a competitive horse ride at Moccasin Gap under a Recreational Event Special Use Permit usually the third weekend in April. Participation's in this event consist of locals and the general public horse rider enthusiasts. The equestrian use and motorized use do clash at times creating use conflicts but these incidents are rare. Currently, horse use and motorized use have created paths (undesignated/unauthorized trails) located throughout the general forest and along old woods roads (not drivable in a passenger vehicle). These created paths can and are degrading the forest where a high/continual volume of traffic is occurring, adding to the issue of unmanaged recreation. The difference in the historical use and current use is that currently the paths being used are impacting the forest floor leaving a scar that is evident year round. This use will take more than one growing season to heal if use is eliminated. Most of the scarring from unmanaged use would recover in time if the use were stopped.

The effects 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. The environmental setting is characterized by physical and natural features as well as the amount of apparent modification from human activity. 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 three of the five ROS classifications with the following acres:

**Rural** approximately 257 acres associated with the community of Treat

**Roaded Natural** approximately 28,835 acres associated with the majority of the area along the main forest roads, the major drainages and ridges which include the highway that borders the project.

**Semi-primitive motorized** approximately 8,733 acres associated with the interior roads and areas that are more difficult to assess including Wainscott bottoms and Waldo Mountain Special Interest areas

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, 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. Evidence of vegetation management is acceptable because treatments are relatively short-lived, 3-5 years.

The majority of the project is predominately older than 80 years old (73%). Several environmental events have happened in this project area which has shaped the visual landscape such as red oak borer infestation, tornados, ice damage and landslides. This resulted in a shift from more uniform canopy to a broken more open canopy with stressed and dying trees creating the appearance of a damaged forest. The broken canopy has allowed more light to reach the forest floor producing an increase in understory vegetation. These events have created an unsightly brushy condition which limits viewing opportunities.

The RLRMP (pg. 2.20) priorities 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 6 with 1 representing high public value and 6 as moderate/low public value which usually is found in unseen areas. A landscape architect was consulted as per FS Standard 110 found on page 3-15 of the RLRMP. The Landscape Architect's site specific project designs are incorporated in this EA and can be viewed on page II-16 – II-18.

The management area combined with the scenic class numbers identifies the Scenic Integrity Objectives for the High Mountain Project which is 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. For this project (10,709 acres or 29%) The foreground and middle ground along Scenic Highway 7 and Maupin Flat Road to the community of Treat and most lands adjacent to private property are designated with a high Scenic Integrity objective

\***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. For this project (22,312 acres or 61%) The remainder of the watershed is intermingled with Low scenic class within the middle and back ground along interior roads, west project boundary and northern portion of Maupin Flat Road and Indian Creek road.

\***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. For this project (3,482 acres or 9.5%) The remainder of the watershed is intermingled with Moderate scenic class within the middle and back ground along interior roads. The areas designated as low Scenic Integrity objective are seldom visible /unseen except by an occasional visitors hiking or riding through the back country.

The analysis area is forested. Sight-seeing is limited along the state highways and gravel roads because the terrain and the vegetation offer little opportunity of vistas with the exception of Rotary Ann Rest Area, and the Big Piney Overlook off of the Maupin Flats Road (Dover Lights).

Areas that have been previously prescribed burned also allow a greater sight distance for viewing.

Table below shows Scenic Integrity Objectives (SIO) by Management Area showing the Objectives of High, Moderate, and Low scenic classes can be found in the RLRMP Appendix G. The table below shows the distribution of the SIO by Management Areas within the project.

**Scenic Integrity Opportunity Table**

Management Areas	Inventoried Scenic Class				
	1	2	3	4	5-6
	Scenic Integrity Objectives				
1.C Designated Wild and Scenic Rivers	High	High	High	High	High
1.G. Special Interest Areas	High	High	High	Low	Low
1.H. Scenic Byway Corridors	High	High	High	High	High
2.C. Developed Recreation Areas	High	High	Moderate	Moderate	Moderate
3.B Oak Woodland	High	Moderate	Low	Low	Low
3.E. High Quality Forest Products	High	Moderate	Low	Low	Low
3.I Riparian Corridors	High	High	Moderate	Low	Low

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 Management 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.

The general landscape character of the area is predominately a mature closed forest canopy with the exceptions of areas where natural events (ice storms, tornados, red oak borer infestation, landslides and general decline due to age of the forest) along with pastures and openings on private property. The RLMP has classified the scenic value for the majority of the project as moderate to high. It should be understood that Forest Plan mapping was completed using a “broad brush” approach and was mapped at a large scale over the entire Forest.

In the case of Scenic Integrity Objectives (SIOs) Forest Plan mapping was based on foreground and middle ground from existing roads without consideration of topography, vegetation or the amount or type of traffic the roads received. The Forest Plan mapped many areas as “seen or unseen” but did not include factors such as, terrain, viewer positions, vegetative screening or frequency or type of traffic etc. that are considered at the project level. For that reason areas may

be identified as scenic level high that is located in unseen areas; these areas would receive standard project designs to achieve a more acceptable visual composition. Other areas in seen locations would each be identified with specific measures as needed based on the desired future conditions of the management area and scenic level. A map showing SIOs is contained in the process file at the Jasper office.

## **Proposed Action and Alternative 2**

The difference between the recreational and visual impacts of the proposed action and alternative 2 is negligible so the effects were analyzed together.

### Direct/Indirect Effects

#### Recreation

The proposed vegetation management activities include practices such as, tree cutting, skid trails, temporary road construction, slash, etc. which would have a direct negative effect on the recreational setting, but the activities would not exceed the current ROS classifications, see definitions above. The current classification for Roaded Natural and Semi primitive motorized expects forest visitors to encounter resource utilization while traveling Forest Service roads, hunting or while cross country hiking. Impacts are expected to be short-lived three to five years with an increase in non-recreational human activity. Indirectly, the areas where vegetation management activities take place could experience a temporary reduction in recreational use. Vegetative treatments have been implemented over the years within the vicinity. However, the amounts of activities proposed are higher due to management direction to manage on a watershed scale, seeking to improve overall conditions of the forested areas. An example of this follows; the vegetative treatments would produce younger trees, reduce unsightly brushy conditions, create wildlife viewing opportunities, improve forest health by reducing competition for food and sunlight, and in general enhance the visitors' recreational experience. These increased viewing opportunities would take place where ever vegetative management occurs and be available to visitors along roads, portions of the Moccasin Gap Trails, OHV routes, and cross country riding or hiking.

Forest Service open roads 93691M and 93691A have been closed and removed from the OHV designated routes map due to resource damage and safety concerns which includes steep grades, severely eroded roadbed and an entrenched road template (site visit fall of 2011). The above roads which access Buzzard Roost Special Interest Area from the east would remain closed and the two roads would be stabilized for resource protection. In order to ensure public access to Buzzard Roost SIA, the PA and Alternative 2 both propose access from the west which includes construction of up to 2 parking areas just outside the SIA boundary. The first priority is to seek Rights of Ways along an existing road that crosses two different land owners' properties. If that fails, then the Forest Service would construct two parking areas at either end of 1.5 miles of an OHV trail to ensure access to Buzzard Roost. The objective is to provide adequate network of trails and OHV routes that would move us closer to meeting the public need for motorized recreational access to a point of interest but stop short of having motorized access across Buzzard Roost that was traditionally used.

Additional activities proposed to improve recreational opportunities are to construct and designate 1.5 miles of new trail, realign 1.7 miles of trail and decommission and rehabilitate 3.3 miles of existing trail within the Moccasin Gap trail system. This need was identified by trails

specialists conducting trail inventories in 2009-2010. The goal is to establish trails in more sustainable locations providing for safer riding conditions while creating more manageable trails that would better protect the resources while improving the recreational experience.

The PA and Alternative 2 would close OHV route FS Road 1803 to OHVs from a safety standpoint. The route is an attractive enticement for OHV users to ride on the paved road from Long Pool Campground to the designated route. OHV owner's manuals state that OHVs are not designed for use on paved roads, and OHVs are unstable when used on paved roads. The concern is that the campground access road is a paved road which is narrow with many limited sight distances this creates a safety hazard for OHV users and passenger vehicles.

Also, the program manager and forest visitors expressed the need to improve hiking opportunities within the vicinity of Long Pool Campground and Day Use Recreation Area. The Proposed Action and Alternative 2 would construct a 2.5 miles loop trail in the area of Long Pool Campground enhancing (positive effect) the variety of activities and settings. The hiking trail would go through portions of the areas listed below. The recreational effects disclosed below are based off of past vegetative management activities observed such as; commercial thinning and timber stand improvement, which have taken place within other projects on the district. The trail would be located within all or portions of; area numbers 34, 140, & 216 which fall within the Big Piney Scenic River corridor. These areas would be commercially thinned (except 216 which would receive a chemical timber stand improvement treatment for alternative 2 the treatment would be mechanical) once and prescribed burned multiple times. Page 2-37 of the RLRMP under Scenic sections of Wild and Scenic Rivers ,desired conditions, states "management of vegetation is permitted within the river corridor to maintain outstandingly remarkable values. Vegetation management may be used for scenic enhancement or rehabilitation to provide wildlife viewing opportunities; ". It can be expected access to the above areas would be limited during the life of the operation, up to three years. The limited access would create a direct temporary negative effect on recreation. Recreational use would increase after operations are complete due to the area being more open and accessible (skidder trails, temporary roads). This would be an indirect positive effect as the slash decomposes and exposed areas are re-vegetated. Area 216 would have similar effects as the commercial thinning but without the impacts associated with heavy mechanical machinery.

The prescribed burn proposed in the area of Long Pool Campground would take place in part of area numbers 34, 140, and 216. The trail would be utilized as a control line on portions of the prescribed burn that's within the scenic river corridor. Access into the area would be limited temporarily (negative effect) during implementation and until prescribe burn personnel deem it is safe for the public. The initial burn would have a negligible negative effect on recreational users since it would be associated with the other above treatments which has a greater degree of impacts. The burn would assist in deterring undergrowth and allowing more access to part of the river corridor. The above vegetative treatments would promote and enhance the recreational remarkable values for which the scenic river was designated by improving the scenic quality.

Also, construct gates for closures into Long Pool Recreation Area in case of emergencies such as landslides, floods, etc. The first set of gates would be in a location where the public could turn around before reaching the entrance to the recreation area. The second set would be at the entrance to the recreation area.

Commercial surface rock collection would be allowed in areas which have activities proposed and an abundance of rock, but would not be allowed on more than 1 percent of the project area, within the Scenic River Corridor, or inside any SIAs. Based off of my (Terrell Hope) experience inspecting rock contracts and timber sales, the effects of rock collection on recreation are less than timber harvest activities and while the effects to recreation are negative (unsightly where skid steer type vehicles mash down understory vegetation and move leaf litter) this would only be a temporary condition until the vegetation in an area where collection has taken place recovers, generally one growing season.

Other areas within the Scenic River corridor receiving thinning treatments are; area numbers 35, 138, 147, 153, and portions of 42 and 155 may be in the corridor. These areas would have similar effects as above but the areas are located in more isolated portions of the project area. The effects of treatments on other resource areas that occur within the Big Piney Scenic River Corridor and the general forest such as vegetation, soil, air, water, etc. are incorporated within their appropriate environmental effects section.

#### Cumulative Effects

The project area has similar natural activities occurring due to storm damage, red oak borer infestation, opening roads that previously limited access from a passenger vehicle therefore, these proposals would increase the overall managed recreational experience by opening more roads temporarily (life of timber sales) providing more opportunities for hiking and riding, which is within the niche that has been identified for the district which is primarily day use activities. Commercial surface rock collection would have no lasting effect on recreation as the area where rock has been collected generally heals over within one growing season. Overall recreational impacts from timber, wildlife, prescribed burning, and recreational construction would be limited to the life of the activities implementation, usually a contract life of three years or less, and the response time of vegetation after treatment would be an additional three years for re-vegetation of soil disturbed area or for remnants of the treated area to noticeability respond. The effects of treatments on other resource areas such as vegetation, soil, water, etc. that occur within the Big Piney Scenic River Corridor and the general forest are incorporated within their appropriate environmental effects section.

The area immediately to the south and west of the High Mtn. project is currently being inventoried for vegetation management at some point in the future. However, no specific proposals have been identified at this time. The same types of activities are anticipated with similar effects expected as in this project; however these would occur in a lower recreational sensitivity level.

#### Direct/Indirect Effects

##### Scenery

The proposed action and alternative 2 would increase temporary direct negative effects on the aesthetic and scenic quality in the area where activities are proposed. During implementation, and for a period of a few years after, the area of the proposed activities could look visually unappealing. Site specific project designs have been developed by a Landscape Architect and those designs are included in this analysis in chapter II under "H" site specific project designs.

Additionally, they would be included in the decision if the proposed action or alternative 2 are chosen. The site specific project designs would minimize the negative visual effects from the proposed activities.

Indirectly, with up to 1/3 of the total project area having activities proposed, fewer visitors may visit the area due to an increase in vegetation management work taking place within this project area. Visitors who do visit the area where activities would take place might not return for some time if they perceive the management activities as visually negative. The site specific project designs would minimize many of the negative visual effects by modifying the treatment areas so they would have smoother transitions and feathering in areas which have high visibility. The activities proposed would produce younger trees, reduce unsightly brushy conditions created by natural events such as ice storm damage, insect infestation, straight wind events and tornados, create wildlife viewing opportunities, improve forest health by reducing competition for food and sunlight, and enhance the visitors' visual experience. These increased viewing opportunities would be available along roads, portions of the Moccasin Gap Trails, OHV routes, and cross country riding or hiking. Noticeable deviations in the above management areas would be present.

Commercial surface rock collection could have a temporary negative effect on scenic quality within specific activity areas but no more than 1 percent of the project area would be approved for this. No indirect effects on the scenic quality would occur if commercial surface rock collection is allowed since the effects to the area are less than vegetative treatments and would be within proposed activity areas. Visually the activities' impacts would begin to lessen as vegetation growth cover disturbed areas. Based off my past experience inspecting rock contracts and timber sales it takes approximately three years after implementation (once treated area is vegetated) before the visual effects become negligible. As the contrast in vertical and horizontal vegetation lessens, the impacts would be minimized by degrees. The degree of visual impact would vary depending on the degree of change from the existing conditions. Example; thinning area would have less effects on visuals since the treated area would maintain the majority of its original composition limiting recovery to three to five years. Conversely, a shelter-wood regeneration treatment, would have the majority of the trees removed requiring a time frame of thirty to forty years to achieve a similar composition of the currently existing area based off past experience with similar sites and treatments. Visually the area would be re-established within three to ten years.

The Proposed Action and Alternative 2 would both receive commercial thinning, prescribed burning and chemical timber stand improvement within all of area 34 and a portion of 140 and 216 (216 would receive mechanical if alternative 2 is chosen) inside of the Big Piney Scenic Corridor that are visible from the stream and access road to Long Pool Recreation Area. Also the trail that would be located at Long Pool is within these stands to be thinned and burned. The thinning would have a short term negative visual effect for approximately three years until the slash partially decomposes and exposed areas have re-vegetated. The burning also has a temporary negative visual effect lasting until spring green up or re-growth. Additionally, areas 35, 138, 147,153 and portions of 42 and 155 proposed to be thinned are within the Scenic River corridor. These areas are more isolated and not often seen by the general public visiting due to locations that are not easily accessible. The above treatment areas are blocked by terrain or other vegetation limiting any direct effects on scenic quality. The effects of vegetative treatments would enhance the scenic quality by increasing sight distances and promoting the development of hardwood mid-story within the Loblolly Pine stand, area 35, that's visible along the creek and

access road to Long Pool. In this area a multi-layer canopy would be created by removing a percentage of the pines which would allow the understory and mid-story hardwoods to develop increasing the scenic value.

The effects of treatments on other resource areas such as vegetation, soil, water, etc. that occur within the Big Piney Scenic River Corridor and the general forest are incorporated within their appropriate environmental effects section.

#### Cumulative Effects

The project area already has similar types of natural activities occurring due to storm damage, red oak borer infestation in the vicinity, therefore the potential negative effects from the proposed action and alternative 2 would be a temporary condition as the management activities are completed and the vegetation regrows. Any negative visual effects become less evident as each growing seasons pass and the vertical and horizontal contrast lessen. These impacts would be lessened by site specific project designs (II-16 – II-19 of this EA) to help meet the management directions of the Forest Plan Scenic Integrity Objectives, minimizing the impacts associated with the various vegetative treatments proposed.

There would be no cumulative effects of commercial surface rock collection on scenic quality within proposed activity areas since the impacts are less than those any timber harvesting or wildlife stand improvement activities. The area immediately to the south and west of the High Mtn. project is currently being inventoried for vegetation management at some point in the future. However, no specific proposals have been identified at this time. The same types of activities are anticipated with similar effects expected as in this project; however these would occur in a lower visual sensitivity level.

### **Alternative 1 – No Action**

#### Direct/Indirect Effects

No management would be proposed. The amount of trails and OHV would remain the same as they are currently. The public demand for a variety of activities and settings would stay the same with no new designation of trails or OHV routes. Safety issues would still be addressed as they are found, but resource issues of poorly located trails and routes would remain unchanged. Visually, the general landscape character of the area would remain the same, predominately a mature closed forest canopy, with the exceptions of broken canopy areas where natural events such as, ice storms, tornados, red oak borer infestation, landslides with an appearance of a general forest decline due to age. The demands for enhancement or additional recreational needs would remain the same and unaddressed. Such as, the areas within the scenic corridor in the vicinity of Long Pool would go unaltered.

#### Cumulative Effects

The overall objective to provide adequate network of trails, OHV routes and a variety of activities and settings that fall within the District's niche would not be met nor are there any increase or movement toward meeting the demands of the public.

The project area already has similar natural activities occurring due to storm damage, red oak borer infestation, therefore the potential negative effects already exist and is a temporary condition as the management activities are completed and the vegetation grows.

Approximately 73% of the High Mountain Project Area's Trees are 80 years old or older (see age class distribution table on page III-26 in this document). For the majority of the management areas within this project the RLRMP recommends harvest rotations of between 80 to 110 years. The only exception is for shelter-wood with reserves and its recommended rotation is 120 to 140 years. The visual impacts in this area of mature trees are at a greater risk of dying from natural events similar to recent past events, such as; red oak borer infestation of 2000, the ice storm in 2009 or the present exceptional drought currently in 2012. At some point those trees could die, and if 73% of the trees in this project area die or are overcome by insects or disease within a few years of each other, then visually, that would have a dramatic negative effect on the visual quality in this project area.

The Big Piney River Scenic corridor would remain the same/unaltered without responding to the identified needs to enhance the recreational or scenic quality.

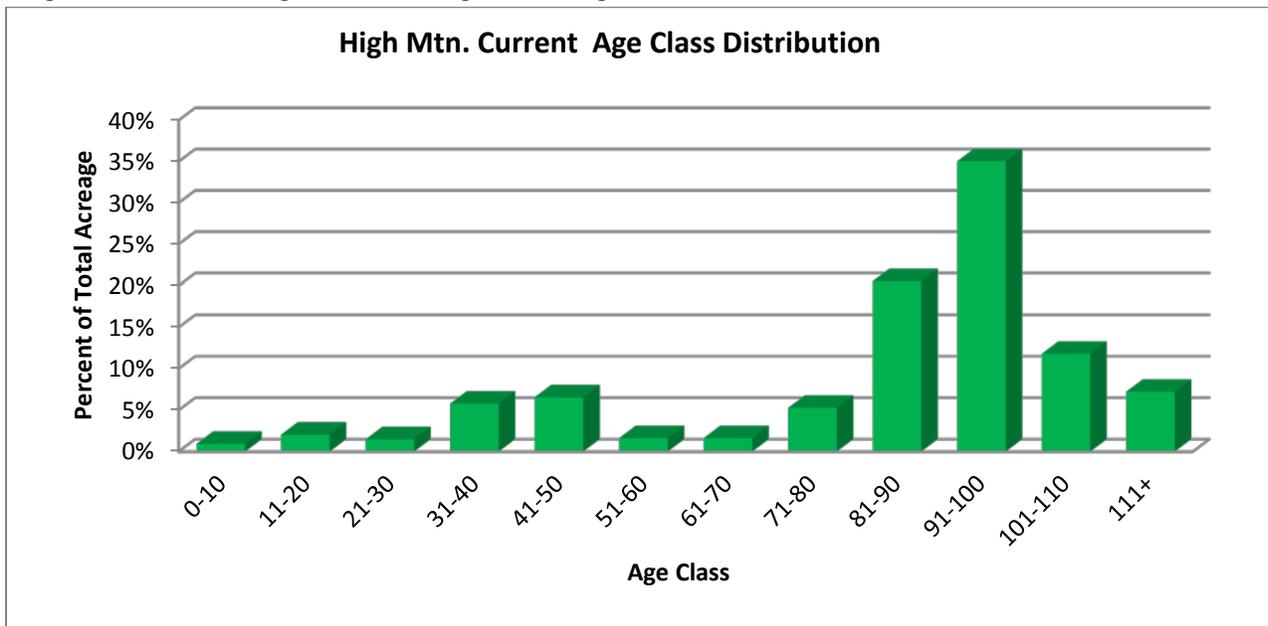
The area immediately to the south and west of the High Mtn. project is currently being inventoried for vegetation management at some point in the future. However, no specific proposals have been identified at this time. The same types of activities are anticipated with similar effects expected as in this project.

## **E. Vegetation**

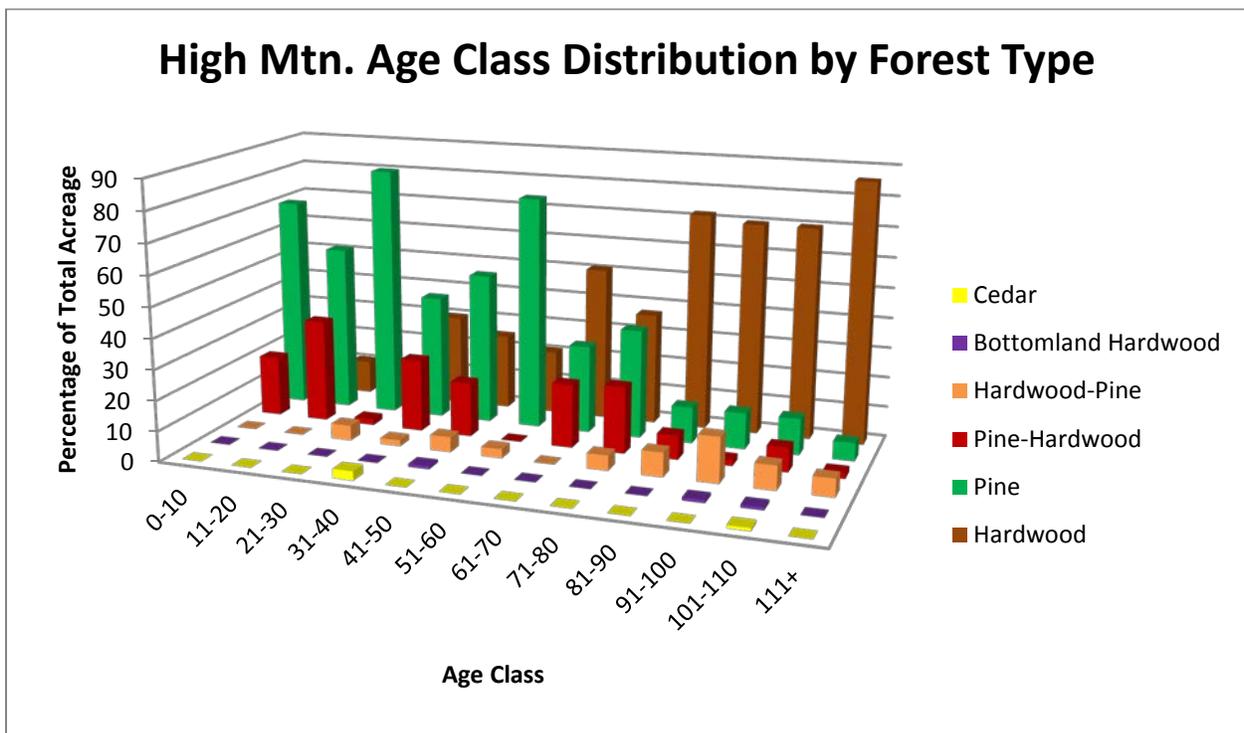
### **Existing Conditions**

The High Mountain project area is primarily located within the two HUC-12 watersheds identified as Indian Creek-Lower Big Piney Creek (111102020802) and Moccasin Creek-Lower Big Piney Creek (111102020801). A portion of the southwest corner of the project area falls within the Mill Creek-Big Piney Creek (111102020804) HUC-12 watershed. This project area encompasses approximately 37,826 acres of Forest Service and privately owned lands. Private or other non-Forest Service lands comprise approximately 1,278 acres while Forest Service lands comprise approximately 36,547 acres. Some acres in the vegetation effects section may have minor discrepancies with those in the proposed action, due to the following factors. From February through August of 2011, Forest Service personnel conducted an inventory of current stand conditions on Forest Service lands within the High Mountain project area. Data collected included information on current stocking levels, tree species, height, and diameter, forest type, and stand age. The data was then incorporated into GIS where it was utilized to delineate stand boundaries and analyzed in order to determine different stand and forest characteristics. The characteristics obtained from analysis of the stand inventory data was also used to aid in the development and prioritization of silvicultural treatments. Forest types present on Forest Service lands include: cedar at 92 acres, pine forest at 7,547 acres or 21%, pine/hardwood forest at 3,140 acres or 9%, hardwood forest at 22,177 acres or 61%, hardwood/pine forest at 3,374 acres or 9%, and bottomland hardwood at 213 acres or less than 1%. Figure 1 illustrates the age class distribution across all forest types present within the High Mountain project area, while Figure 2 and Table 1 illustrate the current age class distribution present across each forest type.

Vegetation section Figure 1 showing current age class distribution



Vegetation section Figure 2 table showing current age class distribution by forest type



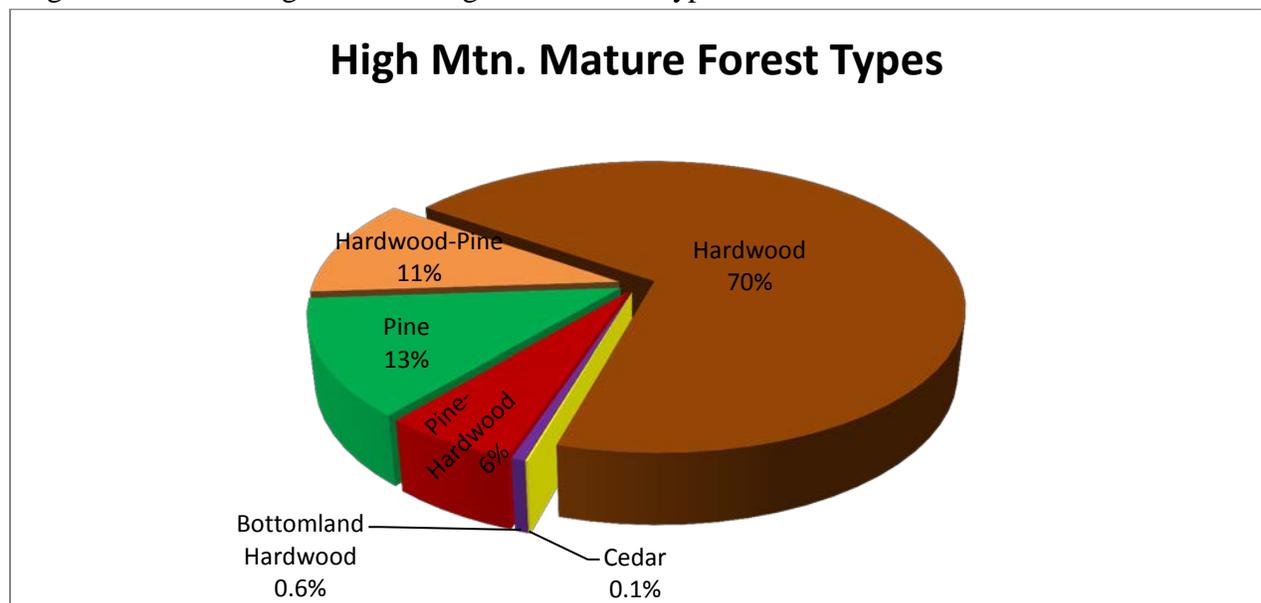
Vegetation section Table 1 Showing Current age class by species

Age Class			Forest Type <sup>1</sup>																	
			Cedar			Bottomland Hrwd			Pine			Pine-Hardwood			Hardwood			Hardwood-Pine		
Years	Acres	% of Total	Acres	% of Type	% of Total	Acres	% of Type	% of Total	Acres	% of Type	% of Total	Acres	% of Type	% of Total	Acres	% of Type	% of Total	Acres	% of Type	% of Total
0-10	345	1%	0	0%	0%	0	0%	0%	242	3%	70%	70	2%	20%	33	0.1%	10%	0	0%	0%
11-20	749	2%	0	0%	0%	0	0%	0%	414	5%	55%	256	8%	34%	79	0.4%	11%	0	0%	0%
21-30	542	1%	0	0%	0%	0	0%	0%	452	6%	83%	10	0%	2%	55	0.2%	10%	25	1%	5%
31-40	2,118	6%	61	66%	3%	0	0%	0%	875	12%	41%	505	16%	24%	632	3%	30%	45	1%	2%
41-50	2,398	7%	0	0%	0%	34	16%	1%	1,201	16%	50%	438	14%	18%	603	3%	25%	122	4%	5%
51-60	596	2%	0	0%	0%	0	0%	0%	457	6%	77%	0	0%	0%	124	1%	21%	15	0%	3%
61-70	598	2%	0	0%	0%	0	0%	0%	171	2%	29%	124	4%	21%	303	1%	51%	0	0%	0%
71-80	1,929	5%	0	0%	0%	0	0%	0%	685	9%	36%	434	14%	22%	710	3%	37%	100	3%	5%
81-90	7,506	21%	0	0%	0%	0	0%	0%	885	12%	12%	618	20%	8%	5,416	24%	72%	587	17%	8%
91-100	12,806	35%	0	0%	0%	128	60%	1%	1,478	20%	12%	295	9%	2%	8,931	40%	70%	1,974	59%	15%
101-110	4,313	12%	31	34%	1%	51	24%	1%	533	7%	12%	339	11%	8%	3,013	14%	70%	346	10%	8%
111+	2,643	7%	0	0%	0%	0	0%	0%	154	2%	6%	51	2%	2%	2,278	10%	86%	160	5%	6%
<b>Total Forested</b>	<b>36,543</b>	<b>100%</b>	<b>92</b>		<b>&gt;1%</b>	<b>213</b>		<b>1%</b>	<b>7,547</b>		<b>21%</b>	<b>3,140</b>		<b>9%</b>	<b>22,177</b>		<b>61%</b>	<b>3,374</b>		<b>9%</b>

<sup>1</sup>- Pine Forest Type: At least 70% of the dominant and co-dominant crowns are softwoods.  
Pine/Hardwood: 51-69% of the dominant and co-dominant crowns are softwoods.  
Hardwood/Pine: 51-69% of the dominant and co-dominant crowns are hardwoods.  
Hardwood: At least 70% of the dominant and co-dominant crowns are hardwoods.

The most predominant age class across the project area is the 91-100 year age class. At 12,806 acres it comprises 35% of the total forested area within the project area. Approximately 29,197 acres or 80% of the stands within the project area are considered mature (older than 70 years of age). Of these 29,197 acres approximately 20,348 acres or 70% are mature growth hardwood types; 3,167 acres or 11% are mature hardwood/pine forest types 3,735 acres or 13% are mature growth pine types; 1,737 acres or 6% are mature pine/hardwood forest types; 179 acres or less than 1% are bottomland hardwood forest types; and 31 acres or less than 1% are mature growth cedar forest types. Currently, there are approximately 55 acres or approximately 0.2% of the forested lands that are considered to be in the early seral 0-10 year age class. Forest health and stand vigor is declining or at risk due to advanced stand age and overcrowding or densely stocked stands (Gouldin, 2011, Haavik et al, 2012). Figure 3 illustrates the mature forest type distribution.

Vegetation section Figure 3 showing mature forest types



Most stands proposed for silvicultural treatment have an average basal area ranging from 90 to 130 square feet per acre. The stand conditions are predominately immature poletimber, immature sawtimber, and mature sawtimber. The current high stocking levels increase competition for available sunlight and nutrients. This competition reduces the amount of nutrients available to individual trees and reduces their ability to defend against attacks by insects or disease. This creates an unhealthy forest environment and leaves portions of the forest susceptible to attacks by insects, diseases, wildfire, and weather.

Within the project area, oak-hickory stands tend to occur on north-facing slopes above 35% and along stream courses. The midstory and understory components on these stands are typically comprised of flowering dogwood, red maple, eastern hophornbeam, and blackgum. The midstory and understory species composition on north aspects less than 35% typically includes flowering dogwood, vacciniums, rusty blackhaw, and witch hazel.

Pine timber types are typically found on the southern aspects. Their midstory and understory associates include oaks, hickories, flowering dogwood, blackgum, and vacciniums. Species often found on ridge tops include grasses, forbs, serviceberry, blackjack oak, and hickories.

**Non-Native Invasive Species (NNIS).** An invasive species is identified as “[a] species that can move into an area and become dominant either numerically or in terms of cover, resource use, or other ecological impacts. An invasive species may be either native or non-native” (USDA-Forest Service 2005a p. 132; USDA-Forest Service 2005b p. 172). Several non-native invasive plant species have been identified throughout the project area. These species include shrubby Lespedeza (*Lespedeza bicolor*), Chinese Lespedeza (*Lespedeza cuneata*), Royal Paulownia- (*paulownia tomentosa*), Japanese privet (*Ligustrum japonicum*), Japanese Honeysuckle

(*Lonicera japonica*), Nonnative Rose (*Rosa multiflora*), Mimosa (*Albizia julibrissn*), and Japanese stiltgrass (*Microstegium vimineum*).

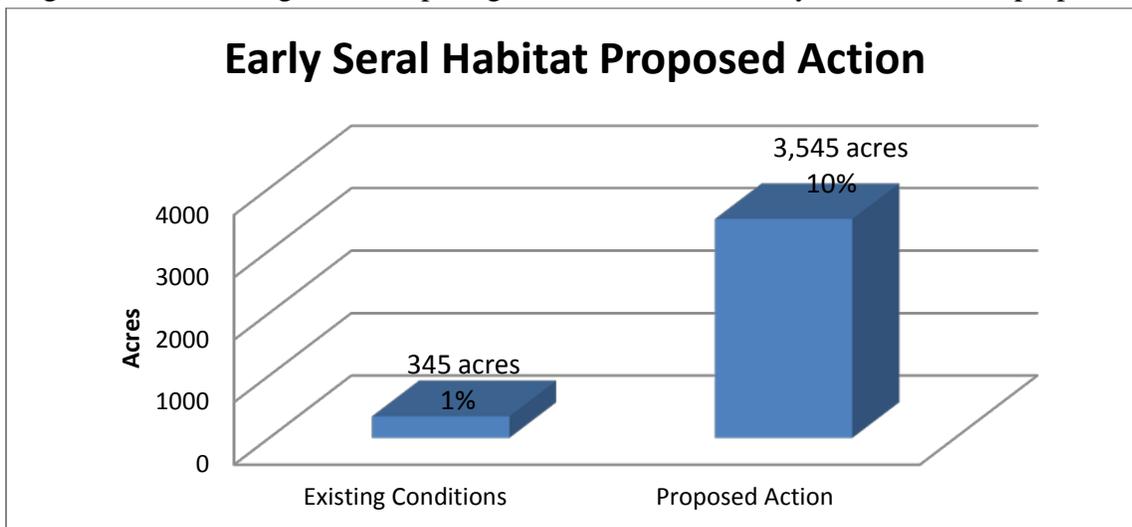
### **Effects of Management Activities on Early Seral Habitat**

#### **Proposed Action**

##### Direct Effects:

The amount of early seral habitat within the project area would increase by approximately 3,200 acres (from 1% to 10%) through regeneration harvests, managing existing wildlife openings, enlarging existing wildlife openings, construction of new wildlife openings, and reforesting existing wildlife openings. (Figure 3).

Vegetation section Figure 3 comparing current amount of early seral habitat to proposed action



The proposed prescribed burns and field management activities under the PA would reduce the new growth and establishment of woody vegetation and maintain existing early seral habitat within the project area.

##### Indirect Effects:

Under the PA, approximately 3,200 acres of new early seral habitat would be created from the proposed actions. Over time, the 2,743 acres of proposed regeneration harvests and 49 acres of reforesting existing wildlife openings would continue to grow into older age classes, and the amount of early seral habitat available would be reduced. However, the 75 acres of opening construction, 11 acres of existing opening maintenance, and 330 of opening enlargement would continue to be maintained in the 0-10 year age class. This would serve to maintain the amount of early seral habitat over time.

By reducing the stand density, the forest floor would receive the required sun light for the germination and establishment of the early seral community. With the reduction of the possible fuel loading, the risk for catastrophic wildfires is reduced. Prescribed burns, repeatedly on 3-5 year cycles, would retain a grass, forbes, and brushy understory.

Cumulative Effects:

In the spring of 2011 a tornado passed across the Ozark National Forest damaging approximately 959 acres of forest land. Damage in the path of the tornado ranged from light to severe. Within the High Mountain Project Area, approximately 31 acres of the severely damaged lands were salvaged and replanted. The 31 acres salvage operation increased the amount of early seral habitat by a small amount, less than 0.1%. These acres would only temporarily increase the amount of early seral habitat until the regenerated stands grow out of the 0-10 year age class. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities that would affect age class structure are expected to occur. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

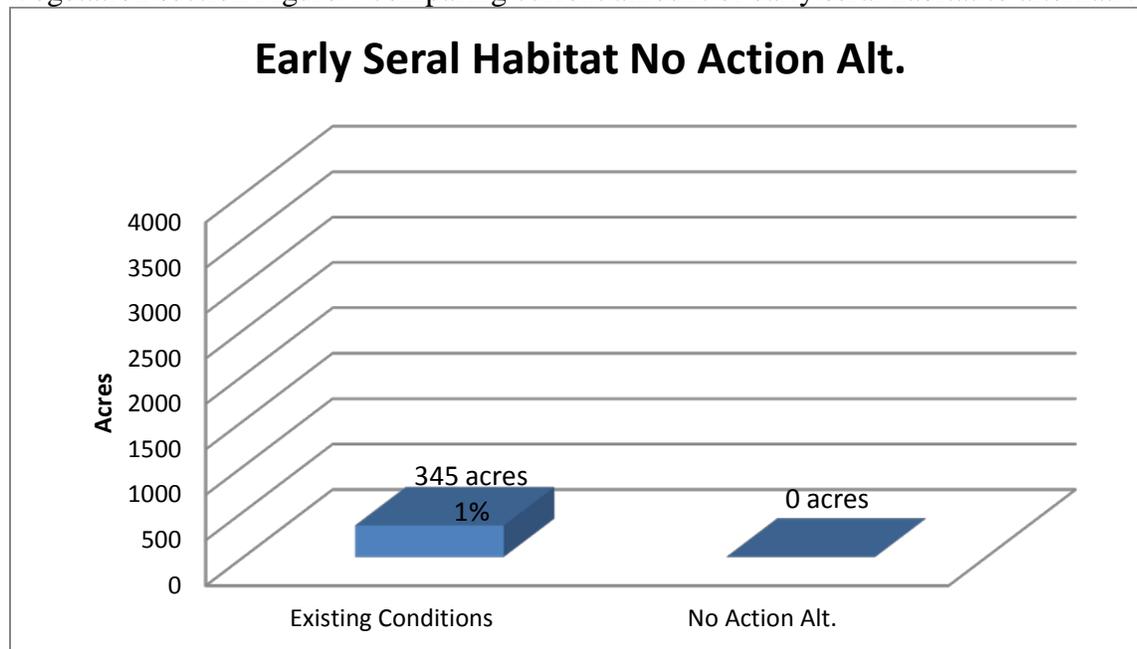
With repeated prescribed burning, existing early seral habitat would be retained over time. Forest pests usually attack older, weaker trees, and are less damaging to trees that are growing vigorously. Increased stand vigor would result in increased resistance to forest pests such as Southern pine beetle.

**Alternative 1: No Action**

Direct Effects:

Alternative 1 proposes no management actions that would result in the creation of additional early seral habitat within the project area (Figure 4). No direct effects to early seral habitat would occur.

Vegetation section Figure 4 comparing current amount of early seral habitat to alternative 1



Indirect Effects:

In the absence of fire or other vegetation management activity, trees and other woody vegetation would grow in and shade out existing early seral habitat. The absence of management activities such as thinning and regeneration harvests would put overall forest health at risk. Stands would continue to grow and increase existing stocking levels. As stocking increases competition for resources such as light, water, and nutrients increase. The increased competition for resources strains trees and leaves them susceptible to insects such as the Southern pine beetle and diseases by reducing their ability to fight off attacks. Further increases in stocking levels would lead to density dependent mortality. This is the point at which competition for resources is so great that trees begin to die

Cumulative Effects:

Under this alternative, the proposed management activities would not occur. As discussed in the indirect effects section, there is a potential for trees and other woody vegetation to take over existing early seral habitat. The 31 acres salvage operation increased the amount of early seral habitat by a small amount, less than 0.1%. These acres would only temporarily increase the amount of early seral habitat until the regenerated stands grow out of the 0-10 year age class. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities that would affect age class structure are expected to occur. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

Over time, without the implementation of the proposed vegetation management activities, the amount of trees and other woody vegetation would increase and the area of land in early seral habitat would decrease. Forest health and stand vigor would continue to decline.

**Alternative 2: No Herbicide Use**

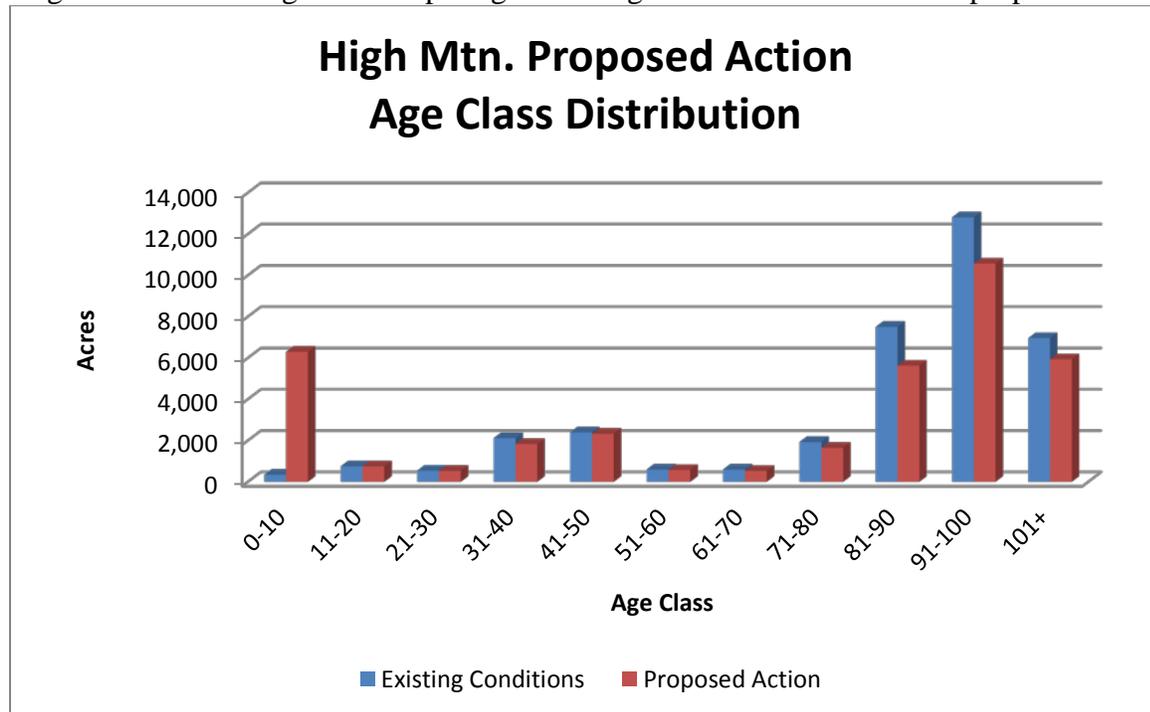
For this alternative, the direct, indirect, and cumulative effects would be the same as those listed under the proposed action. The proposed vegetation management activities would still be implemented for this alternative utilizing manual methods instead of the use of herbicides.

**Effects of Management on Age Class Diversity**

**Proposed Action**

Direct Effects:

Approximately 10 acres of the 21-30 year age class, 197 acres of the 31-40 year age class, 67 acres of the 41-50 year age class, 14 acres of the 51-60 year age class, 52 acres of the 61-70 year age class, 141 acres of the 71-80 year age class, 964 acres of the 81-90 year age class, 1,185 acres of the 91-100 year age class, and 523 acres of the 100+ year age class of pine and hardwood forest types, 3,153 acres total, would shift to the 0-10 year age class through the even-aged regeneration harvests, new wildlife opening construction, and expansion of existing wildlife openings (Figure 6). In addition, 11 acres from existing wildlife opening maintenance and 49 acres of reforesting old existing wildlife openings would be returned to earlier age classes. Vegetation section Figure 6 comparing current age class distribution to the proposed action



#### Indirect Effects:

The proposed actions would increase age class diversity by shifting 3,213 acres across several age classes to the 0-10 year age class through regeneration harvests, construction of new wildlife openings, expansion of existing wildlife openings, maintenance of existing openings, and reforesting existing openings. Overall forest health and vigor would be increased. Younger age classes tend to exhibit more vigorous growth while increased age class structure and diversity helps limit any disease or insect attacks that occur because of the differences in stand structure and composition.

#### Cumulative Effects:

The 3,213 acres of regeneration harvests, construction of new wildlife openings, and expansion and management of existing wildlife openings associated with the proposed actions combined with the 31 acres salvage operation would increase age class diversity across the entire project area by shifting mature age classes to the 0-10 year age class by a total of 3,244 acres over current conditions. Overall forest health and vigor would be increased. Younger age classes tend to exhibit more vigorous growth while increased age class structure and diversity helps limit any disease or insect attacks that occur because of the differences in stand structure and composition. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities that would affect age class structure are expected to occur. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

### **Alternative 1: No Action**

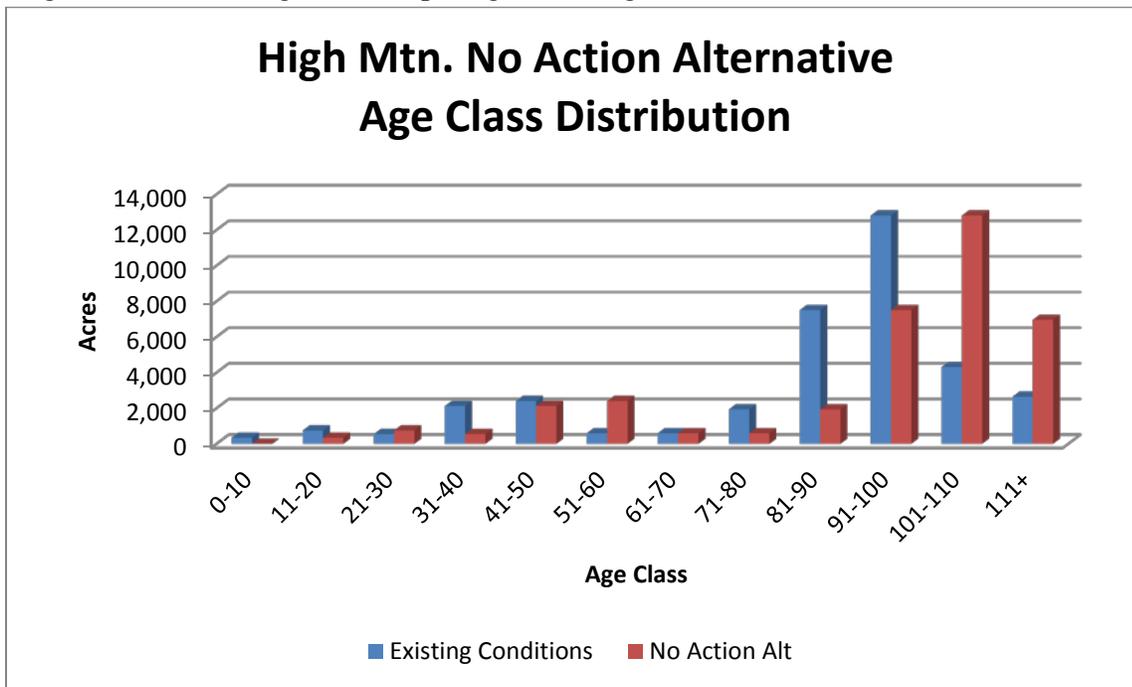
#### Direct Effects:

No activities are proposed under this alternative, therefore there would be no direct effects to age class structure within the project area.

#### Indirect Effects:

Younger age classes tend to exhibit more vigorous growth while increased age class structure and diversity helps limit any disease or insect attacks that occur because of the differences in stand structure and composition. In the absence of management activities or natural disturbances, through time the current age classes would retain the same distribution in relation to one another, but the distribution would be increasingly skewed to the older age classes as depicted in Figure 7. This would reduce overall Forest health and vigor.

Vegetation section Figure 7 comparing current age class distribution to alternative 1



**Cumulative Effects:**

Under this alternative, the proposed management activities would not occur. As discussed in the indirect effects section, increased age class diversity leads to increases in the overall forest health and vigor. The only management actions known or expected to occur is the 31 acres of tornado salvage operations. These acres would only temporarily increase the amount of early seral habitat until the regenerated stands grow out of the 0-10 year age class. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities that would affect age class structure are expected to occur. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

Over time, without the implementation of the proposed vegetation management activities, the current age classes would retain the same distribution in relation to one another, but the distribution would be increasingly skewed to the older age classes. Forest health and vigor would continue to decline.

**Alternative 2: No Herbicide Use**

For this alternative, the direct, indirect, and cumulative effects would be the same as those listed under the proposed action. The proposed vegetation management activities would still be implemented for this alternative utilizing manual methods instead of the use of herbicides.

## **Effects of Management Activities on Mature Growth**

### **Proposed Action**

#### Direct Effects:

Currently there are approximately 29,197 acres or 80% of mature growth (older than 70) present within the High Mountain project area. Of the 29,197 acres, approximately 23,515 acres or 81% are comprised of mature growth hardwood forest types, approximately 5,472 acres or 19% are comprised of mature growth pine, approximately 179 acres or 0.6% are comprised of mature bottom land hardwood types, and approximately 31 acres or 0.1% are comprised of mature cedar forest types. Under the PA, approximately 2,813 acres of mature growth forest types would be reduced through regeneration harvests, managing existing wildlife openings, enlarging existing wildlife openings, construction of new wildlife openings, and reforesting existing wildlife openings

Where the activities would be performed, approximately 1,766 acres would be reduced on mature growth pine types and 1,047 acres would be reduced on mature growth hardwood forest types. This would reduce the amount of mature growth forest types across the project area to 72%.

#### Indirect Effects:

The mature growth would be reduced by approximately 2,813 acres or 8%. Overtime the younger age classed would continue to grow into older age classes, increasing the amount of mature growth present within the project area. By removing 8% of the current age structure from mature growth age classes to the 0-10 year early seral age class age class diversity is increased. As discussed under the Age Class Diversity section, increases to forest age class diversity and structure improves overall forest health and vigor because younger age classes tend to exhibit more vigorous growth while increased age class structure and diversity helps limit any disease or insect attacks that occur because of the differences in stand structure and composition.

#### Cumulative Effects:

Management activities under the PA would reduce the amount of mature growth pine forest age classes to 3,706 acres, and the amount of mature growth hardwood forest types to 22,486 acres. The previous tornado salvage operations which occurred within the High Mountain project area did occur on mature pine forest age classes. The reduction of an additional 31 acres of mature forest type would only constitute 0.001 % less mature forest age classes across the project area. As discussed under the Age Class Diversity section, increases to forest age class diversity and structure improves overall forest health and vigor because younger age classes tend to exhibit more vigorous growth while increased age class structure and diversity helps limit any disease or insect attacks that occur because of the differences in stand structure and composition.

Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities are expected to occur with these activities. Past and present gas well development has resulted in the clearing of 9.1 acres of mature and immature pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

### **Alternative 1: No Action**

#### Direct Effects:

No activities are proposed under this alternative, therefore there would be no direct effects to mature growth within the project area.

#### Indirect Effects:

Overtime, the current age classes would retain the same distribution in relation to one another, but the distribution would be increasingly skewed to the older age classes. The younger age classed would continue to grow into older age classes, increasing the amount of mature growth present within the project area. The disproportionate amount of mature and older age class structures would result in decreased forest vigor and increased susceptibility to insects, disease, and mortality.

#### Cumulative Effects:

Under this alternative, the proposed management activities would not occur. The previous tornado salvage operations which occurred within the High Mountain project area did occur on mature pine forest types. The reduction of an additional 31 acres of mature forest type would only constitute 0.001 % less mature forest types across the project area. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities are expected to occur with these activities. Past and present gas well development has resulted in the clearing of 9.1 acres of mature and immature pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

Overtime, the current age classes would retain the same distribution in relation to one another, but the distribution would be increasingly skewed to the older age classes. The younger age classed would continue to grow into older age classes, increasing the amount of mature growth present within the project area. The disproportionate amount of mature and older age class structures would result in decreased forest vigor and increased susceptibility to insects, disease, and mortality

## **Alternative 2: No Herbicide Use**

For this alternative, the direct, indirect, and cumulative effects would be the same as those listed under the proposed action. The age classes that comprise the mature status are generally not in direct competition with the understory or midstory vegetation.

### **Effect of Management Activities on Retention and Recruitment of Hardwoods**

#### **Proposed Action:**

##### Direct Effects:

Approximately 3,025 acres of proposed even-aged regeneration harvests, commercial thinning, or wildlife opening construction/enlargement would occur on hardwood forest types. These activities would remove hardwoods of poor form and condition, retaining those with a higher value in terms of seed production and overall health. These activities would also create canopy openings and disturb the forest floor. Following regeneration harvests, areas would be reforested, either naturally or artificially, to a minimum stocking level of 150 hardwood trees per acre within 3 years following harvest activities. The target stocking level is 250-350 hardwood trees per acre within 3 years following harvest activities (RLRMP, 2005, FW-11, p.3-2). Prescribed fire would remove litter from the ground surface, aiding in the germination of hardwood seeds. In regards to hardwood retention, dormant season burns do not kill the rootstocks of hardwood species. Top-killing could occur, but hardwoods often re-sprout.

##### Indirect Effects:

Approximately 253 acres or 1% of hardwood forest acres present across the High Mountain project area would be converted to open early seral habitat conditions through the construction of improved forage wildlife openings.

##### Cumulative Effects:

Previous tornado salvage operations occurred on pine forest types. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities are expected to occur with these activities. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

## **Alternative 1: No Action**

### Direct Effects:

No management activities would occur under this alternative. There would be no direct effects on the retention and recruitment of hardwoods.

### Indirect Effects:

Due to the lack of activities, the competing vegetation could suppress the growth and development of the hardwoods potentially resulting in a change in timber type from pine and oak to shade tolerant timber types such as red maple.

### Cumulative Effects:

Previous tornado salvage operations occurred on pine forest types. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities are expected to occur with these activities. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

## **Alternative 2: No Herbicide Use**

For this alternative, the direct, indirect, and cumulative effects would be the same as those listed under the proposed action.

## **Effects of Management Activities on Hard Mast Production**

### **Proposed Action**

#### Direct Effects:

Under the PA, approximately 3,025 acres or 8% of the project area would receive treatments that would reduce the overall stand density on hardwood forest types. Within these areas, selected hardwood and soft mast producing trees would be released from competition and would reduce competition, increase available sunlight, and through selection retain the best mast producers.

The removal of hardwoods during regenerative harvests would temporarily reduce the hard mast production. Thinning activities within the hardwoods forest types would decrease competition for light and nutrients, reduce canopy closure, and allow for crowns to expand. This would increase the residual trees capability to produce hard mast.

#### Indirect Effects:

Approximately 253 acres or 1% of hardwood forest types present across the High Mountain project area would be converted to open early seral habitat conditions through the construction or expansion of wildlife openings. This would eliminate hard and soft mast production on these areas. However, by reducing stocking levels through commercial thinning, woodland management, and TSI activities competition for available sunlight and nutrients would be reduced. Selective marking techniques would help to ensure that the best mast producers are retained. This would in turn, improve the health and mast producing capabilities of the remaining areas. Mast production could be reduced in the future from site preparation activities and release treatments on regeneration areas. Hardwood regeneration cuts are designed to propagate oak on the site thus insuring mast crops for the future.

#### Cumulative Effects:

With the increased health of the stands, their mast production would increase, allowing a greater number of seeds for regeneration. With this increased production, the surplus hard mast would be available for the deer, turkeys, and squirrels. These and other species are dependent on the hard mast production as a food source.

Previous tornado salvage operations occurred on pine forest types. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities are expected to occur with these activities. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

### **Alternative 1: No Action**

#### Direct Effects:

No activities are proposed under this alternative, therefore there would be no direct effects to the hard mast production.

#### Indirect Effects:

Stand densities and competition would continue to increase. The increased competition would reduce overall stand and forest health and could reduce the amount of quality mast available. Without action many stands would eventually convert to timber types that would not produce hard mast.

### Cumulative Effects:

Stand densities and competition would continue to increase. The increased competition would reduce overall stand and forest health and could reduce the amount of quality mast available causing the wildlife dependent on this food source to search elsewhere.

Previous tornado salvage operations occurred on pine forest types. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities are expected to occur with these activities. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

### **Alternative 2: No Herbicide Use**

For this alternative, the direct, indirect, and cumulative effects would be the same as those listed under the proposed action. Management activities would still be performed throughout the project area utilizing manual methods instead of herbicides.

### **Effects of Regeneration Harvests on Vegetation**

#### **Proposed Action**

##### Direct Effects:

Under the PA approximately 2,743 acres of early seral habitat would be created through the proposed seedtree and shelterwood regeneration harvests. Seedtree regeneration harvests would retain approximately 10-20 ft<sup>2</sup> of residual basal area while shelterwood regeneration harvests would retain approximately 20-40 ft<sup>2</sup> of residual basal area. Trees that are removed during regeneration harvests include any diseased or damaged trees as well as any overmature, intermediate or suppressed trees. The residual trees that remain exhibit good health with dominant or co-dominant crowns, straight trunks, good pruning and seed producing ability. By removing overmature, diseased, and stressed trees and leaving the healthy, vigorous, seed-producing trees, the current and future health of the stand is improved. All regeneration harvests would be followed up by site preparation, release, and if necessary planting to ensure adequate reforestation within five years following harvest activities.

##### Indirect Effects:

As forested stands reach maturity and continue to age, competition for light and nutrients increases and growth and vigor begin to decline. Overtime, the increased competition, combined with the reduction in health and vigor leads to mortality in overmature, diseased, stressed, or suppressed trees. By removing approximately 2,618 acres of mature forest through regeneration

harvests the expected losses from future mortality would be reduced or eliminated and a new early seral age class would be introduced. As discussed in previous sections, the early seral habitat created through proposed regeneration harvests would increase the overall age class diversity across the project area. This would serve to improve the overall health and vigor of the forest because younger age classes tend to exhibit more vigorous growth while increased age class structure and diversity helps limit any disease or insect attacks that occur because of the differences in stand structure and composition.

#### Cumulative Effects:

The proposed 2,743 acres of regeneration harvests combined with, 49 acres of reforestation existing wildlife openings, 75 acres of opening construction, 11 acres of existing opening maintenance, and 330 acres of opening enlargement would increase the amount of early seral habitat to 3,200 acres or 10% of the forested acres within the project area.

Within the High Mountain Project Area, approximately 31 acres of the severely damaged lands were salvaged and replanted. The 31 acres salvage operation increased the amount of early seral habitat by a small amount, less than 0.1%. These acres would only temporarily increase the amount of early seral habitat until the regenerated stands grow out of the 0-10 year age class. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities that would affect age class structure are expected to occur. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

As discussed under previous sections, increases to early seral habitat and forest age class diversity and structure improves overall forest health and vigor because younger age classes tend to exhibit more vigorous growth while increased age class structure and diversity helps limit any disease or insect attacks that occur because of the differences in stand structure and composition.

### **Alternative 1: No Action**

#### Direct Effects:

No activities are proposed under this alternative, therefore there would be no direct effects from regeneration harvests on vegetation.

#### Indirect Effects:

Under this alternative the proposed regeneration harvests would not occur. Stands would continue to mature and age resulting in increased competition for sunlight and available nutrients as well as a decline in forest growth and vigor. Overtime, the increased competition, combined with the reduction in health and vigor leads would increase natural mortality in over-mature,

stressed, or suppressed trees as well increase the risk of mortality from insect or disease outbreaks and likely lead to a change in timber type .

#### Cumulative Effects:

Under this alternative, the proposed management activities would not occur. As discussed in the indirect effects section, there is a potential for trees and other woody vegetation to take over existing early seral habitat. The 31 acres salvage operation increased the amount of early seral habitat by a small amount, less than 0.1%. These acres would only temporarily increase the amount of early seral habitat until the regenerated stands grow out of the 0-10 year age class. Activities such as trail maintenance and relocation or road maintenance/ reconstruction would only result in the removal of a few individual trees. No large clearing activities that would affect age class structure are expected to occur. Past and present gas well development has resulted in the clearing of 9.1 acres of pine and hardwood forest types. Future gas well development is unknown at this time however; the environmental effects of each natural gas proposal would receive its own analysis.

Overtime, the current age classes would retain the same distribution in relation to one another, but the distribution would be increasingly skewed to the older age classes. The younger age classed would continue to grow into older age classes, increasing the amount of mature growth present within the project area. The disproportionate amount of mature and older age class structures would result in decreased forest vigor and increased susceptibility to insects, disease, and mortality. Overall, forest health and stand vigor would continue to decline.

#### **Alternative 2: No Herbicide Use**

##### Direct Effects:

The direct effects of Alternative 2 would be the same as those listed under the proposed action.

##### Indirect Effects:

Under this alternative no herbicides would be utilized to achieve management goals. The activities listed on the Herbicide Use Table on pg. II-10 would be accomplished using manual methods. The use of manual methods for these activities greatly reduces the effectiveness and success of site preparation and release activities. It is important to adequately reduce competing vegetation on when performing regeneration harvests to ensure that conditions are adequate for successful regeneration to become established and grow. Manual methods are less effective than chemical treatments because of the propensity for the vegetation to re-sprout. Because the competing vegetation already have established root systems they can often out compete and shade out desirable regeneration after re-sprouting. This may require follow up manual treatments and increase the overall cost to ensure adequate reforestation.

### Cumulative Effects:

Past experience on the Big Piney Ranger District has shown that manual site preparation and release techniques are far less effective at adequately ensuring successful regeneration following regeneration harvests. Because follow up treatments are often required they are less cost effective.

## **Effects of Commercial Thinning on Vegetation**

### **Proposed Action**

#### Direct Effects:

Under the PA approximately 5,237 acres of commercial thinning (3,326 acres on pine forest types and 1,911 acres on hardwood forest types) would occur across the project area. Stocking levels would be reduced to approximately 60 ft<sup>2</sup> of residual basal area. Other activities such as firewood thinning on 99 acres, existing woodland management on 224 acres, new woodland management on 407 acres, and thinning around wildlife openings of up to 688 acres involve the removal of existing vegetation to reduce stocking levels. These treatments may be noncommercial or commercial. Commercial thinning operations as well as firewood thinning and woodland management activities remove the smaller, weaker, damaged or diseased trees within a stand. The residual trees which are retained are the larger dominant and co-dominant trees. These are often the healthiest and most vigorous trees in the stand, due to the position of their crowns in the canopy.

#### Indirect Effects:

Commercial thinning operations on 5,237 acres, firewood thinning on 99 acres, existing woodland management on 224 acres, new woodland management on 407 acres, and thinning around wildlife openings of up to 688 acres would result in reduced stocking levels by removing small, weak, damaged, or diseased trees. This would reduce competition for available light and nutrients among the residual trees and improve the overall health and vigor of these areas. By maintaining a healthy and vigorously growing forest likelihood and severity of future attacks from insects and diseases are reduced. Lower stocking levels also allow more sunlight to reach the forest floor. This would improve the number and diversity of plant species present within the forest understory as well as increase the amount of available browse for wildlife species.

#### Cumulative Effects:

The commercial thinning, firewood thinning, woodland management, and thinning around wildlife openings activities combined with prescribed burning and other vegetation management techniques such as TSI, release, and pre-commercial thinning would increase and maintain the amount of reduced stocking levels across the project area. Commercial thinning and other non-

commercial activities such as firewood thinning, woodland management, and thinning around wildlife openings, seedling site preparation and release, or under/midstory reduction treatments would reduce current stocking levels by removing diseased, damaged, or weakened trees. This would reduce competition for light and available nutrients, as well as increase the amount of sunlight reaching the forest floor thus increasing the amount and diversity of plant species on the forest floor as well as increasing browse for wildlife species. The proposed prescribed burning would help maintain the lower stocking levels over time by controlling the amount of smaller vegetation present in the forest understory.

### **Alternative 1: No Action**

#### Direct Effects:

No activities are proposed under this alternative, therefore there would be no direct effects from commercial thinning on vegetation.

#### Indirect Effects:

Under this alternative proposed commercial thinnings and other vegetation management activities would not occur. The forest would continue to grow resulting in increased stocking levels, competition for sunlight and available nutrients as well as a decline in forest growth and vigor. Overtime, the increased competition, combined with the reduction in health and vigor leads would increase natural mortality in overmature, stressed, or suppressed trees as well increase the risk of mortality from insect or disease outbreaks. Thick forest canopies would prevent sunlight from reaching the forest floor. This would reduce the amount and diversity of forest floor species as well as reduce the amount of available browse for wildlife.

#### Cumulative Effects:

Under this alternative, forest health would decline due to the lack of management activities. Stocking levels would continue to increase, increasing competition and reducing vigor. The overstocked conditions would leave the forest susceptible to outbreaks from insects and disease. The lack of prescribed burning would allow fuel loading to increase. Higher fuel loadings would increase the risk and intensity of wildfires.

### **Alternative 2: No Herbicide Use**

The direct, indirect, and cumulative effects of Alternative 2 would be the same as those listed under the proposed action.

## **Effects of Management Activities on Non-Native Invasive Species (NNIS)**

### **Proposed Action**

#### Direct Effects:

Under the PA, NNIS populations up to 500 acres per year would be suppressed, contained, or eradicated. Identified populations would be treated with a combination of herbicide application, prescribed burning, manual, or mechanical treatments. This would aid in the re-establishment of native plant communities across the project area. Because some species have persistent seeds that remain viable in the soil for years, monitoring would determine the effectiveness of the treatments and if further treatments would be required.

#### Indirect Effects:

Ground disturbing activities such as timber harvest, road construction, road maintenance, fireline construction, fireline maintenance, and improved forage area construction could increase the population and spread of non-native invasive species by destroying individual stems which would result in prolific sprouting. They would also provide seedbeds for NNIS germination. Mechanical equipment could also dislodge seeds and transport them to unaffected areas. Treating known NNIS populations prior to or in conjunction with other proposed management activities would help contain infestations while they are relatively small and prevent their spread into uncontaminated areas by vehicles, equipment, foot traffic, etc. Implementation of Best Management Practices would reduce the possibility of introducing or spreading non-native invasive plants during project implementation.

Once NNIS populations are reduced or eradicated, plant diversity would be re-established from existing native seeds in the soil and from adjacent areas. Grasses or other early-seral vegetation would recover within treated areas within the first growing season (typical for recovery on most sites) while abundance and diversity of native vegetation would increase over subsequent years. Re-establishment of native vegetative cover is key to prevent the re-infestation of NNIS populations.

#### Cumulative Effects:

Cumulative effects are uncertain, if private lands are treated to reduce NNIS it could reduce the overall NNIS measurably. Reduction of NNIS would allow native species that had been temporarily lost from the habitat to become re-established. Activities such as road maintenance, recreation, camping, could transport the NNIS to uninfected parts of the project area. However, by treating existing populations of NNIS and allowing native vegetation to become re-established, future infestations and spread of NNIS would be reduced or eliminated.

## **Alternative 1: No Action**

### Direct Effects:

No activities are proposed under this alternative, therefore there would be no direct change to NNIS populations.

### Indirect Effects:

Ongoing activities such as road maintenance and recreation could continue to spread the existing populations and introduce new populations of NNIS to the project area. With the absence of any management activities, the NNIS would continue to spread and dominate the native vegetation.

### Cumulative Effects:

Due to the lack of management activities, NNIS populations would continue to increase and spread over the project areas. Through recreation and road maintenance the NNIS would continue to spread, reducing the amount of native species from the project area. The project area could become a seed source for other lands including private.

## **Alternative 2: No Herbicide Use**

### Direct Effects:

Under this alternative, NNIS populations would be controlled by using combination of prescribed burning, manual, or mechanical treatment without using herbicides for control. Prescribed burning and manual methods are less effective than chemical treatments because of the propensity for the vegetation to re-sprout. These treatments alone can often increase populations. Also, some species have persistent seeds that remain viable in the soil for years. Little to no control of existing NNIS population could be expected under the no herbicide alternative.

### Indirect Effects:

With no treatment on existing NNIS populations would continue to spread making future eradication efforts much more expensive and less likely to succeed. Ground disturbing activities such as timber harvest, road construction, road maintenance, fireline construction, fireline maintenance, and improved forage construction could increase the population and spread of non-native invasive species by destroying individual stems which would result in prolific sprouting. They would also provide seedbeds for NNIS germination. Mechanical equipment could also dislodge seeds and transport them to unaffected areas. Implementation of Best Management Practices would reduce the possibility of introducing or spreading non-native invasive plants during project implementation. Without the use of herbicides, populations of NNIS could continue to increase and spread across the project area.

### Cumulative Effects:

Reduction of NNIS would allow species that had been temporarily lost from the habitat to become re-established. Adversely, activities such as road maintenance, recreation, camping, could transport the NNIS to uninfected parts of the project area. Without the use of herbicides, populations of NNIS could continue to increase and spread across the project area and beyond.

## **F. Wildlife**

### **Existing Condition**

The analysis area used for this discussion totals 37,826 acres of which 36,535 acres are National Forest lands within the Lower Big Piney watershed. The Forest Plan's designated Management Areas (MA) within this project include Oak Woodland (MA 3.B), High Quality Forest Products (MA 3.E), Riparian Corridors (MA 3.I), Special Interest Areas (MA 1.G), Designated Wild and Scenic Rivers (MA 1.C), Scenic Byway Corridors (MA 1.H), and Developed Recreation Areas (MA 2. C).

Currently, timber stands lean heavily to late stage age classes with approximately 80% above the age of 70. Permanent openings make up less than 1% of the project area, and early successional habitat comprises approximately 2% of the area when you take into consideration the previously thinned existing woodlands as well as the openings. Ponds of various sizes, condition, and origin are scattered throughout the project area. See Vegetation Section for more details.

Existing wildlife openings in this project support many native wildlife species including bear, white-tailed deer, turkeys, migratory birds and others. Some current openings are small, hard to maintain, poorly located, and/or are too close to recreational activities to prevent human intrusion.

During scoping, concerns were voiced about Threatened, Endangered, or Sensitive (TES) plants and animals known to be in the project area. Potential effects will be considered in detail for these species in the Biological Evaluation (BE) and a summary of potential effects can be found in the TES section of this EA. Site specific biological inventories and monitoring were conducted by Forest personnel, the Arkansas Game and Fish Commission, and contracted biological consultants from 2009-2012. Evaluating these species meets the legal requirements for an environmental analysis (EA); therefore, specific species mentioned in scoping comments may not be directly addressed in this EA but grouped with species of similar habitat or lifecycle.

A second concern raised during scoping was the potential for adverse impacts to the forest from herbicide use. The Forest Service as an agency recognizes the Syracuse Environmental Research Associates (SERA) ecological risk assessments as the source for evaluating herbicide impacts on the forest. More discussion on herbicides will be found in the project alternatives below.

Another issue identified during scoping was forest fragmentation. Although the canopy would be fragmented in terms of stratification and percent coverage, what that means in terms of habitat fragmentation must be defined by the species being examined (Franklin et.al, 2002). Species such as elk, bear, white-tailed deer, and prairie warblers are examples of species that may benefit from a mosaic landscape to one degree or another. Prairie warblers may only use shrubby woodlands and open field edges whereas bears may use old growth, early successional shrub and forest, woodlands, and open fields. Usage of various elements of the mosaic may be seasonal or impartial to season. To such species, the landscape is an interconnected mosaic of continuous habitat. Other species such as Northern Bobwhite quail and Ovenbirds would be less adaptable to changes in the landscape in varying degrees. Certain species of herpetofauna such as amphibians and salamanders may become geographically isolated due to fragmentation because, for instance, the majority of southern herpetofauna do not make long-range migratory movements overland (Gibbons and Buhlmann, 2001). Amphibians and reptiles require both terrestrial and aquatic habitats and movements between them occurs regularly at several hundred meters (Bailey et. al, 2006). Streamside Management Zones (SMZs) would be established according to the Forest Wide Standards in the Forest Plan adjacent to perennial streams, springs, and defined channels (FW81). Gibbons and Buhlmann also stated that the presence and persistence of certain species may depend on the long term availability of specific habitats as well as acceptable travel habitat between alternate breeding sites (2001, pg.384). Further discussion may be found under the project alternative headings below.

### Management Indicator Species Analysis

This analysis will focus upon the Management Indicator Species (MIS) to assess the potential impacts of this project on wildlife by the proposed actions in Chapter 2 of this EA. 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 list in the table below provides information on the current conditions for the 17 MIS chosen for the Forest. Data for assessing population and habitat trends for MIS in fiscal year 2011 was used to evaluate the proposed action and alternatives.

#### Wildlife section Table 1 Management Indicator Species for the Ozark-St. Francis National Forest

Northern Bobwhite ( <i>Colinus virginianus</i> ) – For the Forest, oak savanna and woodland, restored glades, native fields, early seral forest (0-5) and thinned and burned forest areas. This species is at historic lows on the forest. Long term Breeding Bird Surveys across this species entire range show a marked declined.
White-tailed Deer ( <i>Odocoileus virginianus</i> ) - For the Forest, the preferred habitat for deer can be described as areas of mature hardwood, hardwood-pine and pine-hardwood stands, which provide hard and soft mast, with 0-5 year old regeneration areas, food plots, oak savannas and woodlands and permanent water sources intermixed. The regeneration areas, savanna and woodlands provide cover and along with food plots provide forage. The population appears to be stable on the Ozark National Forest.

Black Bear ( <i>Ursus americanus</i> ) - On the Forest, the preferred habitat for bear can be described, as areas that are relatively isolated from human disturbance, comprised of mature hardwood, hardwood-pine and pine-hardwood forest types that provide hard mast, with 0-5 year old regeneration areas and food plots intermixed to provide cover, forage and soft mast. The numbers of bears remain high on the Ozark National Forest and continue to be stable to increasing.
Eastern wild turkey ( <i>Meleagris gallapavo</i> ) - The preferred habitat for wild turkeys can be described as mature hardwood or hardwood-pine stands with open areas (fields, food plots or natural openings) nearby and a permanent water source readily available. Habitat is wide spread on the forest, but recent surveys indicate decline.
Prairie Warbler ( <i>Dendroica discolor</i> ) - Optimal habitat conditions include early seral habitat, regeneration areas that are in the 5-20 year old age class, pine-bluestem and oak savanna/woodland habitats. Species monitoring indicates declining trend for this physiographic region.
Yellow-breasted Chat ( <i>Icteria virens</i> ) - On the Forest, the preferred habitat for the chat can be described as regeneration areas and other openings with 1-3 m (3-10 ft) tall brushy vegetation. Identified in RFLRMP as MIS for the St. Francis NF.
Brown-headed Nuthatch ( <i>Sitta pusilla</i> ) - This species is tied to mature open pine stands or pine woodland conditions. The upland Ozarks fall outside of this species range although it is possible that historically it was more widespread where mature pine stands once occurred. This species is rare on the Forest.
Northern Parula ( <i>Parula americana</i> ) – Habitat is typically mature, moist forests along streams and within riparian areas. Commonly found along Ozark wooded rivers and streams. On the Ozark National Forest, this species appears to be stable to slightly declining.
Rufous-crowned Sparrow ( <i>Aimophila ruficeps</i> ) – A very small population occurs on Mt. Magazine in Logan County. It is primarily a species of the desert southwest. Habitat would include glades or thin shrub/seedling stands with sparse grasses and shrubs.
Cerulean Warbler ( <i>Dendroica cerulean</i> ) – The Arkansas Ozarks are on the southern edge of this species range. Primary habitat includes rich mature forest with mesic to wet conditions. Typically they have larger diameter trees with a defined shrub layer. More commonly found in bottomland hardwoods, but on the main division of the forest in upland habitats. This species is declining over its range but on the Ozark National Forest, it appears to be fairly stable.
Ovenbird ( <i>Seiurus aurocapillus</i> ) – Typical habitat would include mid to late seral dry-oak deciduous forests with limited understory. Nesting occurs on the ground. Species well distributed in the Ozark Uplands. This species is common on the Ozark National Forest but has shown some decline.
Red-headed Woodpecker ( <i>Melanerpes erythrocephalus</i> ) – Preferred habitat would include open woodlands or pines. Requires dead trees and snags for nesting. Species is uncommon on the Forest. On the Ozark National Forest, this species has increased.
Pileated woodpecker ( <i>Dryocopus pileatus</i> ) - The preferred habitat for the pileated woodpecker can be described as mature stands of any species or species mix with large dead snags and woody debris on the forest floor. USFWS Breeding Bird Surveys show this species is decreasing for this physiographic region.
Scarlet Tanager ( <i>Piranga olivacea</i> ) – Mature deciduous forest and rich upland forest is the preferred habitat for this species. In suitable habitat this species is not uncommon on the Forest. Long term Breeding Bird Surveys for indicates a decline overall for AR but is slightly increasing on Forest.
Acadian Flycatcher ( <i>Empidonax virescens</i> ) – Prefers moist deciduous forest near streams and

bottomland hardwoods. Not uncommon and increasing on the Ozark NF in riparian areas but declining overall.

Small-mouth Bass (*Micropterus dolomieu*) - Cool, clear, mid-order streams, greater than 10.5 m (35 ft), wide with abundant shade, cover and deep pools, moderate current, and gravel or rubble substrate characterize optimum riverine habitat. The largest stream populations of smallmouth bass occur in streams with gradients of 0.75-4.70 m/km, (3-15 ft/mi) that provide alternating pools and riffles, support. Standing crop is generally largest in pools deeper than 1.2 m (4 ft.). In suitable habitat this species is indicative of high water quality. The relative abundance of this species in streams on the Ozark National Forest is considered normal.

Largemouth Bass (*Micropterus salmoides*) – prefers larger ponds, lakes, reservoirs, slough and river backwaters. Usually found close to shore in lakes and reservoirs. This species prefers warm quiet waters with low turbidity, soft bottom and beds of aquatic plants. For lakes on the Forests, the overall relative weights, PSD, and RSD for largemouth bass stayed fairly stable from 2005 to 2010, but the relative weight continues to be below the expected value for an ideal largemouth bass fishery.

A more complete description of the habitat relationships for these species can be found in the Nature Serve database: <http://www.natureserve.org/> , and a Land Manager’s Guide to Birds of the South: <http://www.srs.fs.usda.gov/pubs/2702>

Two of the MIS species were eliminated from the analysis due to the following reasons: the Yellow Breasted Chat is identified in the Forest Plan as an MIS for the St. Francis NF, and the Rufous-crowned Sparrow’s occurrence on the Forest is limited to an area on the Mt. Magazine district. The remaining MIS will be divided into two groups: Low Disturbance Species (LDS) and High Disturbances Species (HDS). Low disturbance species occupy habitats that require low intensity and/or frequency of disturbances. 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. For the purpose of this project analysis, COMPATS (Computerized Project Analysis of Timber Sales) modeling was done for six of these species: Scarlet Tanager, Prairie Warbler, Pileated Woodpecker, Northern Bobwhite quail, deer, and turkey. COMPATS was developed by researchers and experts of these species to illustrate theoretical effects of forest management practices across alternatives on an individual project level. The Scarlet Tanager and Pileated Woodpecker will represent LDS species. Their responses to management activities according to the model will serve as an indicator for how other LDS such as ambystomatid salamanders, ovenbirds or southern flying squirrels would respond. The Prairie Warbler, Northern Bobwhite quail, deer, and turkey will represent the HDS species. Their model responses will serve as an indicator for how other HDS species such as bear, Eastern cottontails, or Bluebirds would respond to management activities.

**Wildlife section Table 2** Classification of MIS

Common Name	Classification (LDS or HDS)
Northern Bobwhite	HDS
White-tailed Deer	HDS

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

**Wildlife section Table 3 MIS/COMPATS\***

All units given as individuals per square mile		Species					
		Scarlet Tanager	Prairie Warbler	Pileated Wood Pecker	Quail	Deer	Turkey
Baseline		29.7	5.7	35.3	20.3	11.2	11.2
Proposed Action	Implementation	29.3	34.5	31.5	84.4	20.4	18.5
	% change over baseline	-1.5	502.0	-10.7	314.9	81.6	66.2
	10 years	31.6	24.6	34.2	52.1	17.9	16.1
	% change over baseline	6.2	329.3	-3.0	155.9	60.0	44.2
Alternative 1 - No Action	Implementation	29.7	5.7	35.3	21.4	11.4	13.3
	% change over baseline	0.0	0.0	0.0	5.1	2.1	19.1
	10 years	31.0	1.8	37.2	17.6	11.0	11.3
	% change over baseline	4.2	-67.9	5.4	-13.6	-1.6	1.2
Alternative 2-No Herbicide	Implementation	29.3	34.5	31.5	84.4	20.4	18.5
	% change over baseline	-1.5	502.0	-10.7	314.9	81.6	66.2
	10 years	30.1	24.4	34.3	50.0	17.9	16.1

All units given as individuals per square mile		Species					
		Scarlet Tanager	Prairie Warbler	Pileated Wood Pecker	Quail	Deer	Turkey
Baseline		29.7	5.7	35.3	20.3	11.2	11.2
	% change over baseline	1.1	326.4	-2.9	145.6	59.7	44.4
For Comparison: No Management- Stop all prior NEPA	Implementation	29.7	5.7	35.3	20.3	11.2	11.2
	% change over baseline	0	0	0	0	0	0
	10 years	31.0	2.5	37.2	17.6	10.8	11.2
	% change over baseline	4	-56	5	-14	-4	0.18

\*The above Table represents a model developed by researchers and experts on these species to illustrate theoretical effects by each alternative for project level comparison purposes and does not necessarily reflect exact changes in population. Number results may show minor discrepancies due to rounding.

In the COMPATS table, the category named No Management-Stop all prior NEPA was included to illustrate that the NO ACTION Alternative isn't completely without some type of management in the project area. Prior projects that fall into the current project area include maintenance and seeding of openings and prescribed burning. The impacts of these projects would continue to have an influence on species and some management may continue to occur under previously approved projects. The influences of these activities are reflected in the COMPATS for Alternative 1: No Action in comparison to the No Management.

### **Proposed Action (PA)**

#### Direct/Indirect Effects

For the purpose of this analysis, the area within the project boundary was used to determine wildlife effects. The proposed action would increase permanent openings to approximately 1.5% of Forest Service Land in the project Area. Early successional shrub/grassland habitat, including those acres that have a mature overstory component, would increase to approximately 12%. All four HDS (deer, turkey, prairie warbler, and Northern Bobwhite quail) carrying capacities improved with the implementation of the PA. Quail, representing other species that prefer Pine/Oak woodlands and grasslands, would receive the most benefit followed by prairie warblers, deer, and then turkeys. The model shows that species such as Quail benefit from ponds and openings as well as prescribed burning, site prep and wildlife seeding. As stands age, thinning and WSI midstory treatments increase in importance. Prairie warblers represent the species that depend on regenerating forests, i.e., early seral and more open woodland habitats. These species prefer shrubby-early successional, young forest habitat including regeneration areas. This group would benefit most from prescribed burning and WSI midstory treatments.

Prescribed burning was important across all age classes while WSI midstory treatments gained in importance as stands aged. A reason for the large response seen in both the prairie warbler and quail at project implementation is mostly due to the lack or insufficient amount of suitable habitat currently existing for these species. Turkeys and deer are both game species that rely on habitat at both ends of the age class spectrum as well as sources of water. These species would benefit from ponds, seeding, and thinning. Turkeys also responded well to site preparation.

The PA would remove or reduce stand density on approximately 22% of the 70 and above age class stands within the project area. The COMPATS model indicated that carrying capacity for LDS (scarlet tanager and pileated woodpecker) would be decreased immediately after implementation of the action alternatives. Scarlet Tanagers represent species that prefer mature forest slightly favoring hardwood over pine. Thinning in the older age classes improved carrying capacity for the tanager whereas the prescribed burning decreased their carrying capacity. Pileated Woodpeckers represent species that prefer older forests with standing dead trees and woody debris on the forest floor. Species such as the Pileated respond negatively to any management within mature stands. Site preparation, Pre-commercial thins, and Releases that occur in stands 20 years old or younger would not affect either of these LDS species.

The COMPATS model was run again to estimate effects 10 years from implementation. After project implementation of either action alternative, HDS showed an increase in carrying capacity over the current condition. Some HDS have very little available habitat under current conditions and show a remarkable increase and a sustained future presence under the PA. Better understory control with herbicide would help sustain early successional conditions and herbaceous growth. For all HDS, the action alternatives showed the greatest sustained benefit compared to the no action alternative.

Although LDS initially had a small decline, they still remained a major element of the system. Carrying capacity for both LDS initially decreased but in a 10 year period showed a slight recovery. This recovery may include reasons such as canopies within thinned areas would branch out into the gaps and recover at least partial closure, and advancement of timber currently in the 41-100 age classes into the 71-70+ age classes. The Scarlet Tanager actually shows improvement over current conditions over the long run. Pileated Woodpeckers show improvement after their initial decline, but they do not recover completely to the level of current conditions. One thing to consider that is not reflected by the model is the increased amount of snags and woody debris created or caused by bug kill, the 2009 ice storm, and recent tornados. Although the project area model shows a slight decline due to project implementation, increased snag habitat may have a positive influence on population numbers.

Species diversity would be higher in the Action alternatives. Increasing acreage of early successional vegetation, while maintaining mature forest and closed canopy acreage, would allow the presence and sustainability of both LDS and HDS within the project area.

Pond construction and reconstruction would improve conditions for HDS such as turkey, deer, and quail. 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 and trail decommissioning near stream zones would, in the long term, benefit species that rely on low

disturbance in aquatic systems. Riparian habitats are currently protected on Forest lands by observing Forest Wide Standards for stream-side management and the Arkansas State Best Management Practices (BMPs).

Field maintenance would increase the value of the fields for HDS. Those areas seeded with a variety of forage would provide higher quality forage than monoculture agricultural fields. Control of NNIS would protect the quality and availability of foraging habitats.

Road closure and decommissioning would benefit the HDS and LDS by decreasing human disturbance especially for the demand species (deer and turkey) as well as herpetofauna and migratory birds. Road closures into fields and openings would decrease vehicle mortality, noise disturbance, sensitivity to exposure, and habitat degradation such as ruts and bare spots.

Surface rock collection within commercial timber sales and openings would reduce available potential habitat for some species such as the Eastern small-footed bat and certain herpetofauna by removing potential cover. Bluff-lines and talus slopes are off-limits for rock collection and avoided during timber harvest. This is a non-renewable resource; therefore, the reduction of potential habitat is permanent. Site specific design criteria are included in each rock contract limiting the total area of collection, the percentage of rock that may be collected by size, and the distance between collection areas. Potential habitat from surface rock would be reduced in these site specific areas; however, the entire project area is unlikely to reflect an overall measurable change for species utilizing rocky habitats.

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

The Human Health and Ecological Risk Assessments completed by the USDA, Forest Service [www.fs.fed.us/foresthealth/pesticide/risk.shtml](http://www.fs.fed.us/foresthealth/pesticide/risk.shtml) (See individual SERA s) indicate that the proposed formulations of herbicides are either nontoxic or of low toxicity to birds, mammals, and insects. Only herbicides with aquatic labels may be used near water. Terrestrial animals may be exposed to herbicides by way of the following examples: direct spray, contact with sprayed vegetation, or ingestion of contaminated vegetation, water, or insects. Non-target species may be impacted by drift or run-off.

Toxicity is generally tested at rates above label application rates. In order to reduce potential adverse effects to non-target species, the herbicides would be applied according to label specifications, would be largely target specific by using methods such as backpack spraying, and would be applied using the guidelines in the Forest Plan.

### Specific Herbicides (Does not apply to Alternative 1 or 2)

*Glyphosate* – is used to control post-emergent vegetation. It functions by interrupting the production of aromatic amino acids. The two main formulas of glyphosate that would be used are Rodeo and Accord whose toxicity is rated as low and have had extensive studies (SERA 2011). 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 (SERA 2003a). Such formulations are not proposed for use in aquatic systems.

*Triclopyr* – has two different forms: a salt and an ester. It functions by mimicking a growth hormone disrupting normal plant development. Both forms readily degrade and do not persist in the environment. In general, the ester formulation is more toxic than the salt form with larger mammals being more sensitive than smaller mammals. The ester formulation would be used for basal spray application only. This method would require less of the herbicide to control the woody species than foliar spray. Triclopyr is classified as being practically non-toxic to slightly toxic to birds. Although the ester formulation poses more of a toxicity risk to fish, it will not persist in surface water and would have minimal long-term risk. The highest risk to aquatics would be a direct spill in large amounts.

*Metsulfuron methyl* - is used to control pre and post emergent annual weeds, perennial weeds, and woody plants. It functions by inhibiting an enzyme involved in making chain amino acids. There is little information on non-target wildlife; however, Metsulfuron methyl is of low toxicity to practically nontoxic for birds, mammals, fish, and bees.

*Imazapyr* –is used for the control of terrestrial and aquatic vegetation such as grasses, broadleaf weeds, vines, and brush. It functions by inhibiting an enzyme involved in making chain amino acids. It is hazardous to both terrestrial and aquatic macrophytes but practically non-toxic to mammals, birds, honeybees, fish, aquatic invertebrates, and algae. There is little information on the toxicity to reptiles, terrestrial and aquatic-phase amphibians, and microorganisms.

Fluroxypyr - is a plant growth hormone mimicking, post-emergent systemic herbicide which is more toxic to dicots such as broadleaf weeds and woody brush than monocots like grasses. Fluroxypyr acid and fluroxypyr-MHE appear to be relatively non-toxic to terrestrial animals. Very little information is available on the toxicity of fluroxypyr to insects, reptiles, and amphibians. Available studies indicate that fluroxypyr is relatively nontoxic to birds and up to slightly toxic to aquatic animals such as fish, most aquatic crustaceans (daphnids and shrimp), and freshwater invertebrates; however, fluroxypyr-MHE may be highly toxic to bivalves and perhaps to other molluscs. Runoff of up to about 10% of applied fluroxypyr may occur in predominantly clay soils with high rates of rainfall. Much less runoff is expected from loam soils, and virtually no runoff is expected from predominantly sand soils. Soil half-life (aerobic) ranges from 7-23 days, and water half-life (field dissipation) ranges from 13-25 days (SERA, 2009).

### Cumulative Effects

At a Forest-wide scale, the Monitoring and Evaluation report (2010) suggested that three species were trending down: Eastern wild turkeys, Northern Bobwhite Quail, and Prairie Warblers. The report recognizes that the failure to regenerate early successional and woodland habitats on a regular basis across the Forest could be hindering the stabilization of Bobwhite Quail and Prairie Warbler populations. The 2011 pre-report data indicates that long-term observations for Ovenbirds and Pileated Woodpeckers may show a downward trend as well; however, Ovenbirds have been relatively stable in recent years, and increases in snag habitat due to insect, disease, and storm damage may improve local Pileated populations in the near future. Scarlet Tanagers, Deer, and Bear reflect stable trends or slightly increasing. These general trends are from the Breeding Bird survey for the Ouachita-Ozark Plateau Area, Forest Landbird surveys, and Arkansas Game and Fish's annual harvest data. Further details on interpreting Breeding Bird data can be found at: <http://www.mbr-pwrc.usgs.gov/bbs/>.

Surface rock would be permanently reduced in designated collection areas for the foreseeable future. Available habitat for rock dwelling species could be limited within these areas depending on the current structure of each site; however, no more than one percent of the project area would be affected, and the overall project area would continue to provide habitat of this element.

Improvements and closures to roads and trails within an area that receives a notable amount of recreational activity may encourage users to stay within designated areas thereby decreasing the overall intensity of disturbance to potential habitats.

### **Alternative 1: (No Action)**

#### Direct/Indirect Effects

The No Action Alternative for the project area would remain without substantial suitable habitats for species such as Northern Bobwhite quail and Prairie Warblers, and habitat for deer would decline. In the No Action alternative, effects of previous wildlife opening creation, maintenance, and seeding show a positive influence on deer and turkey when compared to COMPATS for the "Stop All Prior NEPA" category.

Pileated woodpeckers, representing the snag/mature forest habitat group, show a clear preference for the No Action alternative. Scarlet Tanagers show a preference for the No Action at implementation, but they also show a slower rate of growth over time. No Action is the worst alternative for Prairie warblers, quail and deer due to the disappearance of early successional habitats. Although turkeys don't show a decline for any of the alternatives, the No Action alternative does not stimulate an increase in population as do the action alternatives. The COMPATS model does not account for the loss of brood rearing habitat which is critical for the sustainability of turkey populations.

### Cumulative Effects

Some of the previously managed lands, both FS and private, have created habitat for HDS. Sustainability of current conditions would decrease with time, but some benefits would perpetuate. Forest trends are likely to follow the current trends; i.e. prairie warblers, quail, and turkeys would continue to decline; and deer, bear, pileated woodpeckers and scarlet tanagers would remain stable.

Unknown intentions for management on private lands leave future conditions unpredictable; however, some early successional habitat is likely to remain.

The No Action alternative would fail to address improvements and closures to roads and trails within an area that receives a notable amount of recreational activity. Over time, these current systems could begin to impact a wider area if allowed to decline.

## **Alternative 2: (No Herbicide)**

### Direct/Indirect Effects

The PA and Alternative 2 (No Herbicides) initially show similar benefits to prairie warblers, quail, deer and turkeys, but habitat conditions with alternative 2 could not be sustained and over time would decline from a previously improved state most likely due to the reduced ability to control woody succession in woodland and grassland habitats.

Burning alone would not completely control the resurgence of woody growth due to limitations on rotations and required burning parameters. Eventually open woodlands would advance to shrubby woodlands and early forest. Although non-target species would less likely be adversely affected by herbicide, the diversity in structure and plant species composition within the woodland and savanna habitats would decline.

Scarlet tanagers represent a group of low disturbance species that prefer mature canopy but derive some benefit out of thinning and WSI; therefore, after the same initial decline after project implementation that was seen in the proposed action, the rebound over time was less in Alternative 2 than in the PA due to the reduced control of woody succession in the mid-story.

Pileated woodpeckers which represent the almost “no disturbance” species group shows little preference between the PA and Alternative 2; however, COMPATS does not reflect the amount of increased disturbance required for manual control versus herbicidal control including a higher number of entries into an area and noise disturbance.

Non-native invasive species would be difficult to control without the use of herbicide, and their populations can be expect to expand over time especially in areas that do not have an established understory and any type of ground disturbance occurs. Burning is unlikely to kill many NNIS such as Tree of Heaven and likely to increase germination in others such as exotic lespedezas (Evans, C.W. et. al, 2006). NNIS displace native species and reduce the variety and quality of available vegetation. “Many reptiles and amphibians are specifically adapted to forage, bask, hibernate, and nest exclusively in native vegetative communities.” (Bailey et. al, 2006, pg. 19). Recreational vehicles and horses may spread NNIS along trails. Without an effective means of control, any habitat improvements would be counterweighed with the negative impacts from the loss of available native vegetation.

### Cumulative Effects

Forest trends are likely to show a temporary increase in species such as prairie warblers and quail and then continue to show a slow decline. Turkeys, deer, and bear are likely to remain relatively stable. Pileated woodpeckers and scarlet tanagers are likely to remain stable or slightly decrease.

Previous management and natural events on both Forest Service and private lands have created opportunities for NNIS to become established. Unless there is an effective tool available for the control of these non-natives, the established populations would continue to be a seed source for the spread of NNIS.

See the PA cumulative effects for surface rock, roads and trails.

## G. Fisheries

### Existing Condition

The fisheries analysis area for this project is the Indian Creek-Lower Big Piney watershed, the Moccasin Creek-Lower Big Piney watershed, and the Mill Creek-Big Piney Creek watershed. Three main tributaries are in the project area: Indian Creek, Moccasin Creek, and Gunter Branch. These streams are typical of perennial streams within the Boston Mountain physiographic regions. Indian Creek originates in Pope County near Pelsor, AR and flows through the project area into Big Piney Creek just south of Treat, AR. Moccasin Creek originates in Pope County and flows in to Indian creek and then Big Piney Creek south of Treat. Mill Creek is outside of the project area, but the upper reaches of small tributaries are within the Mill Creek watershed which lies south and west of the Meadows Knob/Maupin Flat road. Gunter Branch is a tributary to Indian Creek which originates near Muddy Gap south of Solly's Knob.

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 late summer months. For more detail on stream habitat characteristics, see Table 1 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.

Indian Creek supports a small sport fishery with smallmouth bass (*Micropterus dolomieu*), Long ear sunfish (*Lepomis megalotis*) and green sunfish (*Lepomis cyanellus*) being the most popular species. Gunter and Moccasin Creeks are smaller and do not support a sport fishery.

Fish assemblages in these tributaries were determined from surveys conducted by the Southern Research Station's Center for Aquatic Technology Transfer (CATT) out of Blacksburg, Virginia during the summers of 2009 and 2010. A total of 19 species of fish in six families were identified.

**Table 1.** Habitat description of the tributaries in the project area. Numbers in the table are averages for each parameter from the samples taken in those tributaries.

Parameters	Moccasin Creek	Indian Creek	Gunter Branch
Percent Pool	66	73	72

<b>Parameters</b>	<b>Moccasin Creek</b>	<b>Indian Creek</b>	<b>Gunter Branch</b>
Percent Riffle	34	27	28
Percent Dry	24	3	24
Number of Pool/km	14	14	30
Number of Riffles/km	13	13	23
Average of Pool Avg. Depths (cm)	46	35	19
Average of Riffle Avg. Depths (cm)	15	12	6
Percent Pools Inventoried as Glides	5	4	18
Mean Bank full (m)	10	14	8
Gradient	3	1	4
Large wood Debris (Piece of wood with a length >5 m and diameter >55)	2	0	0

The Index of Biotic Integrity from the Arkansas Department of Environmental Quality was used to classify these streams. Indian Creek classified as excellent. Moccasin and Gunter Branch classified as fair. The differences in the classification for these tributaries can in part be contributed to watershed size and geology. Moccasin Creek and Gunter Branch have smaller watersheds and the topography is steep, especially on Gunter Branch. This situation results in less, and flashier, water supplies for these streams which decreases habitat diversity. Gunter Branch had an average gradient of 4% with 24% of the stream reaches dry at the time of survey. Moccasin had an average gradient of 3% with 24% of the stream reaches dry at the time of the survey. At the same time, Indian Creek had an average gradient of 1% with only 3% of the stream reaches dry. When streams have a lower percent pool habitat in relation to the percent riffle habitat it naturally reduces species richness and diversity. Comparison of current data with previous data for assemblages in Indian Creek indicates that two (native) species may have been introduced into the system, possibly by fishing bait buckets. See Table 2 for specific information on the fish assemblages.

The streams and fish assemblages in the project area north of Moccasin Creek are currently in good shape according to IBI classifications, relative watershed sizes and habitats, and fish assemblages reflecting expected species. The project area within the Moccasin Creek watershed has minor inconsistencies with what was expected, such as, a lower number of total individuals and a smaller, less diverse population of darters compared to Gunter Branch.

Smaller headwater streams are typically dominated by minnow species such as creek chubs and stonerollers and have one or two darter species. Such areas have few if any bass and sunfish. This assemblage describes what was found in Gunter Branch and the upper reaches of Moccasin Creek which is expected for these size watersheds. This type of assemblage would naturally have a lower IBI value. Other factors that may be lowering the overall IBI in the Moccasin Creek watershed could include private land practices and the extensive trail systems in the Moccasin Gap area. The project activities proposed in the Moccasin watershed are defined in Table 3 following the description of fish assemblages.

**Table 2. Description of the fish assemblages in project area tributaries**

Common Name	Tributaries					
	Moccasin Creek		Indian Creek		Gunter Branch	
	Number	Relative Abundance	Number	Relative Abundance	Number	Relative Abundance
Central Stoneroller	53	29.3	267	16.4	38	5.3
Creek chubsucker	1	0.6	0	0	0	0
Bigeye Shiner	11	6.1	60	3.7	0	0
Redfin Darter	3	1.7	23	1.4	23	3.2
Cardinal shiner	0	0	32	2.0	0	0
Blackspotted topminnow	0	0	8	0.5	0	0
Bluntnose Minnow	0	0	22	1.4	0	0
Creek Chub	51	28.2	54	3.3	331	46.5
Northern Hog Sucker	1	0.6	10	0.6	0	0
Slender Madtom	10	5.5	260	16.0	31	4.4
Northern Studfish	0	0	1	0.1	0	0
Yellow bullhead	0	0	1	0.1	0	0
Green Sunfish	3	1.7	10	0.6	0	0
Fantail darter	0	0	61	3.8	3	0.4
Longear Sunfish	2	1.1	101	6.2	0	0
Smallmouth Bass	0	0	12	0.7	0	0
Greenside	10	5.5	215	13.2	2	0.3

Common Name	Tributaries					
	Moccasin Creek		Indian Creek		Gunter Branch	
	Number	Relative Abundance	Number	Relative Abundance	Number	Relative Abundance
Darter						
Banded Darter	0	0	42	2.6	0	0
Orangethroat Darter	36	19.9	445	27.4	284	39.9
<b>Total number of Species</b>	11		18		7	
<b>Total number of individuals</b>	181		1624		712	
<b>IBI Classification</b>	Fair		Excellent		Fair	

Actions within the Moccasin Creek watershed would contain approximately 45% of all proposed recreational treatments, 20% of the proposed wildlife treatments, 30% of the proposed forestry treatments, and 22% of the proposed road treatments (see Table 3 below). All of the recreational treatments in the Moccasin Creek watershed involve improving the trail system as discussed under the proposed action section to follow.

**Table 3. Treatments in the Moccasin Watershed**

Treatments and Acres (In acres unless otherwise specified)	PA	Moccasin Watershed
<b>Recreation</b>		
Horse/ATV trail Construction/Relocation (mi.)	3.2	3.2
Horse/ATV trail Decommission/Obliteration	3.3	3.3
Construction of Longpool Hiking trail	2.5	0
Longpool gate and turnaround installations (count)	2+	0
Buzzards Roost Hiking Trail	1.5	0
Buzzards Roots Parking (count)	2	0
<b>Wildlife</b>		
Field Mgt for Improved Forage	416	Approx. 70
Drop and Reforest Openings	49	32
Non-Native Invasive Species Control	500*yr	Approx. 150/yr*
Wildlife Ponds (no.)	25	Approx. 8
Placement of Large Woody Debris	Yes	Yes
Native Cane Restoration	323	0
<b>Forestry</b>		
Woodland Management	407*	407*

<b>Treatments and Acres (In acres unless otherwise specified)</b>	<b>PA</b>	<b>Moccasin Watershed</b>
Existing Woodland Mgt	224	0
Pine Seed Tree Regeneration Harvest	871*	262*
Pine Shelterwood Harvest	980*	404*
Pine Seed Tree Removal	111	0
Hardwood Shelterwood Harvest	822*	97*
Hardwood Commercial Thinning	1,911**	598**
Pine Commercial Thinning	3,326	763
Pine and Hardwood shelterwood preparation cut	285*	118*
Seedling Release and Pre-commercial Thinning	521*	172*
Pre-commercial Thinning	684	<1
Timber Stand Improvement Thinning	578*	42*
One time Site Preparation Burning for Planting	1,657	638
Prescribed Burning as needed	751	392
<b>Road Management</b>		
Temporary Roads (mi.)	24	6.4
Road Reconstruction (mi.)	18	2.5
Road Maintenance (mi.)	52	16
Maintenance and Road Closure (mi.)	24	5.5
Road Decommissioning (mi.)	24	1
Road Closure (mi.)	14	3

\* Herbicides would be used as part of these treatments

\*\*Maximum of 50% of area treated with herbicides.

## **Proposed Action (PA)**

### Direct Effects

Timber harvesting has been shown to destabilize stream banks, alter flow regimes and nutrient cycles, and change the morphology of stream channels. Changes in the stream environment may alter fish communities found in the stream. The majority of impacts from timber harvesting are caused by road building activities. This project has 18 miles of road reconstruction and approximately 24 miles of temporary road use. Implementation of resource protection following guidelines outlined in the Forest's Revised Land and Resource Management Plan and Arkansas's Best Management Practices (BMP's) as well as project design would help reduce sediment yield and the potential for impacts on aquatic organisms.

Another significant factor that is contributing to sediment in local streams is the condition of the existing roads in the project area. Maintenance of 76 miles of roads in the project area would reduce erosion and sediment yield to these streams by improving drainage and roadbed integrity. BMP's for silvicultural activities as well as the retention of vegetative filter strips, which slow the velocity of waterflow and whose roots anchor the soil, would be utilized to reduce the impacts to soil and water resources within the project area. Closure of 38 miles of system roads,

and decommissioning of 24 miles of roads would reduce erosion and sediment yield and contribute to the protection and promotion of riparian vegetation.

There would be 4 miles of hiking/multi-use trail construction, 3.2 miles of horse/ATV trail construction and relocation along with 3.3 miles of horse/ATV trail decommissioning and obliteration. User-made and poorly located trails increase the risks to aquatic systems due to factors such as denuding steep slopes and making them susceptible to erosion or widening trails and increasing soil compaction. Well maintained trails reduce the need for users to detour outside of the designated trail area, and re-routing and decommissioning poorly located sections of trail would reduce the impacts to our aquatic ecosystems by stabilizing soils and minimizing erosion.

Enlarging, creating and maintaining 416 acres of improved forage openings may impact sediment yield in the project area for a short period of time. The primary concern would be during the construction of the openings before the establishment of grasses. Some factors that would minimize this impact are

- activities would be scattered over time
- duration in an un-vegetated state would be approximately 2 months or less
- implementation would be largely during periods of lower rainfall amounts
- openings would be located in areas with relatively gentle slopes and upon ridge tops. (Some of these openings would be found closer on benches above a stream, but a forested filter strip would be maintained between the stream and field.)

Maintenance activities for these fields such as disking could also impact sediment yield due to soil disturbance and movement, but these impacts should be much less than the construction. This activity is likely to occur once every 3 to 5 years. Plans include dropping and reforesting 49 acres of existing openings which are economically unfeasible to maintain due to factors such as location, size, or poor soils. Improvements in the design and placement of openings would reduce soil movement into aquatic systems.

Pond construction could slightly affect sediment yield and hydrology. The highest risk to aquatic systems is during construction when there is no vegetation on the dam or spillway to stabilize and anchor the soil. These areas would be mulched with straw and seeded to speed up the re-vegetation process. These ponds, approximately a half acre each, would catch and hold water that would normally run off into streams thereby contributing to its water level and flow; however, due to the ponds small sizes and their distribution across the project area, the decrease in run-off should not be significant enough to impact the aquatic biota in the local streams.

Vegetation removed by prescribed fire could slightly increase sedimentation rates immediately after implementation but these changes would be very short in duration. Within a few weeks the area would re-vegetate as more sunlight is available to the forest floor. In most areas, the mineral soil is not bare but has some duff layer left to protect the soil. The primary concern for affecting sedimentation rates during prescribed burns is associated firelines. The state's BMP's and Forest Plan standards for this activity, including rehabilitation and seeding of firelines, would minimize the potential effects.

Native cane grows along stream banks and flood plains creating a unique habitat for wildlife and acts as a filter and soil stabilizer. Enhancing and planting populations of cane within the project area would expand their beneficial contributions to aquatic system health. Woody succession within these cane brake areas may be reduced to allow for cane expansion. Implementation of this reduction would occur manually and with herbicides using product labels appropriate for the habitat (aquatic vs. terrestrial).

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 section of this document.

Site preparation, release, and the control of woody stems and invasive species associated with several of these activities would require herbicides. Given the resource protection measures that minimize herbicide movement into sensitive surface waters, there should be no significant effect to fisheries from herbicide use. The toxicity and potential risk associated with herbicides used in this project are discussed in the wildlife and water sections.

#### Indirect Effects

This alternative would improve water quality over time. The restoration activities (thinning, woodland management, understory control and prescribed burning) would increase the herbaceous plant density on the forest floor. Many of these plant species such as warm-season grasses are deep rooted and would stabilize and filter sediment out of water run-off. Furthermore, the cane restoration would increase the stability of the stream banks and create another sediment filter as the cane expands along with other plant species in the riparian habitats.

Loss of large woody debris in streams can affect the habitat diversity, nutrient movements through the stream and the hydrology which affects the morphology and stream process. The habitat data shows that the large woody debris per mile is much lower than the recommended 7 to 20 pieces per mile outlined in the Forest Plan. Placement of large woody debris would help restore stream functions and improve habitat diversity to maintain and increase species diversity.

The proposed action has the most potential for improving or maintaining water quality due to the amount of road and trail maintenance, closure, re-routing and decommissioning proposed as well as the stabilization of stream banks with cane restoration.

#### Cumulative Effects

The Moccasin Creek-Lower Big Piney Creek watershed makes up approximately 30% of the High Mountain project area. There have been several recent activities within this watershed as shown in Table 3 below (please note that treatments were implemented after stream surveys were completed and therefore are not part of the IBI/fish assemblage calculations). Several miles of the Moccasin Gap trail system have been maintained, relocated, created, and/or obliterated in recent years. The High Mountain Project would continue to move the recreational trail system into a stabilized, sustainable condition thereby reducing impacts (e.g. sedimentation) to aquatic habitats. All other activities in Moccasin Creek are proportional to the size of the watershed in relation to the size of the project area.

Table 4. Past and present management activities within the Moccasin Watershed

Treatments (On USFS Land)	Acres/ Miles	Year Treated or Affected
Whaley Knob Exploratory Gas Well	7.6ac	2011
Whaley Knob Exploratory Gas Well New Construct Access Road	1.5ac	2011
Moccasin Gap Trail Maintenance	24mi	2011
Moccasin Gap Trail Relocation/New Construction	15mi	2012
Moccasin Gap Trail Obliteration	12mi	2012
Future Actions	Approx. Acres or Miles	Approx. Year
Moccasin Gap Day-use parking area construction (3) areas	5.0ac	2013/2014
Highway 7 Passing Lane Project	3.0ac	2014

The lack of impacts these alternatives would have on water quality is typical of Forest practices 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. As shown in the water quality section, the level of concern for all watersheds within the project is expected to remain low.

### **Alternative 1 (No Action)**

#### Direct Effects

The “No-Action” alternative would not have the temporary increases in sediment yield during implementation of project activities. Current trends would likely continue.

#### Indirect Effects

The “No-Action” alternative would have higher sediment yields in the long term due to factors such as the deterioration of road and trail systems. These systems would not be repaired, maintained, or decommissioned resulting in the deterioration of the surfaces and existing sediment control structures. Activities such as thinning, and understory control would not occur under this alternative. As a result, development and maintenance of cane and an herbaceous understory in woodland habitats would be impeded due to competition and reduced sunlight. This alternative would not have the improved stabilization, sediment filtering, and potential increases in soil depth that would help to buffer local streams from increase sedimentation or flash flooding associated with both natural and man-made disturbances.

This alternative would not address the low level of large woody debris and it is anticipated that habitat diversity would continue to decline.

Cumulative Effects

See the PA.

**Alternative 2 (No Herbicide)**

Direct Effects

This activity would eliminate the risk of contaminating local streams, but the project would require an increase in mechanical treatments to control woody plant species for stand regeneration, woodland restoration activities, and opening maintenance. This change would increase the intensity and number of disturbance events which would increase the potential for higher sedimentation rates; however, the difference in sediment yield between the Proposed Action and Alternative 2 is likely to be slight if any (see the water quality section for further information). All other effects would be the same as the PA.

Indirect Effects

The primary difference from the Proposed Action is the extent and the time required to establish the herbaceous understory in the woodlands. Mechanical and manual treatments to control woody species are not as effective as herbicide treatments. This change would cause some areas to become too thick (more canopy closure), shade out the herbaceous plant species and decrease the beneficial effects of stabilization, sediment filtering and buffering of local streams. All other effects would be similar to the proposed action.

Cumulative Effects

See the PA.

**H. Proposed, Endangered, Threatened and Sensitive Species (PETS)**

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 review 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 20 federally proposed, endangered and threatened species identified through informal consultation with the USFWS (Forest Plan BA) were also considered. All but 16 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 have suitable habitat for these species.

Table showing PETS species known to occur or which may occur within project treatment areas or area of influence include;

COMMON NAME	SCIENTIFIC NAME	CLASSIFICATION
Gray Bat	<i>Myotis grisescens</i>	Endangered
Indiana bat	<i>Myotis sodalis</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
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
Longnose Darter	<i>Percina nasuta</i>	Sensitive
Eastern Small Footed Myotis	<i>Myotis leibii</i>	Sensitive
Nearctic Paduniellan Caddisfly	<i>Paduniella nearctica</i>	Sensitive
Alabama Snow-wreath	<i>Neviusia alabamensis</i>	Sensitive
Ovate-leaf Catchfly	<i>Silene ovata</i>	Sensitive
Ozark Spiderwort	<i>Tradescantia ozarkana</i>	Sensitive

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, refer to the BE found in the process file for this project.

## **Proposed Action and All Alternatives**

### Direct/Indirect Effects

Neither the PA or any of the alternatives are likely to adversely affect the Indiana bat, Gray bat, or Ozark Big-eared bat. Arkansas State Forestry Commission's Best Management Practices (BMP's) and all standards identified in the Revised Forest Plan and the High Mountain project would be applied to all action alternatives. These measures should minimize or eliminate any potential effect to these species.

The action alternatives could benefit the Isopod, Nearctic caddisfly, Longnose Darter, Bachman Sparrow, Ozark Chinquapin and Small-headed pipewort. In contrast, the no action alternative would allow conditions for these species to continue to degrade. For the other sensitive species, the BMP's and all standards identified in the Revised Forest Plan should minimize any impacts to these species. Individuals may be impacted by the action alternatives but are not likely to cause a trend to federal listing or loss of viability for any of the Regional Forester's Sensitive Species.

### Cumulative Effects

Based upon the Biological Assessment for the Forest Plan, implementation of these types of forest practices at the levels identified in the Revised Forest Plan would not result in an adverse effect for any of the Federally Threatened and Endangered species nor cause a trend toward listing for the Regional Forester's Sensitive species. At the project level, all cumulative effects from past, present and foreseeable future actions would result in a "may affect -not likely to adversely affect" determination for the Indiana bat, gray bat, and Ozark Big-eared bat for the proposed action. The other action alternative and NO Action would decrease management activities which would initially decrease the risk to these species, but in the long term, the habitat improvements and reduction in sedimentation in the local streams would also be minimized which would decrease the suitability of this area.

Of the sensitive species identified as occurring within the analysis area, Ozark chinquapin would 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 impacted. For these sensitive species identified in the project area, the determinations range from actions that are beneficial to actions that may impact individuals but are not likely to cause a trend to federal listing or loss of viability. For more details, see the High Mountain Biological Evaluation (BE).

## **I. Climate Change**

### **Existing Condition**

Although it is possible to quantify a project's direct effects on carbon sequestration and Green House Gas (GHG) emissions, there is no certainty about the actual intensity of individual project's indirect effects on global climate change. Uncertainty in climate change effects is expected because it is not possible to meaningfully link individual project actions to quantitative effects on climatic patterns. Complete quantifiable information about project effects on global climate change is not currently possible and is not essential to a reasoned choice among

alternatives since it would be such a minute factor in the climate change equation. However, based on climate change science, we can recognize the relative potential of some types of proposals and alternatives to affect or influence climate change and therefore provide qualitative analysis to help inform project decisions. Climate change in this assessment focused on using qualitative rather than quantitative analysis.

Forests play a major role in the global carbon cycle by storing carbon in live plant biomass (approximately 50% of dry plant biomass is carbon), in dead plant material, and in soils. Forests contain three-fourths of all plant biomass on earth, and nearly half of all soil carbon. The amount stored represents the balance between absorbing CO<sub>2</sub> from the atmosphere in the process of photosynthesis and releasing carbon into the atmosphere through live plant respiration, decomposition of dead organic matter, and burning of biomass (Krankina and Harmon, 2006).

According to the laws of organic chemistry the process of photosynthesis **removes carbon** from the atmospheric pool. About half the carbon absorbed through photosynthesis is later released by plants through respiration as they use their own energy to grow. The rest is either stored in the plant, transferred to the soil where it may persist for a very long time in the form of organic matter, or transported through the food chain to support other forms of terrestrial life. When plants die and decompose, or when biomass or its ancient remains in the form of fossil fuels are burned, the original captured and stored carbon is released back to the atmosphere as CO<sub>2</sub> and other carbon-based gases. In addition, when forests or other terrestrial ecosystems are disturbed through harvesting, conversion, or natural events such as fires, some of the carbon stored in the soils and organic matter, such as stumps, snags, and slash, is oxidized and released back to the atmospheric pool as CO<sub>2</sub>. The amount released varies, depending on subsequent land use and probably rarely is more than 50% of the original soil store (Salwasser, 2006). As forests become older, the amount of carbon released through respiration and decay can exceed that taken up in photosynthesis, and the total accumulated carbon levels off. This situation becomes more likely as timber stands grow overly dense and lose vigor. Wildfires can cause of a quick carbon release from forests but have little effect on the long term since most carbon released in the fire would eventually be released through decay. At the global scale, if more carbon is released than is captured and stored through photosynthesis or oceanic processes, the concentration of carbon dioxide (CO<sub>2</sub>) builds in the atmospheric pool. However, the greatest changes in forest sequestration and storage over time have been due to changes in land use and land use cover, particularly from forest to agriculture. More recently changes are due to conversions from forest to urban development, dams, highways, and other infrastructure (Malmsheimer, Heffernan, Brink, et al.).

## **Proposed Action and Alternative 2**

### Direct Effects:

The proposed harvest operations associated with the Proposed Action and Alternative 2 would result in a release of carbon and reduce carbon storage in the forest both by removing organic matter (trees) and by increasing heterotrophic soil respiration. However, much of the carbon that would be removed is offset by storage in forest products. With the proposed action and alternative 2 some of the carbon currently sequestered in vegetation and soils would be released back to the atmosphere. In the short-term, greenhouse gas emissions and alteration to the carbon

cycle would be caused by hazardous fuel reduction activities, harvests and thinning of overstocked stands. In the long term, however, these actions would also increase the forest's ability to sequester additional carbon, improve the forest's resilience to the potential impacts of climate change and decrease the potential for uncharacteristically severe wildfires. Harvest would remove some of the mature stems with diminished ability to sequester additional carbon; some of the carbon sequestered in harvested stems would continue to be stored in manufactured wood products. Residual stems and regeneration in the proposed project area would continue to sequester and store carbon.

Forest management that includes harvesting provides increased climate change mitigation benefits over time because wood-decay CO<sub>2</sub> emissions from wood products are delayed (Malmsheimer, Heffernan, Brink, et al.). Prescribed burning activities, although a carbon neutral process, would release CO<sub>2</sub>, other greenhouse gasses, and particulates into the atmosphere. However, implementing the proposed prescribed burns on a 3 to 5 year cycle would reduce fuel loading and could be expected to reduce fire intensity and severity as well. Wildfires may still occur in the proposed project area; however, because fuel loads would have been reduced, there would be a lower risk of uncharacteristically severe wildfire for the treated acres than the current condition poses. The reduced risk has a two-fold effect on greenhouse gas emissions or the carbon cycle:

- There is a direct beneficial effect on climate change of decreased greenhouse gas emissions from the treated acres, because the risk of acres being burned by uncharacteristically severe wildfires would be reduced.
- There is an indirect beneficial effect because live stands of trees would retain higher capacity to sequester carbon dioxide compared to stands killed by uncharacteristically severe wildfires, especially if not immediately reforested.

#### Indirect Effects:

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

#### Cumulative Effects:

As Green House Gas (GHG) emissions and carbon cycling are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with this project or any number of similar projects. It is not expected that the effects of this project or multiple projects can be specifically attributed the cumulative effects of global climate change. However, the cumulative effects of climate change on this project can be seen in the form of more frequent environmental events such as the red oak borer outbreak in the year 2000, the ice storm of 2009, the tornado event in 2011, and the drought of 2012. Forests with older trees are less able to withstand and recover from these events.

## **Alternative 1: (No Action)**

### Direct Effects:

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

### Indirect Effects:

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

### Cumulative Effects:

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

A possible cumulative effect with the no action alternative is harvest of trees that have reached or passed maturity or are too thick would not occur. The ability of those trees to sequester additional carbon from the atmosphere would continue to be less than that of younger stands of trees. No wood products such as wood flooring, furniture and lumber that would store carbon would be obtained from the proposed project area.

## **Alternative 2: No Herbicide Use**

The effects of Alternative 2 would be the same as those listed under the Proposed Action and Alternative 3 above.

## **J. Human Health Factors**

### **Existing Condition**

Chemicals used to control plants are known as herbicides. Herbicides are being considered in the Proposed Action with the goal of incorporating herbicide treatment along with non-chemical treatments. Herbicides kill the existing plant but often allow remaining seeds to germinate. Herbicides are known through experience with similar activities to be one of the most effective treatment methods for eradicating or controlling weed species that currently exist (For the

purpose of this document weed species consists of vegetation that may be outside of management desired objective such as non-native invasive species or aggressive native species). When herbicides are used in conjunction with an integrated treatment effort it improves the effectiveness of non-chemical treatments, either concurrently or as follow-up treatments.

The primary herbicides proposed for use within the Project Area have metsulfuron methyl, triclopyr, imazapyr, and glyphosate as their active ingredients. Mixtures of herbicides could be used where they would provide more effective control, particularly for weeds that may be persistent. Because the herbicides proposed for use do not persist in the soil at effective levels for more than a few months (at the maximum), follow-up treatments may be needed to eliminate new sprouts that were in seed during the initial treatment. The most noticeable consequences from weed treatment would be the long-term, beneficial improvements to native ground vegetation such as grasses, forbs and shrubs.

Only herbicide formulas/products that have been registered with the Environmental Protection Agency (EPA) for rangeland, forest land, or aquatic use would be applied. In addition, the Forest Service has completed risk assessments that have analyzed the risk of specific herbicides on human health and safety, on wildlife/fish, and on non-target plants. Only herbicides with a completed risk assessment would be used.

No aerial application of herbicides would be used for this project. Herbicides would be applied using ground-based methods such as hand application using gloves, or spray using a backpack containing the herbicide attached to a flexible sprayer, wand or other hand application device that directs the chemical onto the target weed. Vehicles may be used with a mounted herbicide tank and boom or wand spray device to direct each respective herbicide used. Booms or wands may be articulated or fixed.

The following table explains terminology commonly used in evaluating health risk associated with herbicides.

Herbicide Risk Assessment Standard Terminology

<b>Term</b>	<b>Abbrev</b>	<b>Explanation (see risk assessments for specific definitions)</b>
Toxic		The short-term effects of exposure to a chemical, which appear immediately upon exposure. See specific sections of the risk assessments for definition of the various "end points" of exposure, e.g. nervous system.
Sub-chronic		The effects that do not appear immediately, but that would appear over a short period of time after exposure, or if exposure continues for a period of time.
Chronic		Effects over a number of years (or over a lifetime) of repeated exposure
No Observed Adverse Effect Level	NOAEL	The amount of a substance that shows no toxic effects given short term (mg/kg body weight) or to show lack of chronic effects over long duration may be expressed as a dose over time (mg/kg/day).
No Observed Effect Concentration	NOEC	Used for plants to determine the lowest concentration at which a concentration of herbicide had no effect.
Safety Factor		Once a no observable effect level is established, safety factors are applied for the human risk assessments in order to set a reference dose. Safety factors depend on the information used for the no effect finding.

		Factors include such circumstances as uncertainties in species-to species extrapolation as well as accounting for sensitive individuals in the population. Each factor reduces the exposure dose by dividing by 10, so that a NOAEL of 5 would become an RfD of 0.05 if three safety factors were applied.
Reference Dose	RfD	The amount of a substance that would not have an adverse effect if this does were given every day over a lifespan of 70 years. It is measured in milligrams of substance per kilogram body weight of the person of concern, per day (mg/kg/day). An RfD is basically defined as a level of exposure that would not result in any adverse effects in any individual. The U.S. EPA RfDs are used because they generally provide a level of analysis, review, and resources that far exceed those that are or can be conducted in support of most Forest Service risk assessments. In addition, it is desirable for different agencies and organization within the Federal government to use concordant risk assessment values.
Hazard Quotient	HQ	The result of dividing the reference dose by the expected exposure to provide a measure of the hazard and so a relationship to the expected risk.

The information in this analysis was provided from the SERA identified in the following table:

**Herbicide Risk Assessment Information:**

	<b>Herbicide Name</b>	<b>Date prepared</b>	<b>Reference</b>	<b>Pages</b>
1	Glyphosate	March 1, 2003	SERA 2003a	281
2	Imazapyr	December 18, 2004	SERA 2004e	149
3	Metsulfuron methyl	December 9, 2004	SERA 2004d	152
4	Triclopyr	March 15, 2003	SERA 2003b	264
5	Fluroxypyr	June 12, 2009	SERA 2009	140

Note: Tank mixes and adjuvants (such as Cide-Kick) may be added to the herbicide to improve effectiveness and control of target species. All herbicides would be applied at rates and use only application methods specified on the label. Additional spot treatments would be needed to reach the desired future condition in some areas.

These are standard risk assessment procedures, tested by several years of EPA use and scrutiny by the larger scientific community. As noted in a number of the risk assessments, the anticipated effects can be minimized or avoided by prudent industrial hygiene practices during proper handling of the herbicides. No chemical has been studied for all possible effects and the use of data from laboratory animals to estimate hazard or the lack of hazard to humans is a process that is fraught with uncertainty. Prudence dictates that normal and reasonable care should be taken in the handling of this or any other chemical. Notwithstanding these reservations, the use of herbicides does not appear to pose any risk of systemic toxic effects to workers or the general public in Forest Service Programs. Risk Assessment documents for the specific types of herbicide proposed to be used may be found at <http://www.fs.fed.us/foresthealth/pesticide/risk.shtml>.

## Glyphosate

### Description

The active ingredient herbicide *glyphosate* (examples of trade name RoundUp, RoundUp Pro, Accord SP) would typically be applied to target vegetation with a directed ground application by back pack or vehicle mounted sprayer, at manufacture's labeled rates per acre. Mixing rates would vary depending on topography and amount of vegetation to be controlled. Repetitive treatments may occur in follow up years if overall treatment is needed. Spot applications would occur in years following the initial treatments to control future growth. Spot applications would be made at the same rate and mixture or less, but would be applied only to small areas as needed, and typically made with backpack or vehicle mounted sprayer.

### Risk Summary

The risk characterization for both workers and members of the general public are reasonably consistent and unambiguous. For both groups, there is very little indication of any potential risk at the typical application rate. Even at the upper range of plausible exposures in workers, exposure is below the level of concern, even at the upper levels when broadcast spray is used. For members of the general public, none of the longer-term exposure scenarios exceed or even approach a level of concern. There is no route of exposure or exposure scenario suggesting that the general public would be at risk from longer-term exposure to *glyphosate*. Only exposure scenarios that contemplate consumption of water directly out of a pond immediately after a spill exceed the levels of concern.

The current risk assessment for *glyphosate* generally supports the conclusions reached by U.S. EPA: Based on the current data, it has been determined that typical application rate does not approach the level of exposure in the reference dose.

At the typical application rate, the exposure to hazardous levels would not be reached or exceeded under worst-case conditions (SERA 2003a).

## Imazapyr

### Description

*Imazapyr* would be applied directly to target vegetation with a backpack sprayer, at manufacture's labeled rates (examples of trade name Arsenal, Chopper, Stalker) per acre. In some cases where woody growth is larger, a hack and squirt method or cut stump application may be made directly to each stem. Mixing rates would vary depending on topography and amount of vegetation to be controlled. Repetitive treatments may occur in follow up years if overall treatment is needed. Spot applications would occur in years following the initial treatments to control future growth. Spot applications would be made at the same rate and mixture or less, but would be applied only to small areas as needed. Solutions may contain nonionic surfactants or vegetable-based seed oil to increase surface contact at recommended label rates or have them added according to the manufacturer's label.

### Risk Summary

Typical exposures to *imazapyr* do not lead to estimated doses that exceed a level of concern for either workers or members of the general public at either the typical or highest application rate. For workers and the general public, the upper limits of exposure when compared with reference dose are sufficiently below a level of concern that the risk characterization is relatively unambiguous. Based on the available information and under the foreseeable conditions of application, there is no route of exposure or scenario suggesting that the workers or members of the general public would be at any substantial risk from longer term exposure to *imazapyr* even at the upper range of the application rate considered in this risk assessment. The EPA has classified *imazapyr* as a Class E compound, one having evidence of non-carcinogenicity. Under typical and conservative worst-case exposure assumptions, the evidence suggests that no adverse effects would be expected from the application of *imazapyr* (SERA 1999b).

### Metsulfuron methyl

#### Description

*Metsulfuron methyl* is a selective herbicide that would be used to control brush and certain woody plants, annual and perennial broadleaf weeds, and annual grassy weeds. It is recommended for weed control and suppression in the establishment and maintenance of native grasses along with managing right-of-ways. Commercial products (example: Escort, Ally) contain 60 percent *metsulfuron methyl* and 40 percent inert ingredients. *Metsulfuron methyl* would be applied directly to target vegetation with a back pack or vehicle mounted sprayer, at manufacturer's labeled rates per acre. (Note: One modification to this would be in applications to control Multiflora rose. In that case, a handgun applicator would be used to direct the treatment to the soil within 2 feet of the stem union for each plant). Mixing rates would vary depending on topography and amount of vegetation to be controlled. Repetitive treatments may occur in follow up years if overall treatment is needed. Spot applications would occur in years following the initial treatments to control future growth. Spot applications would be made at the same rate and mixture or less, but would be applied only to small areas as needed. Solutions may contain nonionic surfactants to increase surface contact at recommended label rates or have them added according to the manufacturer's label.

### Risk Summary

Typical exposures to *metsulfuron methyl* do not lead to estimated doses that exceed a level of concern. For workers, no exposure scenarios, acute or chronic, exceeds the reference dose, even at the upper ranges of estimated dose. For members of the general public, all upper limits for hazard quotients are below a level of concern. Thus, based on the available information and under the foreseeable conditions of application, there is no route of exposure or scenario suggestion that workers or members of the general public would be at any substantial risk from acute or longer term exposures to *metsulfuron methyl* (SERA 2004d).

## Triclopyr

### Description

The herbicide *triclopyr* [in a *triethylamine salt* formulation] (example trade name Garlon 3A,) would be used on woody vegetation that is less responsive to treatment by *glyphosate*. This herbicide would be applied directly to target vegetation typically with a backpack or vehicle mounted sprayer, at manufacture's labeled rates per acre. Mixing rates would vary depending on topography and amount of vegetation to be controlled. Repetitive treatments may occur in follow up years if overall treatment is needed. Spot applications would occur in years following the initial treatments to control future growth. Spot applications would be made at the same rate and mixture or less, but would be applied only to small areas as needed. Except for aquatic treatments, solutions may contain nonionic surfactants to increase surface contact at recommended label rates or have them added according to the manufacturer's label. In some cases where woody growth is larger, a hack and squirt method or cut stump application may be made directly to each stem. The rate of application if this method is used would be in a 1:1 ratio or undiluted. *Triclopyr* (ester) the oil based formulation (one trade name being Garlon 4) has similar application methods as the *triclopyr triethylamine* formulation described above. Additional application methods for *Triclopyr* (ester) include; broadcast foliar ground applications, which involve the use of a two- to six-nozzle boom mounted tank and sprayer on a tractor or other heavy duty vehicle.

### Risk Summary

There is no indication that workers would be subject to hazardous levels of either form of *triclopyr* at the typical application rate and under typical exposure conditions. Nonetheless, at the upper range of exposures, all application methods exceed the level of concern based on the chronic reference dose (but not the acute RfD). Thus, for workers who may apply *triclopyr* (any formulation) repeatedly over a period of several weeks or longer, it is important to ensure that work practices involve reasonably protective procedures to avoid the upper extremes of potential exposure. At higher application rates, particularly rates that approach the maximum application rate of 10 lbs/acre, measures should be taken to limit exposure. These measures would need to be developed on a case-by-case basis depending on the specific application rates that are used and the type of the applications that are employed. For members of the general public, the risk characterization is relatively unambiguous at the typical application rate and under the foreseeable conditions of exposure. There is no route of exposure or exposure scenario suggestion that the general public would be at risk from longer term exposure to either form of *triclopyr*. Even at the maximum projected application rate of 10 lbs/acre, the only long-term scenario that exceeds the level of concern is the consumption of contaminated fruit. Several acute exposures also lead to exposure to levels that are above the level of concern. For instance, accidental spray over the lower legs as well as contacting contaminated vegetation both exceed the level of concern at the central estimate of exposure when the highest application rate is considered to be (10 lbs/acre). All dermal exposures exceed the level of concern. These dermal exposure assessments are extremely conservative and designed to identify which possible types of exposure would be most hazardous. For *triclopyr*, such scenarios include dermal contact and accidental spills into water (SERA 2003b).

## Fluroxypyr

### Description

The Herbicide *fluroxypyr* which includes the trade name, Vista XRT (Ultra), is a chemical which controls a wide range of broadleaf weeds and woody brush. *fluroxypyr* is classified as a Group I Herbicide, with a mode of action where the weed cannot grow due to disruption of plant cell growth. *Fluroxypyr* belongs to the Pyridines group of chemicals. *Fluroxypyr* is registered as a spray treatment for the control of a wide range of broadleaf weeds and woody species.

Application methods for larger areas would be by hydraulic spray (typically broadcast sprays using truck/tractor mounted equipment) or pull behind trailers with tanks and boom sprayers wick type application may also be utilized.

Small areas would be treated by backpack application (selective foliar application or spot treatments). Application rates would be according to the manufacturer's label. Further details of use can be found in the Direction of Use section on the Product Label. *Fluroxypyr* would be mixed with *triclopyr* (Garlon 3) to achieve the desired results in certain circumstances.

### Risk Summary

General exposures to workers in terms of normal conditions, for prolonged application times even at the highest application rate, exposure levels of *fluroxypyr*-MHE are substantially below the level of concern. Dermal exposures to *fluroxypyr* are not likely to pose a risk to workers. Damage to eyes studies concerning the irritant effects of Vista XRT formulation, the more concentrated formulation of *fluroxypyr*-MHE are not available. While somewhat speculative, the more highly concentrated Vista XRT formulation (45.52% a.e.) may pose a greater risk of eye damage to workers than a diluted formulation would pose. General public the risk characterizations for all non-accidental exposure scenarios are easily interpreted, and there is no basis for assuming plausible risks to the general public. The upper bounds of the other non-accidental acute exposure scenarios for the general public are below the level of concern by factors from about 10 to greater than 1400 (SERA, 2009). The EPA has not made a common mechanism of toxicity finding for *fluroxypyr* and any other substances, and *fluroxypyr* does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that *fluroxypyr* has a common mechanism of toxicity with other substances. U.S. EPA/OPP, 2004e, p. 73.

### Sub chronic and Chronic Toxicity

Considerable information exists on sub chronic and chronic effects due to exposure to herbicide in controlled animal studies. Sub chronic and chronic effects are those that might occur over a long period of time, after weeks or years of exposure. Sub chronic and chronic effects are reviewed in terms of potential impacts to their potential neurological or reproductive effects. These evaluations assume some lower threshold level below which these effects would not occur.

Other potential health effects evaluated include the herbicide potential to be carcinogenic, mutagenic, or teratogenic. These impacts are not threshold dependent, and so they are evaluated under the assumption that any level may cause the health effect. Hence, they rely on probability, based on exposure levels.

Considering anticipated exposure levels to workers and the public all five herbicides express evidence of non-carcinogenicity. Also, Glyphosate, Fluroxypyr and Imazapyr show no evidence on being mutagenic or reproductive while Metsulfuron methyl and Triclopyr evidence showed no to slight chance of mutagenic or reproductive effects.

In summary the five herbicides considered for use in the Proposed Action and Alternative 3 are not expected to create a health concern for carcinogenic, mutagenic, teratogenic sub-chronic, chronic effects to the workers or to the general public. Since forestry use of herbicide poses a low risk and usage is likely to occur only once or twice over 25 to 75 years cumulative effects are not likely to occur.

### **Alternative 1 (No Action)**

#### Direct/Indirect effects

No herbicides would be applied in the project area. No direct or indirect consequences to human health would occur related to herbicides. Dead and dying trees (snags) pose a potential safety threat to forest visitors and workers. If alternative 1 is chosen no snags would be removed within this project area.

#### Cumulative effects

No herbicides would be applied in the project area. Over time the risk of a forest visitor or worker being struck by a falling snag would increase. As more and more trees die and the number of snags increase across the project area the risk to visitors would increase as well. Also, the potential for a catastrophic fire to happen in this project area would increase as would the risk to a fire fighter or member of the public due to greater fuel loading and increased potential of a large fire.

### **Proposed Action and Alternative 2**

#### Direct/Indirect effects

The term public includes hikers, campers, hunters, fuel-wood gatherers, and other forest users. It basically includes all people who use or work in the project area except those who work with the herbicide treatments.

Risk to the public due to herbicide use is not likely to occur because none of the herbicides are persistent in the environment or in the human body. Also, none of the herbicides proposed to be used in this project bio-accumulates in animal tissues, so there is no threat of human exposure by eating animals that have come into contact with the vegetation on which herbicides were applied. Snags do pose a direct negative effect for forest visitors and workers in the forest. If either the proposed action or alternative 2 were chosen then some of the snags in the project area would be made safe within the activity areas. This would result in a safer working environment for forest workers and forest visitors.

#### Cumulative effects

No cumulative effects are expected. This includes alternatives that propose herbicide use. As shown above effects can be minimized or avoided by prudent hygiene, proper handling and following label application rates. Generally speaking, contamination of workers, the public or the

environment shows very little indication of any potential risk at the typical label recommended application rates and methods.

## **K. Heritage Resources**

### **Existing Condition**

This project proposal falls under archeological protocols specified by an existing Programmatic Agreement (PA) between the United States Forest Service, Native American Federally-recognized Tribes, and the Arkansas State Historic Preservation Office (SHPO). This PA is authorized by and complies with the National Historic Preservation Act of 1966 (NHPA), as amended (80 Stat. 915 et seq.; 16 U.S.C. 470 et seq.). The project area has received partial inventory under previous projects, and a complete archeological inventory has been completed in conjunction with this project. The final Heritage Resource Report was sent to the SHPO and the Native American Tribes. Concurrence on National Register eligibility and the avoidance of adverse effects by project implementation to historical properties was received from SHPO on October 15, 2012. This included a list of known and recorded archeological sites, their recommendations of eligibility for possible inclusion in the Register of Historic Places (NRHP), and avoidance of adverse effects.

Within this project are several miles of user created trails. This illegal use varies from full sized vehicles to UTVs, ATVs, Equestrian and hiking. The remoteness of much of the project area lends itself to these types of uses. These trails are not designated, unmanaged, poorly located, and have the potential to impact cultural sites by erosion and physical damage. The sites range from historic farmsteads, prehistoric rock shelters, lithic scatters, to historic roads with unique features from around the turn of the 20<sup>th</sup> century. A portion of the trails are located on closed/decommissioned roads used as timber haul routes decades ago.

Moccasin Gap Trail system is within this project area and includes approximately 38 miles of designated multiuse trail. Some of the trail system follows existing roads and some of the trails have been constructed. Approximately, 70 percent of the land in and around the trail system is Public Domain land. That means that the National Forest acquired ownership from unsettled lands belonging to the State of Arkansas. The remaining 30% was acquired by National Forest from private ownership and these lands have the bulk of historic sites on them.

### **Proposed Action and Alternative 2**

#### Direct/Indirect Effects

For the purposes of this analysis the proposed action and alternative 2 would have the same effects to heritage resources. The implementation phase of the proposed action and alternative 2 could have a negative effect on historical properties due to increased people and vehicle traffic in and around the activity areas where sites are located. Even though known sites would be protected by excluding them from any activity areas, the sites could be exploited by having workers or visitors in and around the activity. Local informants report that several areas, such as

Buzzard Roost and Rainbow rocks, were heavily visited in the past, removing many artifacts made by Native Americans who also used these areas for many centuries. Across the Forest Journey et al 2010:67-68), where archeological sites are heavily visited, such intense visitorship has resulted in soil compaction, use of camp fires in rockshelters that has damaged sensitive rock art, and looting of human burials. The Arkansas State Historic Preservation Office, the United Keetoowah Band of Cherokee Indians, the Osage Nation, and the Caddo Nation have all recommended relocation of trails away from culturally sensitive area to reduce impacts caused by intense visitation and use of motorized vehicles.

In the area of Buzzard's Roost SIA Forest Service roads 93691M and 93691A have been closed and removed from the OHV designated routes map for safety reasons due to the unsafe condition and resource damage occurring to the two roads (site visit fall of 2011). The above roads which access Buzzard Roost Special Interest Area from the east would remain closed to motorized traffic and would be stabilized for resource protection. In order to ensure continued public access to Buzzard Roost SIA, the PA and Alternative 2 both propose access from the west which includes construction of a small parking area just outside the SIA boundary. The above actions could have a positive effect on heritage resources because access would be by foot traffic only and fewer people would be in the area of any heritage sites. Additionally, Law Enforcement and Investigation can enforce motorized (OHV) violations, once managed travel routes are established. This alternative would locate portions of motorized trails away from certain areas within the Buzzard Roost Special Interest Area. This would also decrease the likelihood of damage to any of these historical properties, by reducing ease of access for looters carrying equipment and avoiding Law Enforcement patrols.

Another area where trails would be relocated is in the Moccasin Gap trail system, a portion of one of the trails follows a historic route which has unique features along it. Moving the trail system off this section would reduce intensive motorized use and this would be a positive effect, enhancing and protecting the features of this linear historic site.

Any new site discoveries made during project implementation would have the following actions taken; implementation of the activity would cease until an archeologist could record the site and make a determination of eligibility. The archeologist would recommend/implement any site specific project designs to ensure the protection of the site.

As people become accustomed to the non-motorized (foot) access to Buzzard Roost SIA, the reduction of vehicle traffic and mass concentration of campers and visitors should positively affect the site and reduce the long term and cumulative effects of continued uncontrolled visitation and artifact collecting (Davis 1982). Instances of looting or damage to sites by dispersed camping in heritage sites would be lessened. The access trail would be constructed away from any known heritage resources, reducing the likelihood that over time any of these resources would be damaged from intensive visitation and use, as well as vandalism and looting.

Any use on the closed rehabilitated roads would be stopped, and instances of motorized use around historic sites (potentially damaging them) should stop.

## **Proposed Action and Alternative 2**

### Cumulative Effects

Informants report that the Buzzards Roost Special Interest Area has been visited for generations by residents of Treat. At one time, many Native American projectile points were commonly found here. However, over the years, fewer artifacts indicative of time and culture have been found due to the previous collecting. During the present inventory survey, no projectile points or form tools were found here.

Also, the intense visits, particularly overnight camping, have caused damage by concentrating fire rings in the protected portions of the Buzzards Roost Special Interest Area. Such intense camping is also evident throughout the project area, where hunters concentrate their camping activities in the locations of former house sites, or in floodplains where prehistoric people once had dwellings, fields, and encampments.

The proposed activities that focus on control of motorized access can delay the accumulation of adverse effects. The combined enforcement of laws that protect archeological resources with control of motorized off-road vehicles should improve the long term protection of sites important to prehistory and history.

### **Alternative I (No Action)**

#### Direct/Indirect Effects

This Alternative could have a negative effect on historical properties due to continued unmanaged vehicle traffic through the Buzzard Roost/Rainbow Rocks Special Interest Areas and other sites along the old roads through the project. Past visitors in the area have disturbed and removed cultural materials around the heritage sites, dispersed camping has caused damage, and camp fires have been built within sheltered overhangs where rock art and perishable remains could be present. If these activities were to continue this would have a negative effect on the heritage resources in the SIA.

Other areas within the High Mountain Project currently have heritage sites at risk due to unmanaged recreation in the form of user created ATV trails, and hiking trails which either go close to or go through heritage sites. The no action alternative would take no steps toward managing this or moving this use to more stable areas away from heritage sites. The no action alternative could have a severe negative effect on the heritage resources in this project area.

### **Alternative I (No Action)**

#### Cumulative Effects

The no action alternative could over time increase the wear and tear to the Buzzard Roost/Rainbow Rocks SIA and other historical properties within the proposed project area. Illegal off road traffic, vandalism and looting, uncontrolled dispersed camping and erosion would continue. The no action alternative could have a severe negative effect on the heritage resources in this project area, which would accumulate through time, and could require remedial action in the future.

## Chapter IV.

### Coordination and Consultation

The Forest Service consulted the following individuals, Federal, Tribal, State, and local agencies during the development of this environmental assessment:

#### **ID Team Members by Location:**

##### **Ozark National Forest – Big Piney Ranger District:**

Terry Hope - Recreation Assistant  
Jim Dixon – Integrated Resources Team Leader  
Dwayne Rambo - Wildlife Biologist  
Rickey Adams – Engineering Technician  
Sarah Davis – Wildlife Biologist  
Kenney Smedley – Engineering Technician  
Mike Mulford – NEPA Coordinator  
Sam Clark – Silviculturist  
Anthony Harris – Timber Management Officer  
Mark Morales – Fire Management Officer  
Leif Anderson – Forester  
Roger Gunter – Forester  
Mike Walden – Heritage Resources Technician  
Michael (Smoke) Pfeiffer – Archeologist  
Chris Brightwell – Integrated Resources Crew Leader  
Heath Thomas - Integrated Resources Crew Leader

##### **Ozark National Forest – Supervisor’s Office:**

Rick Monk – Hydrologist  
J. Keith Whalen – Forest Fisheries Biologist  
Marvin L. Weeks – Forest Soil Scientist  
Dr. David Journey – Archeologist

##### **Arkansas Game and Fish Commission**

Rick Chastain – Deputy Director  
A J Riggs – Wildlife Management Supervisor  
– Field Biologist

##### **Federal, Tribal, State, and Local Agencies:**

Theo Witsell – Arkansas Natural Heritage Commission  
Arkansas State Historic Preservation Office  
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Michael Darrow Historian Fort Sill Apache Tribe of Oklahoma  
Josh Sutterfield Historic Preservation Officer Miami Nation of Oklahoma  
Historic Preservation Office Peoria Tribe of Oklahoma  
Jack Shadwick Historic Preservation Officer Modoc Tribe of Oklahoma  
Historic Preservation Officer Ponca Tribe of Oklahoma  
Joyce Bear Historic Preservation Officer Muskogee (Creek) Nation  
John Berry Tribal Historic Preservation Officer  
Dr. Andrea Hunter Historic Preservation Officer Osage Nation  
Sandra Massey Historic Preservation Officer Sac and Fox Nation of Oklahoma  
Rhonda Dixon Historic Preservation Officer Ottawa Tribe of Oklahoma  
Natalie Deere Historic Preservation Office Seminole Nation of Oklahoma  
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Lisa Stopp Historic Preservation Officer United Keetoowah Band of Cherokee  
Stratford Williams Historic Preservation Officer Wichita and Affiliated Tribes  
Sherry Clemons Historic Preservation Officer Wyandotte Tribe of Oklahoma

## APPENDIX B

### Supporting Literature

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## APPENDIX C

### Public Involvement

To encourage public participation in the **High Mountain Project** decision process, the District published an initial scoping letter in Russellville's *The Courier* (The Official Paper of Record for the Big Piney Ranger District) on June 1st, 2012, requesting comments, questions, and offering detailed information to those expressing an interest in the project. The project was also published in the Ozark- St. Francis National Forest Schedule of Proposed Actions and on the Forest planning website.

Another way the District seeks out public participation is by sending an initial scoping letter to those landowners located within one half mile of the proposed project and to those people who have shown a previous interest. On May 29<sup>th</sup>, 2012, 152 neighboring landowners, the Native American Tribes, and other interested parties were mailed a letter with maps, explaining the project proposal. They were asked to comment on, or involve themselves in, the proposed project, and were informed about the kinds of decisions to be made.

Six letters were returned as undeliverable. The initial scoping effort resulted in 4 responses (2 from Native American Tribes and 3 from members of the public).

Internally, the Interdisciplinary Team met and participated in several field trips to develop the Proposed Action and the Alternatives which were analyzed in the EA. The ID team developed "Key issues" from field trips, meetings, and public scoping. A Key issue is an issue for which an alternative would be developed and considered in detail.

## APPENDIX D

### Economic Analysis

#### Assumptions

The economic analysis for the Proposed Action (PA) and Alternatives 2 includes revenues and costs associated with timber management. It doesn't include costs for discretionary actions, because these actions will only be implemented if funding is available. Examples include, but are not limited to, opening construction, woodland management, pond construction, thinning to create woodlands, prescribed burning.

#### Results

The following table displays a summary of the economic analysis for this project. For more information or to view the economic analysis in its entirety see the process file for this project.

<b>Criterion</b>	<b>PA</b>	<b>Alt. 2</b>
Benefit/Cost Ratio	1.92	2.71
Internal Rate of Return (percent)	120.66	NA
Investment Length (years)	3	3
Net Annual Equivalent (\$)	\$579,885.58	\$763,849.37
Present Net Value ()	\$1,609,235.26	\$2,119,751.53
Present Value (PV)-Benefits ()	\$3,357,299.81	\$3,357,299.81
Present Value (PV)-Costs ()	-\$1,748,064.54	-\$1,237,548.27

Note: The PV-Costs are the same for the PA and Alternatives 2 because this is based on the cost of reforestation for all regenerated acres (seedtree and shelterwood acres). The regenerated acres are the same, therefore the costs associated with these activities is the same.

#### Conclusions

The PA and Alternatives 2 all have a positive benefit/cost ratio. Meaning more dollars would be generated from the sale of timber, from timber management activities, than was spent.

## APPENDIX E

### Project Designs

The following Forest / Management Area Design Criteria are taken directly from the RLRMP while the list below is not all inclusive all the designs below do directly apply to the High Mountain Project;

**FW01** Water control structures necessary for the control of surface water movement from soil-disturbing activities will be constructed for temporary use roads, skid trails, and fire lines concurrent with construction operations.

**FW03** Openings created by even-aged and two-aged regeneration treatments will be separated from each other by fully stocked stands of at least 10 acres in size with a minimum of 330 feet in width.

**FW04** Regeneration areas will be distributed so that no more than 30 percent of 1,000 acres is in the 0 to 20 year age class.

**FW18** Mature forest cover is maintained within 100 feet slope distance from the top of bluffs and 200 feet slope distance from the base to provide wildlife habitat associated with the unique landform. Within this zone, activities are limited to those needed to ensure public safety or to maintain and improve habitat for federally listed species or other species whose viability is at risk.

**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 proposed.

**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 or the Hazard Quotient computed for a proposed treatment to fail to achieve the current Forest Service Region 8 standard for acceptability (acceptability requires a 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 Table 3-2.

**Table 3-2: Criteria for suspension of Herbicide Application.**

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

**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.

**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.

**FW33** Maintain the following average standing dead, existing, and potential hollow den and loose bark trees per acre forest wide:

- ▶ Primary and Secondary Indiana Bat Zones – 9 snags per acre
- ▶ All other areas:

- 2 snags per acre greater than 12" dbh; plus
  - 4 snags per acre
- 
- Total 6 snags per acre

Unless necessary for insect/disease control or to provide for public safety, standing dead and den trees will not be cut during salvage operations.

Snags will be left from the largest size classes and maybe clumped.

**FW35** Provide up to four permanent water sources per square mile in upland sites.

**FW37** Wildlife water holes (ponds) less than one-half surface acre will be managed for native amphibian habitat and not stocked with fish.

**FW39** Add large woody debris (LWD) to streams and rivers where natural levels are inadequate, except in wilderness areas.

**FW42** Karst features will be recognized and documented when they are found to occur across the landscape; these features include caves, springs, sinkholes, and losing streams.

**FW44** Management activities within KMZs will be planned to use practices that result in minimal surface disturbance; this will be measured as less than five percent soil disturbance over the entire KMZ within the project area.

**FW50** A 1,500-ft radius protection zone will be established around any bald eagle nest or communal roost site found on the Forests. Within this protection zone, vegetation management that would affect the forest canopy, or other activities that may disturb eagles, will be prohibited during periods of eagle use.

**FW51** Prescribed burn plans will identify, as smoke sensitive targets, area where active eagle nests with eggs or chicks are present. Mitigation will be done to avoid putting heavy accumulations of smoke into those areas. Prescribed burns should not be planned closer than 1500 feet from active nest sites during nesting season.

**FW55** Close or restrict access to caves where disturbance or vandalism of critical resources may occur.

**FW70** Shagbark hickory, because of its high value as roost/maternity sites, should receive special attention during sale layout and cultural treatments. In areas where shagbark hickory is uncommon, retain all shagbark hickory over six inches dbh (6" dbh) except those that are immediate hazards. If multiple 6-inch or greater stems are encountered, which are competing for moisture, nutrients, and growing space, thin to retain the largest shagbark trees with potential for crown development and longevity. Where shagbark hickory is common within the treatment stand and the surrounding landscape, retain the largest individual shagbark stems in the treatment stand as part of the 20 basal area (overstory) and allow smaller stems, which might be in excess of six inches dbh (6" dbh) to be removed during regeneration treatments.

**FW71** A 200-foot buffer of undisturbed forest will be maintained around gray bat maternity and hibernation colony sites, Ozark big-eared bat maternity sites, bachelor sites, or winter colony sites. Prohibited activities

within this buffer include cutting of overstory vegetation; construction of roads, trails, or wildlife openings or development of pastures; and prescribed burning. Exceptions may be made where coordination with USFWS determines these activities to be compatible with recovery of these species.

**FW72** Promote and implement current Best Management Practices (BMPs) for forestry as recommended by the Arkansas Forestry Commission to all management activities in order to control non-point source pollution and comply with state water quality standards.

**FW73** Concurrent with temporary road construction, install silt barriers at the base of the cut and fill slopes within 50 feet of a stream course.

**FW74** At stream crossings, seed and mulch cut and fill slopes within 50 feet slope distance within 5 days after construction of temporary roads.

**FW75** Apply gravel at temporary road crossings for 35 feet on both sides of the stream channel, when the risk of soil erosion is present and where the crossing substrate requires hardening.

**FW76** On temporary roads, apply gravel on steep grades exceeding 10 percent slope.

**FW77** Reestablish native cane species along streams and rivers during native grass restoration activities

**FW78** Soil disturbances within SMZs will be treated with erosion control measures within five days.

**FW79** Use only native or non-persistent nonnative species when seeding temporary openings from soil disturbing activities.

**FW80** No mechanical site preparation (excluding mulching) is done on sustained slopes over 35 percent or on slopes over 20 percent when soil erosion hazard is classified as "severe."

**FW81** Streamside management zones (SMZs) will be identified and designated during the appropriate stages of project planning for all defined channels, perennial streams, and springs. Minimum SMZs will be as described in

Table 3-3 based on the percent of the adjacent slope:

Table 3-3: Minimum Streamside Management Zones.

Stream Type	Slope Adjacent to the Channel		
	0-15%	16-35%	36%+
Description	Horizontal Distance from Both Sides of Stream Bank or Lake/Pond		
Perennial & Springs	100'	125'	150'
Defined Channels	50'	75'	100'

- ▶ Vegetation within 20 feet of the bank of a perennial stream and 5 feet of a defined channel will not be removed.
- ▶ Retain at least 50 square feet per acre of basal area within the SMZs when available.
- ▶ No mechanical site preparation is allowed within the SMZs.

- ▶ Within SMZs, only non-motorized trails are allowed. Motorized trails are prohibited except at designated crossings or where the trail location requires some encroachment for safety.
- ▶ No more than five percent of the mineral soil within the SMZs will be exposed during ground disturbing activities.
- ▶ Exceptions to SMZ standards are only allowed after site-specific determinations and with consultation/approval by the appropriate Staff Officer.

**FW82** To limit soil compaction, no mechanical equipment is used on plastic soils when the water table is within 12 inches of the surface or when soil moisture exceeds the plastic limit. Soil moisture exceeds the plastic limit if the soil can be rolled to pencil size without breaking or crumbling.

**FW83** Mechanical equipment for site preparation is operated so that furrows and soil indentations are aligned perpendicular to the contour.

**FW85** On all soils dedicated to growing vegetation, the organic layers, topsoil, and root mat will be left intact over at least 85 percent of an activity area.

**FW87** Within the SMZs, cross only at designated crossings identified during planned activities. Cross at a 90-degree angle and utilize temporary structures to maintain bank stability.

**FW88** When temporary culverts or other approved structures are used, they must be removed upon completion of the activity. Streamside management zones disturbances will be restored to a stable, natural condition.

**FW89** Design, locate, and construct new system roads or other improvements to avoid floodplains and riparian areas in order to minimize impacts on water quality, flood flows, and riparian habitat.

**FW90** Soil and debris will not be deposited in wetlands, springs, or seeps.

**FW91** Any area that meets the riparian area definition (Page 2-71) will be managed as Riparian Corridors MA (3.I). These stands will be mapped and reallocated to Riparian Corridors MA (3.I) in subsequent LRMP amendments.

**FW92** Best available smoke management practices (FSM 5140, State Smoke Management Plans and State Implementation Plans) will be used to minimize the adverse effects of prescribed burning on public health and safety and to protect visibility in Class I Area (Upper Buffalo Wilderness).

**FW93** Prescribed burning will be conducted in, or adjacent to, counties with forecasted high Air Quality Index (AQI) values (AQI equals orange or higher) only if meteorological conditions indicate that smoke will be carried away from the high AQI area.

**FW94** Conduct all National Forest management activities in a manner that does not result in (1) a significant contribution to a violation of National Ambient Air Quality Standards or (2) a violation of applicable provisions in the State Implementation Plan.

**FW101** All dispersed and developed recreation management activities will be managed according to Recreation Opportunity Spectrum (ROS) classifications found in Appendix G.

**FW102** Rehabilitate, relocate, or close sites or trails when vegetation loss or excessive soil

compaction occurs to prevent sedimentation and loss of water quality.

**FW103** All areas of the Ozark-St. Francis National Forests except designated open roads and trails are closed to OHV use in order to minimize disturbance, environmental damage, and other user conflicts.

**FW104** Vegetation along trails is treated to maintenance levels identified in the publication "Trails South." Priority is given to correcting unsafe conditions, preventing resource damage, and providing for intended recreation experience level.

**FW105** Projects will be designed to meet the assigned scenic integrity objectives (SIO) as defined in Appendix G.

**FW106** Resource management activities will be conducted in a manner that promotes SIO. Exceptions for short periods of time (one growing season or less) may be allowed to achieve important resource management goals on a case-by-case basis under consultation with and approval of the Forest Landscape Architect or the Forest Supervisor.

**FW108** Where possible, locate log decks and borrow areas out of sight of roads and trails in areas that have high or very high SIOs.

**FW109** In the foreground of scenic roads and trails, prescribed burns will meet SIO criteria. (See Treatment Guide)

**FW110** In very high or high SIO areas, a landscape architect will be involved in the site selection process and development of plans and specifications for projects. In medium SIO areas, project planning will be coordinated with a landscape architect. In low SIO areas, as long as the objective for the area is met, projects may proceed without the involvement of a landscape architect

**FW111** Whenever proposed projects may affect a recreation trail, consult with the Forest landscape architect (or his/her designated representative) to determine how best to minimize impacts on the trail, minimize future vegetation encroachment on the trail and meet the assigned Scenic Integrity Objective. Retain sufficient overstory vegetation above and immediately adjacent to the trail to reduce opportunities for blackberry vines and other vegetation that impede non-motorized travel to flourish.

**FW112** Timber harvests located near recreation trails will be conducted with mitigation measures appropriate for the trail Concern Level and the Scenic Integrity Objective of the area. Where skid trails or skidders must cross the recreation trail, the number of crossings should be minimized and crossings should be made at right angles unless doing so would result in greater damage to the trail than crossing at another angle. The affected trail tread will be restored when the timber harvest is completed.

**FW113** Whenever proposed projects may affect a recreation trail, consult with the Forest landscape architect (or his/her designated representative) to determine how best to minimize impacts on the trail, minimize future vegetation encroachment on the trail and meet the assigned Scenic Integrity Objective. Retain sufficient overstory vegetation above and immediately adjacent to the trail to reduce opportunities for blackberry vines and other vegetation that impede non-motorized travel to flourish.

**FW114** Close access to caves where there are sites listed on the National Register of Historic Places.

**FW115** Coordinate management direction with the State Historic Preservation Office, federally recognized

tribes, and other appropriate state and federal agencies pursuant to Programmatic Agreement.

**FW117** Fuels treatment is allowed through prescribed burning or mechanized means while meeting well-defined risk mitigation objectives.

**FW118** Close or obliterate all temporary roads.

**FW119** Temporary roads should have a grade which does not exceed 20 percent for lengths more than 200 feet.

**FW120** Erosion control will be applied to all newly disturbed road cut and fill embankments before closing roads with native-bed surfaces that exceed a 10 percent grade.

**FW121** All recreation trails, system roads, and associated improvements in project areas will be kept free of logs, slash, and debris. Any road, trail, ditch, or other improvement damaged by operations will be promptly repaired.

**FW129** Locate, design, and maintain trails, roads, other facilities, and management activities to avoid, minimize, or mitigate potential geologic hazards.

**FW150** All prescribed burning will be fully coordinated with all resources and documented in Silvicultural Prescriptions signed by a certified Silviculturist and approved by the District Ranger.

**FW151** Do not burn through planted plantations less than three years old.

**FW152** Except when firefighter safety and/or life and human property are compromised, fire line construction within 20 feet of a perennial stream and five feet of a defined channel will be done using hand tools.

**FW153** Herbicide treatment areas will not be prescribed burned for at least 30 days after application.

**FW155** In any prescribed burning, the duff layer will remain present on 80 percent of the burn area.

**FW156** Appropriate erosion control strategies will be applied to fire lines in order to minimize soil erosion.

**FW160** If necessary to cross a stream with a fire line, the crossing will be as close to right angles as possible and be stabilized as soon after the fire is controlled as possible.

**FW161** The full range of wildland suppression tactics (from immediate suppression to monitoring) may be used consistent with Forest and resource management objectives and direction.

**MA1.C-1** Any project proposals which could affect a Wild and Scenic River will be evaluated against the appropriate river's management plan to ensure that the proposal does not conflict with characteristics or classification that qualified the river for inclusion in the Wild and Scenic River System.

**MA1.C-2** No management activities will be proposed that may compromise the outstandingly remarkable value(s), potential classification, or free-flowing character until designated or released from consideration.

**MA1.C-25** Prescribed fire is allowed to reduce a buildup of fuels to an acceptable level and to decrease the risks and consequences of wildland fire escaping from the wild river corridor.

Through applying current research, past experience, site visits, and observations all of the above project designs have proven effective on sites similar to those that are in the project area.

## APPENDIX F

### Summary Transportation Table and Recommendations

ID	Road Status Before Harvest	Road Status After Harvest	Action	Miles
1810	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	1.05
1828B	1 - BASIC CUSTODIAL CARE (CLOSED)	Decommission	Decommission	0.41
93180H	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	2.86
93180J	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	0.32
93180L	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	0.08
93180M	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	0.25
93180P	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	0.90
93182A	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	0.58
93193E	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	0.30
93193L	2 - HIGH CLEARANCE VEHICLES	Decommission	Decommission	1.03
93197B	1 - BASIC CUSTODIAL CARE (CLOSED)	Decommission	Decommission	0.61
			<b>TOTAL</b>	<b>8.39</b>
1803	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	2.16
1805A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	2.19
1806A	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	2.02
1806B	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	2.66
1810	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.71
1810	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.08
1819	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	1.19
1820	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.09
1824	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.49
1828	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.98
1828B	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.15
1833	3 - SUITABLE FOR PASSENGER CARS	3 - SUITABLE FOR PASSENGER CARS	Maintenance	4.11
1834	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.59
1836	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	1.10
93180A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.47
93180D	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.18
93180T	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.42
93183A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.60
93183C	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.24
93183E	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.44
93193D	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.26
93194C	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.14
93195A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.06
93195B	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.22
93213H	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.35
93213J	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.24
93214A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.64
93215A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.39
93215B	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.13
93228B	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.13
93228D	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.50
93228E	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.18
93228E1	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.28
93228Q	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.22
93229A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.46
93229C	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.45
93229G	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.59

ID	Road Status Before Harvest	Road Status After Harvest	Action	Miles
93229K	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.31
93229M	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.87
93230A	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	1.34
93230B	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.21
93230G	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.25
93230H	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.88
93230I	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.28
93230K	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.44
93230R	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.10
93230W	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.81
93683A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.36
93683B	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.66
93689A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.85
93689C	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.55
93691I	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.22
93691T	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.58
93691W	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.50
93691Z	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.36
93699A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	2.10
93699D	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.80
93699F	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.20
93699H	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.97
93699I	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.51
93699K	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.92
93699L	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.27
93700A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	1.46
93700B	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.45
93700C	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.44
93700D	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.18
93700E	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	1.13
93700H	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.91
93700I	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.13
93700K	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.37
93700N	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.45
93706A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.22
93706B	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.34
93707A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.50
93707C	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.41
93707D	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.20
93707F	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.28
93707H	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Maintenance	0.26
93707H	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.26
93756C	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	1.43
93756I	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance	0.25
			<b>TOTAL</b>	<b>51.12</b>
1803	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.90
1828	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.64
1828	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.50
1828	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.44
1833	3 - SUITABLE FOR PASSENGER CARS	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.93
93180B	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.18
93180I	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.12
93182B	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.65
93182C	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.36
93182D	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.64

ID	Road Status Before Harvest	Road Status After Harvest	Action	Miles
93182E	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.18
93182F	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.65
93182G	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.22
93193A	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.93
93195A	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.35
93195E	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	1.12
93196B	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.61
93215A	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.14
93215B	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.47
93228L	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.23
93228T	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.17
93229J	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.30
93229N	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.70
93230Z	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.46
93683A	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.94
93683B	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.66
93683C	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.86
93683C	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.24
93683D	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.62
93683E	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.20
93683H	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.14
93683J	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.60
93683K	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.20
93689A	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	1.63
93689B	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.34
93689D	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.46
93691R	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.51
93699C	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.69
93700C	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.14
93706A	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.95
93706A	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.36
93756B	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.15
93756C	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.40
93756L	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	1.11
93756M	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.46
93756M	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Maintenance and Close	0.06
			<b>TOTAL</b>	<b>23.61</b>
1805A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	2.22
1805D	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	1.48
1808	3 - SUITABLE FOR PASSENGER CARS	3 - SUITABLE FOR PASSENGER CARS	Reconstruction	5.42
1819	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	2.40
1836	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	0.00
1836	1 - BASIC CUSTODIAL CARE (CLOSED)	2 - HIGH CLEARANCE VEHICLES	Reconstruction	0.68
93180C	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	0.30
93197A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	1.19
93197G	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Reconstruction	0.44
93213A	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	2.18
93213E	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	Reconstruction	0.45
93691J	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	Reconstruction	0.78
			<b>TOTAL</b>	<b>17.54</b>
1804H	2 - HIGH CLEARANCE VEHICLES	1 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.22
93183G	1 - BASIC CUSTODIAL CARE (CLOSED)	2 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.05
93193B	1 - BASIC CUSTODIAL CARE (CLOSED)	3 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.72
93193D	2 - HIGH CLEARANCE VEHICLES	4 - BASIC CUSTODIAL CARE (CLOSED)	Close	1.38

ID	Road Status Before Harvest	Road Status After Harvest	Action	Miles
93193F	2 - HIGH CLEARANCE VEHICLES	5 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.43
93193G	2 - HIGH CLEARANCE VEHICLES	6 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.64
93193I	2 - HIGH CLEARANCE VEHICLES	7 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.13
93193J	2 - HIGH CLEARANCE VEHICLES	8 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.12
93193K	2 - HIGH CLEARANCE VEHICLES	9 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.14
93193M	2 - HIGH CLEARANCE VEHICLES	10 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.20
93196G	2 - HIGH CLEARANCE VEHICLES	11 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.46
93196I	2 - HIGH CLEARANCE VEHICLES	12 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.21
93197C	1 - BASIC CUSTODIAL CARE (CLOSED)	13 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.97
93228G	2 - HIGH CLEARANCE VEHICLES	14 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.12
93681F	1 - BASIC CUSTODIAL CARE (CLOSED)	15 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.19
93691A	2 - HIGH CLEARANCE VEHICLES	16 - BASIC CUSTODIAL CARE (CLOSED)	Close	1.15
93691B	2 - HIGH CLEARANCE VEHICLES	17 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.47
93691C	2 - HIGH CLEARANCE VEHICLES	18 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.36
93691D	2 - HIGH CLEARANCE VEHICLES	19 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.22
93691E	2 - HIGH CLEARANCE VEHICLES	20 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.21
93691F	2 - HIGH CLEARANCE VEHICLES	21 - BASIC CUSTODIAL CARE (CLOSED)	Close	1.36
93691G	2 - HIGH CLEARANCE VEHICLES	22 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.33
93691H	2 - HIGH CLEARANCE VEHICLES	23 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.14
93691K	2 - HIGH CLEARANCE VEHICLES	24 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.74
93691L	2 - HIGH CLEARANCE VEHICLES	25 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.16
93691M	2 - HIGH CLEARANCE VEHICLES	26 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.23
93691U	2 - HIGH CLEARANCE VEHICLES	27 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.20
93700F	2 - HIGH CLEARANCE VEHICLES	28 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.24
93701A	2 - HIGH CLEARANCE VEHICLES	29 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.08
93701B	2 - HIGH CLEARANCE VEHICLES	30 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.97
93701C	1 - BASIC CUSTODIAL CARE (CLOSED)	31 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.57
93701D	1 - BASIC CUSTODIAL CARE (CLOSED)	32 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.13
93701E	1 - BASIC CUSTODIAL CARE (CLOSED)	33 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.45
93706H	1 - BASIC CUSTODIAL CARE (CLOSED)	34 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.19
93708A	1 - BASIC CUSTODIAL CARE (CLOSED)	35 - BASIC CUSTODIAL CARE (CLOSED)	Close	0.09
			<b>TOTAL</b>	<b>14.27</b>
93197H	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	ROW	0.18
93756I	1 - BASIC CUSTODIAL CARE (CLOSED)	1 - BASIC CUSTODIAL CARE (CLOSED)	ROW	0.12
93691T	2 - HIGH CLEARANCE VEHICLES	2 - HIGH CLEARANCE VEHICLES	ROW and Maintenance	0.17

## APPENDIX G.

### Summary of Comments and Agency Responses Received for High Mountain Pre-decisional EA During 30 day Comment Period

In an effort to address the comments as accurate and meaningful as possible the following process was followed; Many comments either did not give specific information (were too general) or the commenter was addressing issues which were outside the scope (not a part of the proposed action in this EA) of this EA and ultimately its decision. Examples of this are as follows;

*Comment:* The project will degrade water quality.

*Response:* While this can be a true statement there is no way to evaluate or measure what the commenter is saying against what is disclosed in the water quality effects section in the EA. The water quality effects section clearly states that the Proposed Action or any action if chosen would have a negative effect on the water quality but only temporarily, and the water quality would not be degraded beyond the established thresholds stated in the Ozark St-Francis Revised Land and Resource Management Plan (RLRMP) which is the guiding document by which management activities are driven. Also, the RLRMP mandates that Arkansas Best Management Practices be utilized to minimize the negative effects of those management activities.

As a result, when comments are addressed some responses may seem trite as the response may only refer to the page number(s) of the EA where the effects of the comment were disclosed, or the document in which that decision was analyzed in if comment refers to a decision which has already been made. Site specific substantive comments will receive an in depth response referencing where the comment was analyzed in the EA.

An example of a comment which is outside the scope of this document or is a decision which has already been decided is as follows;

*Comment:* I am opposed to the 3 E (High Quality Products) Management Area.

*Response:* This comment is directed at a management decision which has already been made by the RLRMP signed in 2005. High Mountain Project EA can have no bearing on that decision. It is outside its realm of analysis and subsequent decision.

#### High Mountain Pre-Decisional Comments Received and Agency Responses

1.*Comment:* Deforestation/removing trees drives climate change, affects soils, and affect the absorbing of greenhouse gases that fuel global warming.

*Response:* As the commenter has stated the removal of trees will affect a variety of environmental areas. The effects on these areas are disclosed in Chapter III of the EA.

2.*Comment:* Violates NEPA because it does not assess combined cumulative impacts of all proposed actions within the project area and with other adjacent, concurrent, past or overlapping projects such as the Moccasin Gap Trail Realignment Project.

*Response:* The commenter is correct that NEPA does require the assessment of cumulative impacts from overlapping projects. The EA on page II-13 discloses the overlapping projects that were considered in this project including the Moccasin Gap Trail Realignment Project. In addition, in Chapter III the cumulative effects are disclosed at the end of each section.

3.*Comment:* Violates Clean Water Act by the construction of roads that causes runoff through ditches and culverts as the 9th U.S. Circuit Court of Appeals ruled in 2010.

*Response:* The commenter mentions road construction causing runoff as being part of this project causing a violation of the Clean Water Act, however, only road re-construction and maintenance are proposed. As far as the court ruling, the final direction based on this court decision is uncertain at this time, when it is finalized the resulting direction will be applied to this project.

4.**Comment:** Does not analyze cumulative impacts of herbicides or any herbicide study that has results contrary to what the USFS proposes.

**Response:** We realize that the use of herbicides is somewhat sensitive in all projects including this one, however, the standard procedures for disclosing effects were followed. The research used to disclose all the effects, including cumulative, of herbicides in each section of the EA has been peer reviewed and is based on best science.

5.**Comment:** Does not analyze endangered species populations in the area.

**Response:** Endangered species were considered throughout the entire process leading up to and included in the proposed action. After inventories were conducted in 2010-2012, a BE was written and sent to the Fish and Wildlife Service, the regulatory agency responsible for endangered species. A concurrence letter was received from the Fish and Wildlife Service October 29, 2012. In addition, the effects of the proposed action and the alternatives are disclosed on page III-69 of the EA.

6.**Comment:** Will cause increased runoff and could cause flooding that could kill recreationists in the area.

**Response:** The commenter is correct in saying that implementation of this project would increase water yields. To address this issue the EA states on page III-6 “Using paired watershed studies for regions of the United States Stednick (1996) depicted effects of silviculture practices on annual average stream discharge. In this study, the actions necessary for producing measurable increases in water yield from forests in Arkansas was determined to be a 50% reduction in basal area across an entire watershed”. The EA goes on to say based on the model used that water yields will be minimally increased.

7.**Comment:** Does not analyze impacts to air quality and erosion caused by prescribed burning.

**Response:** The effects of prescribed burning on air quality are disclosed on pages III-12-18 and for erosion on pages III-8-9.

8.**Comment:** Violates Wild and Scenic River Act by degrading Big Piney Creek.

**Response:** The commenter doesn’t provide enough information as to how the proposed actions would violate the Wild and Scenic River Act, so it is difficult to determine what violation and location they are referring to. The project takes in approximately 7 miles of Big Piney Creek. The EA discloses the effects on water quality and any actions proposed within the Scenic portion of the Big Piney Creek. All effects are within RLRMP thresholds or follows current rules and regulations.

9.**Comment:** Does not monitor water quality effects.

**Response:** The RLRMP requires water quality monitoring be done on a portion of the watersheds throughout the Forest. This EA is tiered to and is bound by this document.

10.**Comment:** Introduces invasive species, partially through creating “high-quality forage”.

**Response:** The commenter is correct that there is a potential for the spread of invasive species through the implementation of a variety of the proposed actions. The EA address this issue by proposing the control both existing and future populations of these species.

11.**Comment:** There is no need for more “wildlife openings” or management of existing “wildlife openings”.

**Response:** The proposal of managing wildlife openings is needed to meet early seral habitat goals established in the RLRMP.

12.**Comment:** Placing large wood debris in streams is going to get someone killed. There are a lot of kayakers that enjoy the use of the smaller streams.

**Response:** Stream inventories within the project area have indicated a lack of large wood debris in streams effecting overall stream health. Two RLRMP objectives addressing this issue are as follows:  
1) Maintain or restore Large Woody Debris (LWD) levels in perennial streams/rivers at 75 to 200 pieces per mile for all LWD larger than 3.3 feet long and 3.9 inches in diameter in the first decade and  
2) Maintain or restore LWD levels in perennial streams/rivers at 8 to 20 pieces /mile for all LWD larger than 16.4 feet long and 19.7 inches in diameter in the first decade. (RLRMP page 2.16). In addition, the issue of kayaking these waters has been brought to our attention and as a result the

placement of LWD has been modified to better accommodate kayaking.

13.**Comment:** Water quality and species populations should be studied before the project and adaptive management should be considered to stop the project if too many adverse effects occur.

**Response:** Management of the project area includes field surveys and monitoring. The USFS monitors water quality and species populations as directed in the RLRMP, and this information shapes current management strategies. The Big Piney Ranger District completes regular inspections during the implementation of project activities as a tool for monitoring the need for adaptive management decisions.

14.**Comment:** Forest fragmentation from logging, road building, and other resource extractive activities are identified as among the top threats to the stability and viability of the species of greatest need and concern in this ecosystem. The website for the “Arkansas Wildlife Action Plan” <http://www.wildlifearkansas.com/index.html> states that for the Boston Mountain region, the activities having the most adverse impacts on species of greatest conservation / need are ranked in the following order:

- Urban development 1,792
- Grazing 1,630
- Dam 1,540
- Resource extraction 1,503
- Forestry activities 1,422
- Road construction 775
- (etc...)

**Response:**

- |                           |   |
|---------------------------|---|
| Urban development 1,792   | None proposed   |
| Grazing 1,630             | None proposed   |
| Dam 1,540                 | None proposed. Small ponds don't equate to “Dams”.  |
| Resource extraction 1,503 | Surface rock collection will be less than 1% of the area and is addressed on pages III-25-27 and III-56-57. |
| Forestry activities 1,422 | Forestry activities used will sustain forests or woodlands  |
| Road construction 775     | None proposed   |
| (etc...)                  |   |

15.**Comment:** A primary component of the State Wildlife Action Plan, to protect the species of greatest concern, "Involves the protection of existing habitat or habitat components". The High Mountain Project would significantly alter “existing habitat and habitat components”. This would be counterproductive for species of greatest need and concern according to the State Wildlife Action Plan.

**Response:** The Wildlife and Fisheries section of the EA (starting on page III-49) used management indicator species (MIS) to address the effects of this project on wildlife species. The species of greatest concern are represented by one or more of these MIS addressed in the EA. Without additional information from the commenter about what species of concern are going to be affected, this comment can't be fully addressed.

16.**Comment:** Water quality in this area is exceptionally high due to the relative absence of heavy equipment, logging, burning, chemical poisons and new road construction. Such pristine conditions would be adversely affected by this project as currently planned. Species would suffer both direct and indirect adverse impacts from the proposed activities.

**Response:** Commenter is correct that the water quality is high in this area. However, the model used in the EA on pages III-3-11 to disclose effects indicate that if the proposed actions were implemented at the same time they wouldn't exceed thresholds established by the RLRMP.

17.**Comment:** Human health and recreational opportunities would also be adversely impacted from burning, chemical applications, noise, and intensive resource extraction.

**Response:** The EA addresses the commenter's concerns in Chapter III the environmental section 18.**Comment:** Along with the High Mountain project, there is at least one other contiguous project in process that affects the environment in this area of the forest; The Moccasin Gap Trail Realignment project. NEPA and CEQ guidance requires an EA or EIS that examine the combined cumulative impacts of all related projects occurring in the same geographic area

**Response:** The Commenter is correct, NEPA and CEQ guidance does require consideration of cumulative effects for past, present, and reasonably foreseeable projects that overlap this project in space and time. The EA on page II-13 discloses all the overlapping projects that were considered in this analysis including the Moccasin Gap Trail Realignment Project. In addition, in Chapter III the cumulative effects are disclosed at the end of each section.

19.**Comment:** Climate change is affected by the scales of prescribed burning being conducted forest wide. Large flushes of CO<sub>2</sub>, soot, particulates, and VOC's released in prescribed fires are having an adverse impact on weather and atmosphere and should be curtailed. Full analysis of these factors is requested in the EA.

**Response:** See the Air section (page III-12) and the Climate Change section (III-71) in this EA. The air section discloses that "State air quality agencies monitor for both ozone and PM<sub>2.5</sub> across the state including one station in Deer, Arkansas within the Ozark-St. Francis National Forests. As of 2011 there were no counties in Arkansas in non-attainment for ozone or fine particulate matter."

Concerning CO<sub>2</sub> release, see the Agency response to Comment #23 below.

20.**Comment:** USFS should utilize current weather data to base predictions for anticipated runoff within the project watershed, and, to assess potential for increased erosion, sedimentation, and flooding, when burns and other management actions take place concurrently.

**Response:** The Ozark St-Francis uses current weather data and predictions to implement activities such as prescribed burning, identification of seeding seasons, etc. For sedimentation this analysis used a model developed on the Ozark St-Francis National Forest by professional Hydrologists, Fisheries Biologists and Soils Scientists. The model was developed over a period of years through collecting data, testing and monitoring actual activity sites. Based off of the model none of the proposed activities, if implemented as proposed, would exceed any regulation thresholds. See water section in this EA starting on page III-3.

21.**Comment:** Project plans and proposals on the Ozark SF NF should include an analysis of herbicide impacts based on the best available science in order to accurately assess potential adverse impacts of chemical applications in the forest. (SERA is outdated and does not reflect the best available science).

**Response:** The US Forest Service as an agency contracts with Syracuse Environmental Research Associates Inc. for researching the effects of herbicides in the environment.

22.**Comment:** End unsustainable and high impact timber harvesting and forestry practices that utilize excessive use of fire, herbicides, and over-intensive logging.

**Response:** The activities proposed are similar in type and size to previous activities that have been implemented on this forest for decades. Observations in this area are the result of decades of previous forest management activities.

23.**Comment:** Improve forest health, human health, ecosystem health, and global climate stability by reducing prescribed burning.

**Response:** The research used for this analysis, which has been peer reviewed, shows that prescribed burning does release some CO<sub>2</sub> and stored carbon, however, by reducing the dead vegetation (limbs, some fallen trees, leaves and pine needles) in an area through prescribed burning allows for more new growth of herbaceous vegetation and this new growth sequesters greater carbon storage. Another benefit from prescribed burning is that the burn is implemented during a timeframe that have known parameters (weather, fuel moisture, soil moisture etc.) this allows for a greater accuracy in predicting effects to vegetation and the amount of dead fuels consumed. Conversely a wildfire, whether caused by a natural ignition or arson, burns in most cases during extreme conditions causing severe effects to the vegetation and duff layer. Wildfires which burn during severe conditions release a greater pulse of

CO<sub>2</sub> (see air section page III-12 and climate change section page III-71) as well as wildfires that occur in areas which have not been previously prescribed burned and have a much greater build-up of dead fuels.

**24.Comment:** Given the dramatic decline of amphibian and bat populations nationwide, this project EA should be postponed or canceled pending current biological inventories for these species.

**Response:** Site specific walk-through surveys for Regional Forester's sensitive species, federally threatened and endangered species, and rare communities were conducted by various Forest Service personnel, summer students, and biological contractors under the supervision of district biologists during 2009-2011. Aquatic surveys were conducted by the USDA Center for Aquatic Technology Transfer (CATT) team in 2009 and 2010. Known bat caves on the Boston Mountain and Sylamore Ranger Districts have been monitored since 2003 and 2004, respectively, during prescribed burning. Caves were monitored for smoke, carbon monoxide, particulates, and temperature. Information collected from this monitoring has been useful in predicting the effects of our management actions as we can expect similar results.

**25.Comment:** Decreased water quality via increased erosion, sedimentation, chemical compounds, Rx burning, and flooding. The Ozark National Forest plan EIS admits, "that prescribed fires can potentially result in the same type of impact on soil as wildfire. It directly affects soils by removing a portion of the vegetation cover, which may expose soil to erosion. Control fire lines also expose mineral soil. These factors can reduce soil productivity. The significance of this varies widely depending on the soils, topography, and the intensity of the burn." (Ch. 3 pg 16). These factors also increase potential for erosion, sedimentation, increased turbidity, and *accelerated stream flows* during and following rain events.

**Response:** The commenter is correct in stating that forest management has the potential to have a degree of impact; however, project designs and Forest Wide Standards within the Forest Plan as well as Arkansas Best Management Practices, when implemented, minimize the potential effect on soil productivity loss, sedimentation, and erosion. See the Soils section page III-1 and the Water Quality section III-3 in the EA.

**26.Comment:** Unsustainable and high impact timber harvesting and forestry practices. Single-tree selection without high grading timber stands offers a sensible alternative that is entirely ignored in current USFS forest management plans in this district and on the Ozark National Forest as a whole.

**Response:** The Forest Service uses standard methods of timber harvest proposed by trained and certified foresters. Treatment activities are based off of the forester's recommendations after field visits and forest timber stand inventories have been completed. Some areas receive no treatment depending factors such as timber age, type, site index, stand growth (an indicator of forest health) and topography to name a few. The same factors are considered when a timber stand is proposed for a treatment activity. The types of harvest methods recommended for this proposal have been implemented on similar sites on the Ozark St-Francis National Forest with no known sizable negative effects when implemented following Forest Wide Standards within the Forest Plan as well as Arkansas Best Management Practices.