

Environmental Assessment

Robert's Gap Project

United States
Department of
Agriculture

Forest
Service

Newton and Madison Counties, Arkansas

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**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 the proposed action. This chapter also references direction from the 2005 Ozark-St. Francis National Forests Revised Land and Resource Management Plan (Forest Plan) and includes decisions to be made, other issues, concerns and opportunities.

A. Location of Project Area

The Robert's Gap Project area is 39,697 acres of National Forest System (NFS) lands located close to the communities of Boston, Fallsville and Red Star. This project is in the northwest corner of the Big Piney Ranger District in Newton and Madison Counties.

B. Purpose and Need

The purpose of this project is to implement the Forest Plan and move the existing conditions of the project area toward the desired conditions as referenced in the Forest Plan.

The primary developmental forces for this project are as follows:

Recent inventories have identified a wide variety of needed treatments which would reduce fuel loading, improve forest health, improve wildlife and aquatic habitat, protect private property in the wildland-urban interface, and increase species diversity. Additional needs identified are access and trespass issues into the Upper Buffalo Wilderness at Hawksbill Crag. There is a need to remove mountain bike trails off open roads, provide better connections between trail heads and provide additional easy-to-moderate skill level trails within the Upper Buffalo Mountain Bike Trail System.

Other Developmental Forces:

This project area was once a fire-dominated ecosystem (Guyette, Spetich, Stambaugh, 2006). Frequent fires eliminated shade tolerant species from the understory which provided ample forage for many species of wildlife and maintained habitat for pollinators. Past forest management practices have caused a reduction in the number of insects (pollinators), small mammals, seed eating birds, deer and wild turkey and have 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 multiple 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 closed.

With the designation of the Upper Buffalo Wilderness and the popularization of Hawksbill Crag, managing this scenic/photographic area to wilderness standards has been a challenge for 30 years. To remedy this, several recreational actions are proposed.

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 demand for timber products.

C. Proposed Action

The Ozark-St. Francis National Forests, Big Piney Ranger District, is proposing the following management activities in the Robert's Gap Project area (see Chapter II of this document for detailed descriptions of individual proposed activities):

- Prescribed burning on 13,468 acres
- New control (dozer) line construction (27 miles) for prescribed burns
- Commercial thinning on 8,336 acres
- Timber stand improvement (TSI) thinning on 296 acres
- Regeneration harvest on 965 acres
- Shelterwood preparation harvest on 1,126 acres
- Woodland restoration on 2,417 acres, on 2,669 acres in conjunction with commercial thinning and on 70 acres around wildlife openings (would treat up to 1,000 acres annually)
- Manual release thinning on 139 acres
- Management of wildlife openings for high quality forage on 35 acres
- Maintenance/reconstruction of 38 wildlife ponds
- Renew hay allotment on 20 acres
- Commercial salvage on up to 1,000 acres
- Large woody debris (LWD) could be placed in streams within the project area (no LWD within Wild and Scenic designation, Upper Buffalo Wilderness or along the mainstream of Kings River)
- Conduct sensitive species canopy thinning on 15 acres for Ozark Chinquapin
- New construction of 0.5 miles of road
- Reconstruction of 3.5 miles of existing roads
- Maintenance of 35.5 miles of existing roads
- Decommission 10.5 miles of existing roads
- Closure of 39 miles of existing roads
- Construction of 40 miles of temporary roads to access timber stands
- New construction of 24 miles of mountain bike trail
- Remove from designation 8.7 miles of mountain bike trail currently on County and Forest Service (FS) system roads
- Improvement of 0.2 miles of existing road and construction of a 30-100 vehicle parking area and vault toilet at Hawksbill Crag trailhead
- Construction of 0.2 miles of hiking trail to access Hawksbill Crag
- Relocation of 0.3 miles of existing hiking trail accessing Hawksbill Crag
- Decommission 0.4 miles of existing hiking accessing Hawksbill Crag
- Decommission 1.1 miles of existing hiking trail (Ratford)

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 approved.

D Alternatives to the Proposed Action

The alternatives to the proposed action were a result of the Interdisciplinary Team (IDT) seeking comments from within the agency, the general public, adjacent landowners, other agencies and Tribal governments (see Appendix B for further details).

1. A "No Action" Alternative (Alternative 1)
2. Herbicide use has been identified as an important issue with the public. For this reason, a "No Herbicide" Use Alternative (Alternative 2) has been included. The environmental consequences of herbicide use are disclosed throughout Chapter 3.
3. The "Other Resources" Alternative (Alternative 3) was developed as a result of determining the location of an additional 24 miles of mountain bike trails included in the Proposed Action, conflicts between the silviculture proposal and location of the mountain bike trail (new and existing), a different idea for addressing access and trespass issues around Hawksbill Crag, and from considering public responses at open house meetings as well as other internal and public input. Alternative 3 was developed in order to address these issues, and other concerns. This alternative is similar to the Proposed Action; however, the specific modifications are shown in Chapter II of this EA under "Alternative 3" and displayed on the map for this alternative.

E. Related Documents that Influence the Scope of the Proposed Action and Alternatives

The Final Environmental Impact Statement (FEIS) for the Forest Plan compares and analyzes the impacts of a variety of treatments needed to achieve the desired future conditions identified in the Forest Plan (pages 1.18-1.49). This Environmental Assessment (EA) tiers to the following documents:

- The FEIS for the Forest Plan
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd618542.pdf

The Forest Plan identifies Forest-Wide Standards (pages 3.1-3.21) and Management Area (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 known documented wetlands within or adjacent to the project area and, therefore, wetlands 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.

Non-Native Invasive Plant Species- These species, where identified, have been addressed by a previous decision.

G. Issues Studied in Detail

Through meetings and public involvement, the IDT determined the following issues are important in showing effects which would assist the responsible official in determining significance and will be addressed in Chapter III of this EA.

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

Water Quality- There is a concern that management actions, namely timber harvest, road construction, prescribed burning, wildlife pond construction and construction/enlargement of openings, may cause a decrease in water quality in the watershed(s) within the project area. *Source: IDT and scoping comments*

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

Vegetation- There is a concern that a lack of early seral habitat occurs within the watershed. Forest health and stand vigor is declining or at risk due to advanced stand age and overcrowded or densely stocked stands. *Source: IDT and scoping*

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: IDT and scoping comments*

H. Issues analyzed but not included in this EA

The IDT through meetings and public involvement determined the following issues were analyzed for effects but these issues would not assist the responsible official in determining significance. For that reason, issues below are in the project record and available upon request.

- **Air Quality**

Potential effects of proposed activities to air quality would be mitigated through adherence to Arkansas State Smoke Management Plan, applicable forest wide standards and other BMPs.

- **Visual Resources**

By adhering to the Landscape Architects site specific design criteria and forest wide plan standards, effects to scenic quality would be minimized to less than three years.

- **Wildlife**

Effects to wildlife are mostly beneficial and activities would create more species diversity through disturbance. Negative effects to wildlife would be minimized by adherence to forest wide standards and BMPs.

- **Aquatics**

Activities would have minor temporary effects to aquatics these effects would be lessened by adherence to forest wide standards and BMPs

- **Threatened, Endangered and Sensitive (TES) Species and Habitats**

A Biological Evaluation was completed for the Robert's Gap Project which considered TES due to either their known presence within the project area or potential to occur within the project area due to the species known distribution and similar habitat characteristics. Adhering to the site-specific design criteria in this EA and forest wide standards would ensure that the activities in the PA, Alternative 2 or Alternative 3 may impact individuals but not likely to cause a trend toward a federal listing or loss of viability.

- **Climate Change**

The Ozark-St. Francis Forests and specifically the Roberts Gap Project, are maintaining a carbon sink and have been relatively stable. Silviculture activities may have a temporary reduction in carbon storage however as younger trees mature, they store carbon more efficiently.

- **Heritage Resources**

By adhering to the District Archeologist's site-specific design criteria and forest wide standards there would be no effects to Heritage Resources.

I. Decision to Be Made

The District Ranger will determine whether the proposed project and alternatives could significantly affect the quality of the human environment. If significance is found, then an EIS would be prepared. If there is a finding of no significant impact (FONSI), the District Ranger will select an alternative deciding:

1. Whether to implement all or parts of the proposed action;
2. What specific design criteria or mitigation measures are needed;
3. What specific project monitoring requirements are needed to assure design criteria and mitigation measures are implemented and effective.

Chapter II

Development and Detailed Description of the Proposed Action (PA) and Alternatives

This chapter describes the development of the PA and other alternatives in detail and compares the range of management actions proposed in the PA and alternatives in Table 10.

A. Process Used to Develop the Alternatives

The IDT is composed of Forest Resource Specialists in areas such as recreation, timber, wildlife, soils and water. The Big Piney Ranger District IDT initiated internal scoping for the Roberts Gap Project on February 29, 2018. A project initiation letter was mailed out to 383 entities, which included Native American Tribes, other agencies, groups, neighboring landowners and individuals. The project initiation letter was posted on the Ozark-St. Francis National Forests planning website and included in the Schedule of Proposed Actions (SOPA). The letter requested any interested public to respond with their recommendations/concerns in order to shape the proposed action of this project. Sixty-six letters were returned as undeliverable. 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 Forest Plan.
- Comments, recommendations and concerns 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. The Proposed Action and Alternatives Considered

A “No Action” Alternative (Alternative 1), a “No Herbicide” Alternative (Alternative 2), and an “Other Resources” Alternative (Alternative 3) were developed in this EA. Each action alternative was designed to be consistent with Forest Plan direction and responds to the “Key” issues:

The Proposed Action (PA)

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

Prescribed burning on 13,468 acres (Table 1 and Appendix A).

Based on monitoring data, the reintroduction of fire has improved conditions within prescribed burn areas on the district. The project area is a fire adapted ecosystem in which fire has been excluded for many years. These areas could be repeatedly burned for fuel reduction, wildlife habitat improvement, and ecosystem restoration and would move them toward the desired future condition for this management area

Approximately 27 miles of (dozer) control-line construction/reconstruction may be established along the Wildland Urban Interface (WUI) adjacent to private property. The remainder of the control lines would take advantage of existing roads or natural fuel breaks such as streams to minimize ground disturbance.

Mechanical treatments such as mulching or piling could be used in areas of heavy fuels, WUI areas, and the like to reduce fuel loading and facilitate prescribed burning operations. Heavy equipment could be used to remove snags along control lines. After burns are completed, the control lines would be stabilized and may be seeded with legumes and annuals such as clovers, winter wheat, oats and annual rye grass or native grasses and forbs to restore vegetative cover and minimize erosion control.

Table 1: Proposed prescribed (Rx) burning units and acres.

Rx Burn Unit	Acres	Rx Burn Unit	Acres	Rx Burn Unit	Acres
County Line	1,814	Marksburg Hollow	725	Reeves Fork	911
Smith Ridge	2,880	Reeves Mountain	958	Roberts Gap	2,803
Eagle Gap	1,062	Buffalo Lookout	2,315	Total	13,468

Regeneration harvest on 965 acres (Table 2) and 1,126 acres of shelterwood preparation (Table 3).

The regeneration timber harvesting method removes mature, over mature or diseased trees and establishes new hardwood stands. This creates early seral habitat and balances age classes which improves overall forest health. A variety of situations triggered the consideration of an area for this type of activity.

Hardwood shelterwood would leave 40-60 basal area of residual trees. This treatment is proposed for areas having trees which are within approximately 10 years of being fully mature, but they do not have advanced regeneration (seedling trees) in the understory.

Hardwood shelterwood preparation treatment, would open up the canopy and allow enough sunlight to reach the forest floor and stimulate the natural establishment and growth of seedling trees. An understory treatment (manual or using herbicide) may be required to control woody non-target species and allow the target species (shortleaf pine, oak, hickory etc.) to become established and effectively compete with the understory species.

Regeneration areas outside of burned areas rely more on manual or chemical efforts to gain advanced regeneration due to the absence of periodic prescribed burning to control brush and other competing vegetation. These areas would be planted with 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 proposal (Table 9). Residual trees may be removed once adequate regeneration has been established. These areas may be utilized for public firewood sale.

Table 2: Proposed acres of regeneration treatment by compartment (Area#).

Area#	Acres	Area #	Acres						
2	30	40	38	63†	38	125	50*	149	31
14	44*	44□	21	71	45*	129	20	152	49*
21	38	45	15	88	23	132	45*	159	35
22	27	50	37	97	18	136	43*		
23	46*	55†	34	100	46*	140	40		
33	38	58	48*	119	43*	148	23		

*Indicates hardwood regeneration areas greater than 40 acres which is the maximum size the Forest Plan allows according to **FW02** (Page 3-1); however, these areas have been impacted by both oak borer and the 2009 Ice storm and **FW02** states, “These acreage limits do not apply to areas treated as a result of natural catastrophic conditions such as fire, insect or disease attack, or windstorm”.

† These areas are within, or partially within, a secondary conservation zone for the federally endangered Indiana bat and are restricted to harvesting between December 1 and March 15 unless there is further coordination with the United States Fish and Wildlife Service (USFWS) and site-specific inventories are conducted.

□ These areas have partial acres within a Northern long-eared bat maternity buffer zone and are restricted to harvesting these acres outside of the pup season May 15- July 31.

Table 3: Proposed acres of shelterwood preparation treatment by compartment (Area#).

Area#	Acres	Area #	Acres						
15	57	51	45	108	16	127	49	156	59
18	32	53†	72	110	41	130	46	162	36
26	30	76	25	112□	20	134	61		
32	40	77	40	115	40	141	68		
35	36	80	74	122	53	143	46		
47	18	93	46	124	45	150	31		

† These areas are within, or partially within, a secondary conservation zone for the federally endangered Indiana bat and are restricted to harvesting between December 1 and March 15 unless there is further coordination with the USFWS, and site-specific inventories are conducted.

□ These areas have partial acres within a Northern long-eared bat maternity buffer zone and are restricted to harvesting these acres outside of the pup season (May 15- July 31).

Commercial thinning on 5,909 acres of hardwoods (Table 4) and 2,427 acres of pine (Table 5).

These areas are pine, hardwood or mixed. They are overstocked (too many trees per acre) which has resulted in a reduction of health and vigor, and a susceptibility to catastrophic fire and outbreaks of insects and disease. These areas would be thinned to an average residual basal area of 60-80 square feet per acre based on the average tree diameter. This would result in improved growth and crown development, healthier trees, development of higher quality trees and reduced fuel loading. Trees selected for removal (harvest) would primarily be those that were damaged, diseased, suppressed and poorly formed. The 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 that are more resistant to natural disturbances such as wildfires and outbreaks of insects/disease. If needed, understory herbicide treatments may be used to control woody species in the form of basal spray, stem injection or cut surface treatment on brush more than six feet tall, or a foliar spray treatment on brush less than six feet tall to control competition. The

understory treatment could be accomplished manually with chainsaws and brush saws as well. These areas may be utilized for public firewood sale.

Table 4: Proposed acres of hardwood commercial thinning by compartments (Area#).

Area#	Acres	Area #	Acres						
1	98	39	48	73*	48	105*	11	138	129
3*	148	41*	55	74*	29	106*	66	139	143
4	119	43*	23	75*□	307	109	60	142	45
5 ³	251	46	27	82	92	111*□	105	144	16
10 ³	15	48	15	84	24	113*□	65	145*	17
11 ³	34	49	22	85*	67	116*	19	147*	515
12 ³	24	52	71	86*	40	117*	198	151*	241
13	98	54†	152	89	64	120	120	153	48
16	114	56†	30	91	47	121*	98	154*	50
19*	463	59†	32	94	13	123	61	155*	37
28	17	60†	85	95	14	126	190	157	41
30	33	62†	24	96	24	128	143	161	107
34	16	64†	182	99	24	131	68	166	36
36	20	68	21	101*	38	133	50		
37	22	70	73	102*	29	135	34		

* After commercial harvesting is completed, these areas, in whole or part (Appendix A), would receive additional treatments on 2,669 acres as described in the woodland restoration section. In Alternative 2, this treatment would be completed manually.

† These areas are within, or partially within, a secondary conservation zone for the federally endangered Indiana bat and are restricted to harvesting between December 1 and March 15 unless there is further coordination with the USFWS, and site-specific inventories are conducted.

□ These areas have partial acres within a Northern long-eared bat maternity buffer zone and are restricted to harvesting these acres outside of the pup season (May 15- July 31).

³ In Alternative 3 after commercial harvesting is completed, these areas would receive additional treatments as described in the woodland restoration section.

Table 5: Proposed acres of pine commercial thinning by compartment (Area#).

Area#	Acres	Area #	Acres						
7	50	38	11	72□	330	104	39	158	14
8	439	42□	172	78□	130	107	14	160	20
								163	29
17	16	57	38	81	12	114†□	496		
25	9	61†	14	83	92	118	115	165	109
29	50	65	70	87	63	137	36		
31	10	66	12	103	16	146	21		

† These areas are within, or partially within, a secondary conservation zone for the federally endangered Indiana bat and are restricted to harvesting between December 1 and March 15 unless there is further coordination with the USFWS and site-specific inventories are conducted.

□ These areas have partial acres within a Northern long-eared bat maternity buffer zone and are restricted to harvesting these acres outside of the pup season (May 15- July 31).

Timber stand improvement thinning (non-commercial, understory, etc.) on 296 acres (Table 6).

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. Selected trees would be released (freed) from overtopping/competing vegetation using hand tools (chainsaws or brush saws). Trees selected to be cut/treated would be those that were damaged, diseased, suppressed and poorly formed. The 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.

In Ecological Land Types (ELTs), having aspects that are more south to west facing and on upper thirds of northern aspects or ridge tops (typically lower site index), the goal would be to restore these areas to historic open forest conditions with an understory dominated by native grasses and forbs. Thinning would permit sunlight to reach the forest floor stimulating the growth of native grasses and forbs. Ideally, the basal area (BA) of these stands needs to be 40 to 60, but the initial treatment of the areas would be to thin them to 60-70 BA. After thinning and prescribed burning one or two times, these areas would be revisited to determine if further thinning and burning is needed to reach the desired future condition.

Table 6: Proposed acres of timber stand improvement thinning by compartment (Area #).

Area#	Acres		Area#	Acres		Area#	Acres
6*	152		24	29		79	25
9	23		27	38		164	29

*This area is within the Eagle Gap Special Interest Area and would only be thinned after a management plan is completed. This area would include a herbicide treatment for understory or midstory removal in order to move the area toward a woodland condition enhancing the botanical qualities (wild azalea) for which the area was designated.

Manual release thinning (non-commercial, understory, etc.) on 139 acres (Table 7).

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, but have yet to reach sufficient size to be commercial (sold). Selected trees would be released from overtopping/competing vegetation using hand tools (chainsaws or brush saws). Trees selected to be cut/treated would be those that were damaged, diseased, suppressed and poorly formed. The 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.

Table 7: Proposed acres of manual release thinning by compartment (Area#).

Area#	Acres		Area#	Acres		Area#	Acres
20	22		69	29		92	18
67	21		90	19		98	30

Woodland restoration utilizing herbicide on 2,417 acres (Table 8) (no more than 1,000 acres annually).

Monitoring data collected since 2004 by the FS and The Nature Conservancy in a joint monitoring project consisting of vegetation plots monitored in existing woodland ecosystem restoration areas shows limited progress toward the desired future conditions (DFC) (monitoring data contained in the process file at Jasper office). Several factors have affected the ability to regularly apply fire on some areas. Areas that have had fire applied on a regular interval have shown a dramatic change in species composition moving the area close to the DFC, but these areas are somewhat isolated and small in scale. An additional tool is needed to create disturbance at regular intervals given the limited ability to apply fire.

In order to reach the DFC, herbicides may be used to control woody species in these areas. This would be accomplished by a basal spray, stem injection or cut surface herbicide treatment on brush more than six feet tall, and by using a foliar spray treatment on brush less than six feet tall to control competition. The treatment could also be accomplished manually (chainsaws and brush saws only). Multiple manual and/or herbicide treatment(s) may occur to move the area(s) toward the DFC (Table 10). Used in conjunction with prescribed burning, these treatments would increase herbaceous plants as well as overall habitat diversity. The reasons for reducing the number of trees and/or understory in these areas vary with the specific aspect, site index (an indication of soil richness) and ELT.

The areas proposed to receive this treatment are within a prescribed burn area.

Table 8: Proposed acres of woodland restoration by compartment (Area#).

Area#	Acres	Area #	Acres								
167*	5	173	37	179	26	186†	193	192□	33		
168□	69	174	184	181	9	187	222	193	105		
169	33	175	21	182	19	188	184				
170	2	176	45	183	3	189	53				
171	12	177	170	184	235	190	20				
172	39	178	479	185	213	191	6				

* This area is pine.

† This area is partially within a secondary conservation zone for the federally endangered Indiana bat.

□ These areas have partial acres within a Northern long-eared bat maternity buffer zone.

Commercial salvage of timber on up to 1,000 Acres.

Across the District, numerous events have occurred in the past which damaged or destroyed timber resources. Trees in the project area would be salvaged only in the event of a disaster such as a tornado or strong wind event. This would expedite the utilization of damaged timber resources and reforestation efforts. If it is determined the work could be performed safely, proposed salvage areas would be revisited by Heritage and Wildlife staff to ensure biological and historical properties (if present) would be protected from adverse effects of activities.

Management of wildlife openings for high quality forage by a combination of enlarging and/or reconstructing existing openings for a total of 35 acres (Appendix A).

Enlargement of openings up to five acres each are proposed. Trees would be removed (harvested) and the area prepared for planting by using a dozer or other mechanical equipment to clear the debris from harvested trees and remove the stumps. Using mechanical equipment, the area would be further prepared for planting of warm and/or cool season native and non-invasive non-native species that provide good forage and cover for wildlife. 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. Management of existing openings would be in the same manner as outlined above. Opening reconstruction would involve removing tree and brush islands from within the clearings and applying the same management as the openings.

Woodland management of up to 10 acres around each 5-acre wildlife opening (total of 70 acres).

Around each proposed 5-acre opening, there could be up to 10 acres of woodland (no more than 70 acres total) which would be thinned commercially, manually (chainsaw) and with herbicide to permit sunlight to reach the forest floor and promote the development of native grasses and forbs. The goal is to have mature open woodlands dominated by native grasses and forbs in the understory. Thinning would reduce tree cover to 40-60 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 six feet in height and a herbicide foliar spray treatment on brush less than six feet to control competition (Table 9). In conjunction with prescribed burning, treatments would increase grasses, forbs, and overall habitat.

Maintenance/reconstruction of 38 wildlife ponds.

The maintenance and/or reconstruction of wildlife ponds (< ½ acre each) would be implemented in order to improve wildlife habitat in the vicinity. These ponds provide permanent water sources to allow for an even dispersal of wildlife throughout the project area. Periodic maintenance/reconstruction of existing ponds may include spillway and dam reshaping, woody sprout removal from the dam using manual and herbicide treatments, sediment removal by draining the pond or adding woody structure in the pond itself.

Large woody debris (LWD).

Large woody debris may be placed in streams, up to 10 pieces per mile, within the project area to improve habitat for aquatic species. No LWD would be placed within a Wild and Scenic River designation, inside Upper Buffalo Wilderness, or along the mainstream of Kings River.

Recreation management.

The project area is used for dispersed recreation and contains two areas where recreational use is concentrated. In order to increase the overall enjoyment and sustainability of recreational experiences, these areas need improvements.

The first area is Whitaker Point, also known as Hawksbill Crag. Currently there is 1.1-miles of developed trail, a trail head with kiosk, and a small parking area.

The following actions are proposed:

- Improve approximately 0.2 miles of existing road.
- Develop a parking area, approximately two acres in size, west of the current parking area to hold 30-100 vehicles.
- Install a vault toilet at the new parking area.
- Construct 0.2 miles of hiking trail from the new parking area and through a newly acquired recreational easement to link up with the existing trail.
- Relocate approximately 0.3 miles of trail within wilderness.
- Decommission 0.4 miles of old trail.

The second area of concentrated use is in Management Area (MA) 2.D. - Upper Buffalo Dispersed Recreation Area where currently there are two trailheads and approximately 35 miles of designated mountain bike trails. The following actions are proposed:

- Construct approximately 24 miles of new mountain bike trail; the majority of which would be easy to moderate difficulty level.
- Remove approximately 8.7 miles of mountain bike trail from the system that is currently designated on county and FS open roads where a possibility of user conflict with full sized vehicles exists.
- Decommission the 1.1-mile Ratford Hiking Trail and remove the kiosk due to the lack of use and limited recreational resources for maintenance.

Hay allotment.

The PA also includes reissuing a 20-acre hay allotment on lands acquired by the National Forest.

Ozark chinquapin restoration.

An Ozark chinquapin (*Castanea ozarkensis*) monitoring plot is within the project boundary. Reproduction by way of stump sprouting has been observed, but the growth and development of stump sprouts have been short-lived and production of burs has not been recorded. In the last 10 years, the mid-story canopy has grown and the overstory has had some impacts from storms that has led to a build-up of woody debris within the plot. The following actions are proposed:

- Manually thin the midstory and overstory canopy within the ¼-acre plot and around the outside perimeter in order to allow more sunlight to reach the forest floor and increase the growth and development of these small sprouts. Areas within the plot that have heavy debris deposits would be manually cut and scattered.
- Up to an additional 14 acres around the outside of this plot may be manually or commercially thinned to achieve desired conditions to support chinquapin development (Appendix A).

Proposed actions for the road system in this project are recommendations taken from the Roberts Gap Travel Management Process Report (TAP) (Project Record at District Office).

Existing NFS roads would be maintained 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, improving sight distance for safety, repairing slide and slump areas, surface blading, spot surfacing with gravel, maintaining drainage structures, replacing culverts, cleaning ditches and clearing the roadside of vegetation. The TAP, in the process file at the Jasper office, contains additional information about each individual road and the associated proposed actions.

Maintenance on 35.5 miles of existing roads.

These roads would have routine maintenance (blading, cleaning leadoffs, filling potholes etc.) in association with proposed activities.

Construct 0.53 miles of new road.

New construction is needed to facilitate access to project activity areas in order to complete silviculture actions.

Reconstruction of 3.5 miles of road.

Approximately 3.5 miles of road would be reconstructed to facilitate access and hauling of timber from stands proposed for commercial harvest. Reconstruction may include shifting the road template or increasing road condition class.

Decommission 10.5 miles of existing roads.

Decommissioning of 10.5 miles of existing roads that are no longer needed for the transportation system in this project area would occur. Methods of decommissioning range from blocking the road entrance to full obliteration and may include re-vegetation, water-barring, culvert removal, establishing drain-ways, removing unstable road shoulders, and restoring natural slopes.

Closure of 39 Miles of existing open roads.

Thirty-nine miles of open NFS roads would be permanently closed. 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 and require maintenance; however, maintenance dollars are limited. Other roads being used in the area 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. 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. Road specific information is provided in the Travel Analysis Report (TAP) contained in the process file at the Jasper office.

Construction and closure of 40 miles of temporary roads.

Temporary roads are needed to facilitate access to project activity areas in order to complete silviculture actions. These roads would be closed once the activity has been completed.

Table 9: Proposed acres and methods of herbicide use by proposed treatment.

Treatment	Glyphosate	Metsulfuron methyl	Triclopyr (ester)	Triclopyr (amine)	Imazapyr	Triclopyr & Fluroxypyr	Proposed Action	Alternative 3
Wildlife Opening and Pond Management	Foliar	Foliar	Basal Spray Stem Injection Cut Surface	Foliar Stem Injection Cut Surface	Foliar Stem Injection Cut Surface	Foliar	54* Acres	54* Acres
Regeneration Harvest Site Prep / Release	Cut surface	None	Basal Spray	Foliar &/or cut surface	Foliar &/or Stem Injection Basal Spray Cut Surface	None	2,091** Acres	2,019*** Acres
Woodland Restoration	Cut surface	Foliar	Basal Spray	Foliar &/or Stem Injection	Foliar &/or Basal Spray Stem Injection Cut Surface	None	2,417 Acres	662 Acres
Commercial Thinning Plus Woodland Treatment	Cut surface	Foliar	Basal Spray	Foliar &/or Stem Injection	Foliar &/or Basal Spray Stem Injection Cut Surface	None	2,669 Acres	324 Acres
Total							7,231 Acres	3,059 Acres

*Includes 35 acres of wildlife openings and 19 acres (1/2 acre per pond) of pond maintenance.

**Includes 965 acres of hardwood shelterwood and 1,126 acres of shelterwood preparation treatments.

***Includes 893 acres of hardwood shelterwood and 1,126 acres of shelterwood preparation treatments.

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 would be applied at rates and 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 (PA), but ongoing National Forest permitted, and approved activities would continue.

Alternative 2: No Herbicide Use

Herbicide application totaling 7,231 acres (Table 9) would not occur. These activities would be accomplished manually and by mechanical means. Ongoing permitted and approved herbicide applications would continue. All other activities would be the same as outlined in the PA.

Alternative 3: Other Resources Alternative (Appendix A)

The Other Resources Alternative (Alternative 3) was developed as a result of the on-the-ground design of 24 miles of proposed mountain bike trails included in the PA, suggesting a different approach to address access and trespass issues around Hawksbill Crag, and from considering public responses at open house meetings as well as other internal and public input.

Much of the proposed mountain bike trail locations in the PA were in areas not sustainable either due to topographic features, multiple stream crossings within a short distance, or in areas where thick vegetation would result in maintenance issues. When the ground truthing process was completed, 13.75 miles of new trail was laid out on the ground in a sustainable location. When the 13.75 miles was overlaid with the silviculture and fire proposals in the PA, conflicts between proposals were discovered. Alternative 3 was developed in order to address these conflicts. All the actions proposed in the PA are the same for Alternative 3 except for the following:

- 13.75 miles of mountain bike trail construction (a reduction of approximately 50% from the 24 miles in the PA)
- Prescribed burning is reduced from 13,468 acres to 10,666 acres (2,802 acres – a 21% reduction)
- Commercial thinning is reduced from 8,336 acres to 7,908 acres (428 acres – a 5% reduction)
- Regeneration harvest reduced from 965 acres to 893 acres (72 acres – a 7% reduction)
- Herbicide treatment to control woody species in woodland restoration areas reduced from 2,417 acres to 622 acres (1,795 acres – a 74% reduction)
- Herbicide treatments to control woody species in commercial thin areas are reduced from 2,669 acres to 324 acres (2,345 acres – an 88% reduction).
- New control (dozer) line construction for prescribed burns reduced from 27 miles to 20.25 miles (6.75 miles – a 25% reduction)
- Maintenance of 35.5 miles of existing roads reduced to 32.2 miles (3.3 miles – a 9% reduction)
- Construction of 40 miles of temporary roads to access timber stands reduced to 38 miles (2 miles – a 5% reduction)

Alternative 3 also includes a parking area at Hawksbill Crag which would be constructed along the west side of Cave Mountain Road (different location from the PA) by widening the road up to 30 feet which would allow for approximately 50 parking spaces where vehicles could pull in and park at a 90-degree angle from the road (approximately 0.3 acres). Constructing the parking

area along the county road would reduce new trail construction by 0.1 mile. The kiosk would be moved from its current location to the east side of Cave Mountain Road adjacent to the relocated hiking trail. Additionally, a vault toilet would not be proposed as part of this Alternative. The other actions not addressed in Alternative 3 are the same as the PA.

Past, present and reasonably foreseeable future actions

Within the project area there are past, present and reasonably foreseeable actions that are **NOT** part of the PA or any part of the Alternatives to the PA, but have occurred or are expected to occur within the foreseeable future are as follows and for the purpose of this assessment the actions would be considered to occur at the same time as the project implementation:

- The County Line prescribed burn was implemented in April of 2019 – 1,800 acres
- A borrow pit expansion of 4 acres
- Private landowner commercial timber thinning on – 150 acres

Additionally, there are 2,324 acres which are privately owned and within the proposed prescribed burn areas that could be burned with landowner permission and included here for cumulative effects.

C. Comparison of the Proposed Action and Alternatives

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

Table 10: Comparison of the total acres/miles by treatment for the Proposed Action (PA) and Alternatives.

Treatments and Acres/Miles	PA	Alternative 1	Alternative 2	Alternative 3
Wildlife				
Create and improve wildlife openings (acres)	35*	0	35 Manual	35*
Woodland management around wildlife openings (acres)	70*	0	70 Manual	70*
Wildlife ponds (including reconstruction) (acres)	38*	0	38 Manual	38*
Woodland restoration herbicide or manual (acres)	2,417*	0	2,417 Manual	622*
Commercial thinning understory (acres)	2,669*	0	2,669 Manual	324*
Silviculture				
Regeneration/shelterwood preparation (acres)* including site preparation (planting or natural)	965/1,126	0	965/1,126	893/1,126
Commercial thinning (acres)	8,336	0	8,336	7,908
Commercial salvage of damaged timber (acres)	1,000	0	1,000	1,000
Timber stand improvement thinning	296	0	296	296

Treatments and Acres/Miles	PA	Alternative 1	Alternative 2	Alternative 3
Prescribe burning				
Prescribed burning as needed (acres)	13,468	0	13,468	10,666
Rx burn control (dozer) line construction/reconstruction (miles)	27	0	27	20
Road management				
Temporary roads (miles)	40	0	40	38
Road reconstruction (miles)	3.5	0	3.5	3.5
Road maintenance (miles)	35.5	0	35.5	32.2
Road decommissioning of (miles)	10.5	0	10.5	10.5
Road closure of (miles)	39	0	39	39
New road construction (miles)	.5	0	.5	.5
Trails/recreation management				
New mountain bike trail construction (miles)	24	0	24	13.75
Trails removed from mountain bike system (roads) (miles)	8.7	0	8.7	8.7
Hiking trail relocation (miles)	0.3	0	0.3	0.3
Hiking trail construction (miles)	0.2	0	0.2	0.1
Hiking trail obliteration (miles)	1.5	0	1.5	1.5
Vault toilet at parking area (acres)	1	0	1	0
Parking area construction (acres)	2	0	2	0.3

* Herbicides would be used as part of these treatments.

D. Protective Measures

In order to protect the environment and lessen possible negative impacts, the measures contained in the Forest-Wide (FW) and Management Area (MA) Standards of the Forest Plan would be applied to the PA and Alternatives and are incorporated in this EA. Best Management Practices (BMP) for Water Quality Protection (Arkansas Forestry Commission, 2002) would also apply as standard protective measures for all proposed actions.

E. 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 a reference to this document and is in the project record at the district office. The project designs are taken directly from the Forest Plan, the implementation plan for the 2018 Roadside Vegetation Management and NNIPS Control project decision and other forest direction documents.

F. Monitoring

1) Monitoring for compliance with forest wide standards, BMPs and other protective measures 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 negative impacts. Monitoring 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.

4) A review of all known occurrences of proposed, endangered, threatened or sensitive species (PETS) has been conducted. The areas will be monitored for 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.

G. Site-specific design criteria

Landscape Architect’s site-specific design criteria Area 54 – Applies to the PA and Alternative 2. It is recommended that the parking for Whitaker Point (Hawksbill Crag) be moved off the roadside and into area 54 to the west with the addition of a vault toilet. Pull the boundary of the treatment area further west of the parking to allow a visual buffer between road and parking in order to preserve the view path along FR1271(Cave Mountain Road). In order to prevent distraction, clearly mark the new parking and provide a barrier at the sides of the road to prevent future parking along the sides of FR1271.

Area 72 – Protect the Dahl memorial and the large white oak tree in the center of a dispersed campsite (they are within 100 feet) and route pre-haul maintenance proposed to occur on FR 1463 as far from the tree as practical. Consider requiring manual thinning within 50 feet of these two sites in order to protect them.

Area 72 – A less than 5-acre upland bog/pond exists adjacent to this area. Upland bogs are home to sensitive plant species and have soils and hydrology that are prone to damage. To protect the soils and hydrology, mechanized equipment would not be allowed in the bog or around the perimeter. Vegetation management which enhances the bog’s qualities or addresses public safety would be allowed. Illegal trails would be decommissioned. carry an aquatic label and would be applied under FS supervision with personnel trained in sensitive plant species identification.

Wildlife

No large woody debris would be placed within a Wild and Scenic River designation, inside Upper Buffalo Wilderness, or along the mainstream of Kings River.

Threatened, endangered, sensitive bats

Bat hibernacula (known locations) – Identify Edgemon Cave and Cave Mountain Cave as smoke sensitive targets in burn plans (as specified in FW52).

Northern long-eared bat maternity roosts (known locations) –Although prescribed (Rx) burning is not prohibited at any time during the year under the final 4(d) rule, it is recommended that when using prescribed burning as a management tool, fire frequency, timing, location, and intensity all need to be considered to lower the risk of incidental take of bats; therefore, a low intensity backing fire is recommended in these known maternity roost sites. These Rx burns should be conducted, if possible, either January through March or late summer/fall avoiding the pup season (May 15 through July 31). Burn units with maternity roost sites are Reeves Mountain, Smith Ridge, Buffalo Lookout, and Reeves Fork. Hazardous tree removal is not prohibited but is recommended that removal occur, whenever possible, during the winter.

The final 4(d) rule for the Northern long-eared bat prohibits the cutting or destruction of known occupied maternity roost trees as well as any other tree within a 150 ft. radius during the pup season, May 15 through July 31; therefore, the following units have maternity roost buffer areas that must be harvested outside of the May 15-July 31st window: Red Star area units 111, 112, 113 & 114; Evans Hollow area units 44 & 42; Sullivan Cemetery area unit 78; and Dixon Ridge Road area units 72,75, 192 & 168.

Indiana Bat Mitigations The northwest portion of the project area is within two overlapping secondary conservation zones for the Indiana bat. Silvicultural areas within the secondary zones include area numbers 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 64, &186. Forest-Wide standards from the Forest Plan related to conservation zones are listed below.

A 2-acre parking lot is proposed within the secondary conservation zones to handle visitors to Hawksbill Crag/Whitaker Point. The caves' primary conservation zones and majority of the secondary conservation zones are outside of the Forest boundary leaving approximately 17% within the Forest boundary. Two acres is less than 1% of the secondary zone (FW68).

Indiana Bat Forest-Wide Standards:

The Reeves Mountain Rx burn is partially within the secondary conservation zone for Indiana bats; therefore, the Forest Plan standards will apply.

See Design Criteria in project record at District office for Forest Wide Standards which apply to Indiana Bat

Heritage

Heritage protection measure 1: Site avoidance during project implementation

Avoidance of historic properties will protect sites from effects resulting from the undertaking. Establish clearly defined site boundaries and buffers around archeological sites where activities that might result in an adverse effect are to be implemented. Route proposed activities away from historic properties. Buffers will be of sufficient size to ensure that site integrity is not compromised.

Heritage protection measure 2: Site protection during prescribed burns

Fire lines: Historic properties located along existing non-maintained woods roads used as fire lines will be protected by hand-clearing those sections that cross the sites. Although these roads are generally cleared of combustible debris using a small dozer, those sections crossing archeological sites will be cleared using leaf blowers and/or leaf rakes. There will be neither removal of soil, nor disturbance below the ground surface, during fire line preparation. Historic properties and features located along proposed routes of mechanically constructed fire lines, where fire lines do not now exist, will be avoided by routing fire line construction around historic properties. Sites that lie along previously constructed dozer lines from past burns (where the fire lines will be used again as fire lines) will be protected during future burns by hand clearing sections of line that cross the site, rather than re-clearing using heavy equipment. Where these activities will take place outside areas not already surveyed, cultural resource surveys and consultation will be completed prior to project implementation. Protection measures HP1, HP3, and HP4 will be applied prior to project implementation to protect historic properties.

Burn Unit Interior: Combustible elements at historic properties in burn unit interiors will be protected from damage during burns by removing excessive fuels from the feature vicinity and, where applicable, by burning out around the feature prior to igniting the main burn and creating a fuel-free zone. Historic properties containing above ground, non-combustible cultural features and exposed artifacts will be protected by removing fuel concentrations dense enough to significantly alter the characteristics of those cultural resources. For sites that have been previously burned or that do not contain combustible elements or other above-ground features and exposed artifacts, no additional measures are proposed. Past research indicates that prescribed burning will not be sufficiently intense to cause adverse effects to these features.

Post-Burn Monitoring: Post-burn monitoring may be conducted at selected sites to assess actual and indirect effects of the burns on the sites against the expected effects. State Historic Preservation Office (SHPO) consultation will be carried out with respect to necessary mitigation for any sites that suffer unexpected damage during the burn or from indirect effects following the burn.

Heritage protection measure 3: Other protection measures

If it is not feasible or desirable to avoid an historic property that may be harmed by a project activity (HP1), then the following steps will be taken:

In consultation with the Arkansas SHPO, the site(s) will be evaluated against National Register of Historic Places (NRHP) significance criteria (36 CFR 60.4) to determine eligibility for the NRHP. The evaluation may require subsurface site testing;

In consultation with the Arkansas SHPO, relevant federally recognized Tribes, and if required with the Advisory Council of Historic Preservation (ACHP), mitigation measures will be developed to minimize the adverse effects on the site, so that a finding of No Adverse Effect results;

The agreed-upon mitigation measures will be implemented prior to initiation of activities having the potential to affect the site.

Heritage protection measure 4: Discovery of cultural resources during project implementation. Although cultural resources surveys were designed to locate all NRHP eligible archeological sites and components, these may go undetected for a variety of reasons. Should unrecorded cultural resources be discovered, activities that may be affecting that resource will halt immediately; the resource will be evaluated by an archaeologist, and consultation will be initiated with the SHPO, tribes and nations, and the ACHP, to determine appropriate actions for protecting the resource and mitigating adverse effects. Project activities at that locale will not resume until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval.

Chapter III

Environmental Effects of the Proposed Action and Alternatives

A. SOIL PRODUCTIVITY

Existing Condition

The analysis area for soils will be the proposed activity areas within the project area which is located in a heavily dissected section called the Boston Mountains. The project area elevation varies from about 2,556 feet at the Buffalo Tower site in the central portion to 1,200 feet above mean sea level on the floodplain of Big Buffalo River in the northeastern 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 the Kings and Big Buffalo Rivers, Filkins, Knuckles and Whitaker Creeks, Marksburg, Williams, and Pruitt Hollows, Reeves and Terripin Branches, and Boen Gulf. Most of the mountain tops, creek bottoms, and some wider benches now or have been under cultivation or in pastures, and some are in 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 and adjacent to open roads and along the main tributaries such as the Kings and Big Buffalo Rivers. Sections of the stream banks along tributaries are unstable and are eroding somewhat 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 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, and live vegetation 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 National Forests during 1993-2002.

The Proposed Action

Direct/Indirect Effects

The High Mountain and Bearcat Habitat Enhancement Projects have been conducted on areas with similar soil characteristics, activities/treatments, and harvest methods and will be used to disclose the affects for this project.

Based on Forest soil disturbance monitoring, the High Mountain and Bearcat Habitat Enhancement projects had an estimated 10 and 11 percent respectively of the harvested area sustaining a temporary reduction in soil productivity (20-25 year recovery period based on

monitoring done in 1981 and 2001 on the Magazine Ranger District) due to harvesting operations and is expected for this project. As indicated in these previous projects, soil productivity would be lost due to construction of trails, road construction, and construction of a parking area. Additionally, a temporary reduction in soil productivity would be due to construction and maintenance of control (dozer) line for prescribed burning. Approximately 10.5 miles of road and 1.5 miles of trail are proposed for decommissioning which would return these areas to a productive state.

Total expected temporary reduction of soil productivity would be from skidding, road reconstruction, trail realignment and construction, and dozer line maintenance and reconstruction. Road and trail decommissioning would reduce the net acreage of soil disturbance slightly. Temporary roads, primary skid trails, and landings would be seeded and closed following harvesting to speed the recovery of the soil productivity. Dozer lines would be bladed and seeded when prescribed burning is completed to speed recovery of soil productivity and to prevent erosion. Road construction and 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.

Reconstruction and expansion of existing wildlife openings and reconstruction of ponds would cause some on-site soil erosion until vegetation becomes established. Soil productivity is not expected to be impacted by this disturbance since seeding and fertilization follow these activities.

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 would 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 areas that are proposed for shelterwood and shelterwood prep harvests. 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 shelterwood prep removal harvests proposed 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. Approximately, 2,091 acres within the project would receive these treatments are expected to sustain a temporary loss in soil productivity due to the initial harvest. With additional acres having a temporary loss of soil productivity due to the follow-up shelterwood and shelterwood prep removal harvests. As indicated in these previous projects soil productivity loss was 10-11%. The cumulative effects are not considered substantial because the existing and estimated temporary loss in soil productivity is expected to be less than 15% of an activity area which is the Forest Plan standard. If more than 15% of the activity area sustains a reduction in soil productivity, mitigation measures must be installed. For a more detailed description of the effects on soil see the process files for the High Mountain and Bearcat Habitat Enhancement Projects.

Alternative 1: No Action

Direct/Indirect/Cumulative Effects

The roads and trails and the adjacent areas proposed for reconstruction, maintenance, closure and decommissioning would continue to deteriorate and erode. Sections of the stream banks along the aforementioned rivers, creeks, and hollows would continue to erode due to past activities.

Alternative 2: No Herbicide

Direct/Indirect/Cumulative Effects

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

Alternative 3: Other Resources

Direct/Indirect/Cumulative Effects

Due to the size of the project and the relatively insignificant reduction (500 acres/5%) in harvest activities outlined in this alternative the overall reduction in effects would be slightly less than the PA. The greatest reduction would be in those individual areas not receiving treatments.

The following is a link to the soil survey website:

<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/tools/?cid=nrcseprd1407030>

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 Upper White sub-region (1101) and the Upper White basin (110100). It is then divided into the Beaver Reservoir (11010001) and Buffalo (11010005) sub-basins (U.S. Geological Survey, 2003). The Ozark-St. Francis National Forests further classifies land areas into two progressively smaller units: watersheds and sub-watersheds. The proposed project falls into the Kings River (1101000109) and Headwaters Buffalo River (1101000502) watersheds and then, at the smallest scale, into the five sub-watersheds (Table 11). These sub-watersheds or 6th level Hydrologic Unit Code (HUC) areas will serve as the analysis area for the proposed project with respect to water resources (Figure 1).

Table 11. Total acres and project area acres per 6th level watershed.

Watershed Number	Watershed Name	Total Acreage	Project Area Acreage
110100050201	Terrapin Branch-Buffalo River	22,788	18,353
110100050202	Beech Creek-Headwaters Buffalo River	12,444	3,380
110100050203	Smith Creek-Buffalo River	21,477	9,485

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Watershed Number	Watershed Name	Total Acreage	Project Area Acreage
110100010901	Headwaters Kings River	18,029	10,727
110100010902	Felkins Creek	13,605	2,437

There are approximately 313 miles of streams within the project area. The primary streams found in the project area include Kings River, Michell Branch, Mink Creek, Felkins Creek, Edgemon Creek, Main Prong Big Buffalo Creek, Nuckles Creek, Reeves Fork, Adkins Creek, Terrapin Branch, Gulf Branch, Whitaker Creek and Buffalo River plus several unnamed tributaries to these streams. Kings River, a designated Extraordinary Resource Water (ERW), runs north through the northwest portion of the project area. Another ERW, Buffalo River, flows north through the Upper Buffalo Wilderness in the eastern part of the project area and becomes the Buffalo National River as it exits the National Forest. 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.

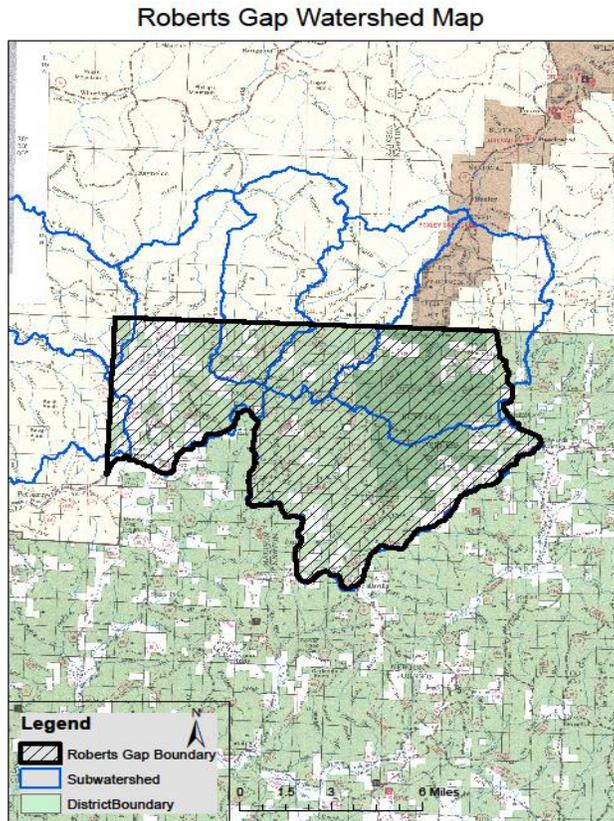


Figure 1.

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 58% of the land is administered by the FS. This leaves a sizable portion of the land within the watersheds as privately owned. Land use within these sub-watersheds is approximately 88% forested. The balance of the land uses is 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 National Forests, 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).

Within the analysis area, roads exist both within the forest boundary and outside the forest boundary. There are approximately 259 miles of roads within the project area and approximately 10 stream crossings where the current road system crosses or intersects a stream. According to the US Fish and Wildlife Service's National Wetland Mapper, there no registered 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 would be taken to protect these resources.

Approximately 687 acres of floodplains were identified within the project area. These features were mainly found to occur along Mink Creek, Main Prong Big Buffalo Creek, Reeves Fork, Buffalo River, and unnamed tributaries of Kings River. 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 also include primary contact recreation. Portions of the Kings River are listed on the 303d list of impaired waters for Arkansas for dissolved oxygen and total dissolved solids.

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. This model will be used to estimate effects for this project.

Proposed Action and Alternative 2: No Herbicide

Direct/Indirect Effects

Activities which could cause effects to water quality are those of vegetation management, silvicultural site preparation, road work, parking lot construction, trail construction, dozer line construction/reconstruction, 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 seed-tree harvest produced over twice 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 half of a 5-gallon bucket of soil. Another study by Lawson and Hileman (1982) investigated the effects of seed-tree removal and site preparation burning. The results indicated that there were no substantial differences in stream turbidity between seed-tree removal sites and undisturbed control sites. Thus, seed-tree 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.

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.

Road work activities planned for this project include road construction and reconstruction, road maintenance, road closure, road decommissioning and temporary road construction. Calculations displaying the contributions of sediment into streams for each activity above are contained in the process file. The parking lot proposed for construction near the Hawksbill Crag trailhead would be cleared and graveled much like in road construction, so it was counted as a road in the sediment model. Using two acres for the size of the parking lot and 12 feet as the average width of a Level C road equals the square footage of approximately 1.4 miles of new road. Road maintenance, closure, and decommissioning 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 Forest Plan and the Arkansas Forestry Commission's BMPs for Water Quality Protection outline the protection measures necessary to conduct these activities while controlling contributions to non-point source pollution.

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). Estimates of sediment yield for fire line construction and reconstruction are contained in the process file. Minor increases in stormflow and nutrients return to pre-treatment levels within 3 years (Van Lear *et al.*, 1985).

Alternative 3: Other Resources

Direct/Indirect Effects

Much of Alternative 3 is the same as the proposed action but with a few changes addressed in Chapter II of this document. Reductions in the number of miles of bike trail, fire control line, road maintenance, and road construction and reduced acres of prescribed burning and timber harvest would result in a net reduction in sediment input for this alternative. Approximately 0.4 miles of what amounts to new road construction would be completed for parking along Cave Mountain Road resulting in slightly higher sediment rates for that activity compared to other activities in this alternative.

Results of WRACE Model and Cumulative Effects for PA/Alternative 2 and 3

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 PA and Alternatives 2 and 3 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 PA and Alternatives 2 and 3, 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 BMPs for Water Quality Protection, current Forest Plan standards, and the site specific protection measures noted in this EA, the activities of the PA and Alternatives 2 and 3 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 established around surface water features are typical measures used to ensure the reduction of negative effects that would occur.

Long-term implications of nutrient loading after timber harvest for streams in the south were described in a study by Lynch and Corbett (1990). In this study best management practices included 100-foot-wide perennial buffers, removal of logging slash from streams, monitoring of sale units by a responsible party, cessation of operations during wet weather, lay out of roads by professionals, building of roads not exceeding 10% grade, utilization of culverts to cross perennial streams and removal when done, utilization of water bars, gating roads, and maintaining filtration strips. 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 PA 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. The Big Piney Fuels Management project contains 1,749 acres of prescribed burn area within the Terrapin Branch-Buffalo River sub-watershed. That area was burned in 2019. Therefore, it was included in the sediment model run for this project. 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 several 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 Forestry Commission’s BMPs should be verified for implementation. Assuming these guidelines are correctly applied, this project would result in minimal risks to water quality. 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. 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 PA and Alternatives (Table 12). All five of the sub-watersheds are currently determined to have a low concern level and the concern level for the PA and each Alternative is estimated to remain low for the future watershed condition.

Table 12. Percent increase of sediment above undisturbed conditions and level of concern by 6th level watershed for current condition and future conditions under the Proposed Action and Alternatives.

	Percent increase of sediment above undisturbed conditions									
	Current		Future							
	% Increase	Concern Level	Proposed Action		No Action		No Herbicide		Other Resources	
% Increase			Concern Level	% Increase	Concern Level	% Increase	Concern Level	% Increase	Concern Level	
Sub-Watershed Analysis Area	% Increase	Concern Level	% Increase	Concern Level	% Increase	Concern Level	% Increase	Concern Level	% Increase	Concern Level
Terrapin Branch-Buffalo River	269	Low	359	Low	270	Low	359	Low	323	Low
BeechCreek-Headwaters Buffalo River	197	Low	218	Low	201	Low	218	Low	215	Low
Smith Creek-Buffalo River	193	Low	202	Low	196	Low	202	Low	202	Low
Headwaters Kings River	370	Low	427	Low	376	Low	427	Low	421	Low

Felkins Creek	223	Low	253	Low	230	Low	253	Low	249	Low
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The activities proposed under the PA would result in an overall increase in sediment yield compared to current conditions. 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 Forest Plan 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 alternatives 2 or 3.

Alternative 1: No Action

Direct/Indirect/Cumulative Effects

There would be no direct, indirect or cumulative 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 System (NFS) 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 adverse resource effects. 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. RECREATION

Proposed Action and Alternative 2: No Herbicide

The difference between the recreational and visual impacts of the PA and Alternative 2 is negligible so the effects were analyzed together.

Direct/Indirect Effects

The proposed vegetation management activities include practices such as, tree cutting, skid trails, temporary road construction, etc. which would have a direct temporary negative effect on the recreational setting. Effects are expected to be similar to those found in Three Knob and High Mountain EAs, detailed discussion of those effects can be found in those EAs. The current ROS classifications do not prohibit and give the expectation that forest visitors would encounter resource utilization while traveling NFS roads, hunting or cross-country riding /hiking. Impacts

are temporary (usually 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 all types of recreational use. The more intensive the vegetation activities, the longer duration of impacts on recreational use. Example, commercial thinning would impact recreational use for a shorter duration (one to two years) of time than a regeneration harvest (three to five years).

The proposed recreational needs identified in the PA and Alternative 2 would address public comments associated with bicyclist on roads open to passenger vehicles and the need for beginner to moderate level trails. The PA and Alternative 2 offers a positive bicyclist user experience by providing additional trails, expanding user base, and reducing user conflict with vehicles. Public comments favored a single designation of bicycle trails. The bicycle trails will allow for hikers, but not horseback riders due to trail specifications and user conflicts. Some activities are not compatible, such as bicyclist and horseback riding. Horseback riding is allowed across the Ozark-St. Francis National Forests, roads, general forest, and wilderness areas.

Cumulative Effects

Cumulative effects are not measurable due to limited size of activities occurring on private and the barrow pit expansion is less than one percent in size of the project area for that reason quantifying the effects to recreation would be very difficult and minor on this resource.

Alternative 3

Direct/Indirect

Effects would be similar to the PA with 500 acres less vegetation management in dispersed non-motorized recreation area surrounding the bike trails. This would improve the overall recreational experience for users in this area.

The reduction of herbicide use within the non-motorized area would appeal to the general recreational user, however this results in more manual vegetative treatments resulting in more horizontal debris and down vegetation that would impede hikers and create a potential safety concern as a trip hazard.

Hawksbill Crag - creation of the parking along the road would ease the traffic issue and trail relocation would also address concerns raised. However, the issue associated with sanitation remains since a vault toilet has not been provided in this alternative.

Cumulative Effects

The project area has had little or no timber activities occurring due to storm damage, red oak borer infestation, and opening roads for over twenty years that previously limited access to passenger vehicles. These proposals would increase the overall managed recreational experience by temporarily opening more roads (while activities are being implemented) which would provide more opportunities for hiking and driving. This fits within the niche that has been identified for the district of primarily day use activities. Due to the broken terrain and limited/temporal nature of management activities planned, no activity is anticipated to affect the recreational user experience for any long duration with the exception of regeneration area approximately 4% well within the acceptable level of impacts.

Improved amenities such as parking area and trail improvement would lessen impacts to local traffic issues and provide safer and more sustainable trail. Sanitation issue would remain and is expected to increase as users search for privacy away from the trail for toileting purposes, therefore creating more social trails.

Alternative 1: No Action

Direct/Indirect/Cumulative Effects

Under this alternative the recreational effects would remain as they currently exist. No activities would be implemented. There would be no improved access, enhanced wildlife viewing opportunities, or enhanced sight distances, no additional bike trails or hiking trail additions would be implemented.

D. VEGETATION MANAGEMENT

Existing Conditions

The existing vegetation condition for the project area is comparable to the analysis done in three recent EAs (3EA), Jakes Creek EA, High Mountain EA and Three Knob EA, and is incorporated by reference (process file at the District Office in Jasper, AR). To make the projects comparable, the forest type, management areas, age classes and potential old growth condition acres were divided by the total NFS land present in each project area, creating a percentage (%) (process file at District Office in Jasper). A range was established between the 3EA and was compared to the % within the Robert's Gap analysis. If the Robert's Gap % was outside the range of 3EA it is addressed in the analysis. The project area encompasses approximately 53,530 acres of NFS and privately-owned land. Private land composes 37% in Roberts Gap compared to the 3EA range of 3-17%.

Differences in forest types present on NFS land in the Robert's Gap project area include:

- Pine and mixed pine-hardwood composes 10% in Roberts Gap compared to the 3EA range of 29-84%.
- Oak/pine and oak/mixed hardwood composes 88% in Roberts Gap compared to the 3EA range of 9-70%.
- Brush composes 0.1% in Roberts Gap compared to the 3EA range of 0-0.02%.
- The 0.06% of Ozark Prairie and Woodland is new to Roberts Gap.
- The 1.5% of Beech-Magnolia is new to Roberts Gap.
- Forest types within the 3EA range include Cedar; Cedar/Hardwood; Bottomland Hardwood; Bottomland Hardwood/Pine and Non-forested NFS land.

Differences in Management Areas present on NFS land in the Robert's Gap project area include:

- 3.C. Mixed Forest composes 44% in Roberts Gap compared to the 3EA range of 0-17%.
- The 30% 1.A. Wilderness is new to Roberts Gap.
- The 16% 2.D. Upper Buffalo Dispersed Recreation Area is new to Roberts Gap.

- Management areas within the 3EA ranges include 1.C. Designated Wild and Scenic Rivers; 1.G. Special Interest Areas; 1.H. Scenic Byway Corridors; 3.B. Oak Woodland; and 3.I. Riparian Corridors.

Differences in forest age classes present on NFS land in the Robert's Gap project area include:

- Forest age classes within the 3EA range include: 21-30; 61-70; 71-80; and 81-90 years old.
- 0-10 constitutes 0.003% in Roberts Gap compared to the 3EA range of 0.3-4%.
- 11-20 constitutes 0.3% in Roberts Gap compared to the 3EA range of 1-12%.
- 31-40 constitutes 1.4% in Roberts Gap compared to the 3EA range of 6-11%.
- 41-50 constitutes 2.7% in Roberts Gap compared to the 3EA range of 7-13%.
- 51-60 constitutes 7.0% in Roberts Gap compared to the 3EA range of 2-6%.
- The most striking forest age class differences are at the upper end of the age spectrum. In total, stands 70 years and older make up 86% of the project area. This is above the 3EA range of 54-80%.

The aging forests in the project area are similar to the Ozark-St. Francis National Forests as a whole. Many of the stands are overstocked and are at an elevated risk of attack from forest pests. The Red Oak Borer outbreak impacted millions of acres across multiple states. One of the contributing factors was the lack of thinning in oak stands. The risk of forest pest outbreaks can be reduced by thinning overstocked stands, which allows the remaining trees more growing space and reduces stress. Regenerating some older stands helps to avoid large blocks of aging trees with reduced vigor that are more susceptible to forest pests and pathogens.

The only current use of fire in the project area is the County Line Burn that occurs on 5% of the NFS land. Otherwise fire has been excluded at the landscape level from the project area for many years; although there is some evidence of past wildfires, particularly the Whitaker Point wildfire. Leaf and needle litter, as well as larger woody fuels, have accumulated for years without fire; the risk for wildfire in the area is evident.

The reduced and suppression of fire from the project area has led to a reduction in forest understory species and an abundance of shade-tolerant vegetation in the midstory and understory of many stands. This situation, caused by a lack of fire that would control these mid- and understory species, prevents the establishment of non-shade-tolerant and intermediate trees like shortleaf pine and oak in the understory of stands (Nowacki and Abrams, 2008). Without established pine and oak regeneration, when disturbances like wind events and wildfires occur in the area, shade-tolerant species like red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*) and eastern hop-hornbeam (*Ostrya virginiana*) are able to respond to the disturbance and become a more dominant part of the stand. Many older stands in the project area have experienced small-scale disturbances and are in the process of converting to more shade-tolerant species. This shift in species composition and structure has been identified across the Ozark-St. Francis National Forests through monitoring plots established by The Nature Conservancy in several prescribed burn blocks (Zollner and Fowler, 2010).

Currently, the project area has scattered populations of non-native invasive plant species (NNIPS). Most of these occur along roadsides in the form of sericea lespedeza (*Lespedeza cuneata*) and Japanese stiltgrass (*Microstegium vimineum*.)

There are no designated 3.F Old Growth Management Areas within the project area, however there are areas that have the potential to exhibit old growth conditions, as defined in the Forest Plan and the Old Growth Report (1997). Old growth stands are ecosystems exhibiting plant, vertebrate and invertebrate diversity; Deep multi-layered canopies with some large super-emergent canopy trees; Significant coarse woody debris and snags; Large trees for the species; Age; As well as openings in the canopy from overstory tree mortality. Signs of past management or settlement, such as logging roads, stone walls, barbed-wire fences, are present, but subservient, as the forest shows signs of reaching climax conditions.

There are three size classes of old growth, but the smaller size (less than 100 acres) are at risk of being eliminated by a single natural disaster, such as a wind event or insect infestation. Potential old-growth acres are unsuitable for timber production due to being in the 1.A. Wilderness Management Area or due to topographic conditions, such as steep or inoperable conditions.

In 1879 logging started in the Ozarks (Bass, 1981). In the late 19th century and early 20th century logging was conducted on a large scale and was intense, targeting most commercially viable trees. In the analysis area, individual trees and clumps of trees could certainly be older than the historic logging era, but no correctly aged stands are older than the start of the historic logging era (141 years). The project area is composed of second growth stands. To determine potential old growth conditions, age is a factor, but the other old-growth characteristics, the lack of recent management disturbance, and the size of the area are more important. An example of this is in the wilderness which lacks recent management, has some good old-growth characteristics, and has a size greater than 100 acres, but the stand ages range from 27 to 134 years old.

In this project area the analysis concentrates on contiguous areas, which are at least one hundred acres in size, are unsuitable for timber production, and have some old-growth characteristics. The potential old-growth condition can be found on 35% of the NFS land. This is higher than the 3EA range of 4 – 29%.

Proposed Action

Direct/Indirect Effects

Activities shared the 3EA include wildlife pond maintenance/reconstruction, woodland restoration around openings, shelterwood preparation treatment, site preparation for planting or natural regeneration, commercial thinning, commercial salvage of damaged timber, release, road reconstruction, road decommissioning, and hiking trail construction.

Prescribed burning at 33.9% is within the 3EA range of 7-76%. All harvesting treatments would cause a short-term increase in forest fuels and increased potential for damaging wildfire in the stand, but this threat would be reduced over time as needles fall off and the slash decomposes.

Well-timed prescribed fire can further reduce this risk, burning the rest of the woody fuels after they have begun to break down.

Implementing the proposed repeated prescribed fires would work to reverse several decades of fire suppression and a shift towards more mesic, shade-tolerant species and instead allow more growing space for oak and pine regeneration. Understory communities would become more diverse after multiple fires and in appropriate light environments (Nowacki and Abrams, 2008). Proposed dozer lines to restrict fire spread would have minimal effect on overstory vegetation. Understory vegetation would be impacted locally, but overall, there would be a net gain of understory vegetation diversity across the project area. Repeated prescribed fire can increase the species richness of herbaceous flowering plants.

Herbicide use at 18.2% is within the 3EA range of 15-48%, below the average of 29.5% and closer to the bottom than the average. The use of herbicide can create structural diversity and heterogeneity. Herbicide also reduces the threat of forest pests and pathogens by removing a portion of the trees and allowing the residual trees growing space which would lead to increased stand growth and vigor (Fettig *et al.*, 2007). The remaining trees would grow faster, producing a more mature-looking forest in less time by reducing crowding of overstory trees.

Activities that are below the 3EA range include:

Create/improve wildlife openings, at 0.1% versus the 3EA range of 0.4-1.3% would be less of an impact on overstory vegetation but would not increase the herbaceous flowering plant richness.

Regeneration at 2.4% versus the 3EA range of 5-15%. This creates early seral habitat and helps balance age classes which improves overall forest health. This treatment would open the canopy and allow enough sunlight to reach the forest floor and stimulate the natural establishment and growth of seedling trees.

Timber stand improvement at 0.7% versus the 3EA range of 3-15%. This activity would remove understory or midstory in order to move the area toward a woodland condition enhancing the botanical qualities (wild azalea) for which the Eagle Gap Special Interest area was designated. This treatment could measurably improve the growth and vigor of wild azalea.

Road maintenance at 32.9% versus the 3EA range of 66-90%. Impact on vegetation would be clearing the roadside of vegetation. Removing woody vegetation and NNIPS would have a positive impact on native grasses and herbaceous flowering vegetation.

Activities that are above the 3EA range include:

Woodland restoration treatments at 6.1% versus the 3EA range of 0.8-2.1%. This is above the 3EA range, but the 3EA has more pine and has much more acreage in High Quality Management Area. In addition, the % is comparable or less than the Southfork, Bearcat I and Bearcat II EAs. Treatments to control woody species help move the area(s) toward the desired future condition (DFC). Used in conjunction with prescribed burning, these treatments would increase herbaceous plants as well as overall habitat diversity.

Rx burn control line at 0.07% versus the 3EA range of 0-0.06% would result in a temporary loss of vegetation, which would be replanted/seeded with native grasses after use.

Temporary roads at 37% versus the 3EA range of 0-14% would result in a temporary loss of vegetation, which would be replanted/seeded with native grasses after use.

Road closure at 36.1% versus the 3EA range of 2-33%. Road closure could lead to increase of native grasses and herbaceous flowering plants.

Cumulative Effects

The County Line prescribed burn, under a previous EA decision, was implemented in April of 2019 and has created a healthier forest by reducing stocking, reducing dense shade tolerant species and has moved the area towards the DFC.

NNIPS is already approved be treated under a previous decision, which in conjunction with these treatments, could improve native vegetation in the project area. If all roads were treated in a single year this would be approximately 262 acres or 0.7% of the NFS land in the project area.

A borrow pit expansion of 4 acres or 0.01% of the NFS land has removed the vegetative layer. Hardwood thinning on 150 acres of private land could improve sunlight penetration on adjoining NFS lands. Additionally, there are 2,324 acres which are privately owned and within the proposed prescribed burn areas that could be burned with landowner permission. Burning, with landowner permission, would reduce fuel for wildfire, contribute to the forest health of the area and would reduce the miles of control line that would need to be constructed. The borrow pit expansion has a negative impact on vegetation, though negligible due to its small size. The County Line prescribed burn, and private landowner thinning could have a positive impact on the vegetation and forest health of the project area and would remain within the 3EA range of treatments. The NNIPS treatment could have a positive impact on the vegetation of the project area and would remain below the 3EA range of treatments.

Alternative 1: No Action

Direct/Indirect Effects

This alternative would not implement any part of the proposed action, but ongoing National Forests permitted, and approved activities would continue; such as, maintenance of major roads and existing wildlife openings. The County Line prescribed burn and NNIPS activities analyzed under the Fuels Management EA and the Non-native Invasive Plant Species & Roadside Vegetation Management EA would continue.

No stands would be regenerated, which would continue the trend in the project area toward a homogeneous landscape of older oaks and pines stands. It would not create structural and spatial diversity at the landscape scale and combined with the reduced tree vigor associated with aging and overstocked forests, it would increase potential hazards from forest pests, pathogens and wildfires. In the event of a disturbance that damages part of the project area, salvage operations would not be pre-planned in the project area.

Early seral vegetation would be absent across the project area, minus the current one acre. Without prescribed fire or simulated disturbance in the form of timber harvests, shade-tolerant species like red maple and black gum that currently occupy the understory would slowly begin to dominate, moving stands towards later-successional hardwood forest types (Nowacki and Abrams, 2008).

Currently overstocked stands would continue to self-thin in the project area, leading to slower growth rates and individual tree mortality as trees compete for resources and growing space. Very overstocked sapling stands may experience stagnation and high stress, leading to greater susceptibility to forest pests and pathogens (Fettig *et al.*, 2007).

Forest fuels would not increase in the short-term as they would with the PA, but without recurring prescribed fire to reduce existing fuel loads, the chances of wildfire in the area would remain elevated given appropriate weather. Long-term fuel loads could increase as understory and mid-story stocking increases. Overstocked stands would continue to impact species richness of flowering plants. Fire effects from wildfires that occur during drought or high temperatures could be much different than those seen after a prescribed burn.

Since NNIPS treatments were analyzed as part of another project, the no action alternative would not prevent NNIPS from being treated in the project area. Without timber harvests and road construction, both vectors for the spread of NNIPS, a no action alternative would likely cause the least spread of these species further into the project area. However, because many NNIPS occur along roadsides of old roads, access to treat these spots would be limited by this alternative.

Cumulative Effects

The County Line prescribed burning of 1,814 acres and the NNIPS treatments would continue, as addressed under separate decisions.

The borrow pit expansion and the private landowner thinning would continue, with similar impacts as described under the PA.

The burning of private land, with landowner permission, would not be implemented and the possible positive benefits to the project area's vegetation and forest health would be lost.

Alternative 2: No Herbicide

Direct/Indirect Effects

The proposed herbicide applications in this Alternative would not occur. These activities would be attempted to be accomplished manually and by mechanical means such as chainsaws and brush-cutters. All other activities would be the same as outlined in the PA. However, different outcomes would occur without the option to use herbicide for the proposed treatments. For example, regeneration treatments would be conducted as described in the PA, but instead of manual and chemical site preparation, only manual means would be used to prepare regenerating stands for seed fall or planting. Many of the existing understory species, like red maple, sprout prolifically when cut. With manual-only site preparation, stands of pine or oak regeneration would have a difficult time competing with the already established maple sprouts, and stand

composition would change from pine or oak to more mesic hardwoods without repeated manual treatments. The expense of these treatments would become important and could limit the number of acres that could be treated effectively. These effects would also occur if the proposed acres of commercial salvage treatments were needed after a disturbance in the project area.

Alternative 2 would have similar effects as described in the PA on the midstory removal treatment associated with the three-stage shelterwood regeneration units. The midstory can be manually cut to reduce the shade footprint and create an appropriate light environment to favor oak regeneration, but this effect would be shorter-lived than in the proposed action because many midstory trees would sprout back quickly and out-compete the existing oak regeneration in the stand. Wildlife openings would be created and maintained without the use of herbicide and may require more manual and mechanical treatments to keep them in early-seral vegetation. The NNIPS proposed under the Non-native Invasive Plant Species & Roadside Vegetation Management EA would continue to occur.

While the treatments in Alternative 2 are the same as those listed in the PA, because of the reduced efficacy of many of the treatments without the use of herbicide and the increased cost associated with multiple rounds of manual and mechanical treatments, fewer acres may be treated on the ground. Reduced control over species composition in stands that would result from not using herbicides could have a measurable effect on the forest composition in the project area over a long period of time.

Cumulative Effects

All the cumulative effects, as described in the PA would continue to occur, including implementation of the NNIPS activities approved under the Non-native Invasive Plant Species & Roadside Vegetation Management EA decision notice. The possible positive impact on vegetation and forest health from herbicide use would occur on approximately 0.7% of the project area. The impacts on the rest of the area could remain static or possibly decline without the use of herbicide.

Alternative 3: Other Resources

Direct/Indirect Effects

Treatments from the PA would continue, but with a reduction, as follows:

Rx burn control line would change from 0.07% to 0.05% of the area.

Upper Buffalo Dispersed Recreation Trails would change from 0.06% to 0.04% of the area.

Temporary roads would change from 37% to 35.2% of miles.

Road maintenance would change from 32.9% to 29.8% of the miles.

Regeneration areas would change from 2.4% to 2.3% of the area. This would create a corresponding decrease in early seral habitat and balancing age classes.

Site preparation for planting or natural regeneration would change from 5.3% to 5.1% of the area.

Commercial thinning would change from 21.0% to 19.9% of the area. With a corresponding decrease in light and nutrient availability as well as decreasing the vigor of the forest.

Woodland restoration would change from 6.1% to 1.6% of the area. With a corresponding reduction in the move towards the DFC, resulting in less herbaceous plants as well as overall habitat diversity.

Prescribed burning would change from 33.9% to 26.9% of the area. With a corresponding reduction in the reversal of several decades of fire suppression and the shift towards more mesic, shade-tolerant species and would allow less growing space for oak and pine regeneration. Understory communities could become less diverse.

Herbicide use would change from 18.2% to 7.7% of the area. Because of the reduced efficacy of many of the treatments with the reduction in the use of herbicide and the increased cost associated with multiple rounds of manual and mechanical treatments, fewer acres may be treated on the ground. Reduced control over species composition in stands that would result from not using herbicides could have a lasting effect on the forest health and composition in the project area over a long period of time.

Cumulative Effects

The borrow pit cumulative effects would be the same as the PA.

The cumulative effects of the private ownership thinning would be the same as the PA. But the reduction of commercial thinning in the project area would lessen the possible positive impact on areas adjoining the private land.

The cumulative effects of the NNIPS treatments would remain the same as what is included in that project's decision. But the reduction of herbicide treatments in the project area would lessen the possible positive impact on areas adjoining the NNIPS treatments. Additionally, because of the reduced efficacy of many of the treatments with the reduction in use of herbicide and the increased cost associated with multiple rounds of manual and mechanical treatments, fewer acres may be treated on the ground. Reduced control over species composition in stands that would result from not using herbicides could have a lasting effect on the forest composition in the project area over a long period of time.

As the amount of burning is reduced within the project area, the possible positive effects on vegetation and forest health would decrease. In addition, the burning on private land, with landowner permission, would also decrease, further decreasing the possible positive cumulative effects of burning.

F. HUMAN HEALTH FACTORS

Methods and Background Information

The PA and Alternative 3, propose the primary concern for human health; which is herbicide application. To analyze effects from herbicide application on human health, the most current Human Health and Ecological Risk Assessments available for each of the proposed herbicides were used (Table 20) (<https://www.fs.fed.us/foresthealth/protecting-forest/integrated-pest->

[management/pesticide-management/pesticide-risk-assessments.shtml](#)). These assessments describe in narrative form the relative level of risk (Table 21) for human and ecological factors for a given application rate of the herbicide. Assessments are supported by accompanying worksheets which document the calculations used in the assessments. The risk assessments prepared by Syracuse Environmental Research Associates, Inc. (SERA) consist of analyses of both human-health effects and ecological effects to support an assessment of the environmental consequences of the use of various chemicals in FS programs (Durkin, 2014a) (https://www.fs.fed.us/foresthealth/pesticide/pdfs/PrepEnvirmentalDoc_11-2014.pdf). In this context, support does not imply that any attempt is made to bias analyses toward making the chemicals look safe. To the contrary, the FS has accepted and often insisted on the use of very conservative methods both in the assessment of exposures as well as consequences. These methods are detailed in the current SERA document. Risk assessment worksheets calculate Hazard Quotients (HQ), the measure of the relative hazard of a proposed action (Durkin, 2014b) (https://www.fs.fed.us/foresthealth/pesticide/pdfs/Worker_Exposure_2014.pdf). **The HQs address acute exposure, which could result in direct or indirect effects, and chronic exposure, which could result in cumulative effects.** The Forest Plan standard for acceptable level of risk requires a HQ less than 1.0. For human safety, the risk assessments examine the level of risk to workers applying herbicide and to the general public. Hazard quotients are calculated for exposed women and children as they are considered to have the most potential for adverse effects and represent the worst-case scenario when analyzing potential for human health effects.

An Environmental Document has been completed disclosing the process and methods used in conducting the research for each SERA it can be viewed at the following website:

A risk assessment and worksheet were completed to examine the risk specific to workers applying the herbicide which can be viewed at the following website:

https://www.fs.fed.us/foresthealth/pesticide/pdfs/Worker_Exposure_2014.pdf

Existing Condition

Herbicides are proposed in the PA and Alternative 3 with the goal of incorporating herbicide treatment along with non-chemical treatments.

The primary herbicides proposed for use within the project area glyphosate, metsulfuron methyl, triclopyr (both ester and amine formulations), imazapyr, and fluroxypyr. Mixtures of herbicides could be used where they would provide more effective control, particularly for types of vegetation 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.

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 FS is required to complete a Pesticide Use Plan (PUP) for each application.

No aerial application of herbicides is being considered for this project. Herbicides would be applied using ground-based spray methods using a backpack containing the herbicide attached to

a flexible sprayer, wand or other hand application device that directs the chemical onto the target vegetation. Limited application using motorized or vehicle-mounted application methods would be allowed.

Table 20: Herbicide Risk Assessment Information

#	Herbicide Name	Date prepared	Reference	# of Pages
1	Glyphosate	March 25, 2011	SERA TR 052-22-03b	336
1	Glyphosate Appendices	November 29, 2010	SERA TR 052-22-03a-App	123
2	Metsulfuron methyl	December 9, 2004	SERA TR 04-43-17-01c	152
3	Triclopyr	May 24, 2011	SERA TR 052-25-03a	267
3	Triclopyr Appendices	May 15, 2011	SERA TR 052-25-03a-App	119
4	Imazapyr	December 16, 2011	SERA TR 052-29-03a	215
5	Fluroxypyr	June 12, 2009	SERA TR 052-13-03a	218

Table 21: Herbicide Risk Assessment Standard Terminology

Term	Abbreviation	Explanation (see risk assessments for specific definitions)
Toxic		The short-term effects of exposure to a chemical, which appear immediately upon exposure.
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 dose were given every day over a lifespan of 70

Term	Abbreviation	Explanation (see risk assessments for specific definitions)
		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 FS 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.
Body Weight	bw	For the purpose of this analysis bw is used to illustrate or contrast a dose of some chemical and expressed as milligrams per kilogram of bw or ml/kg bw

These are standard risk assessment procedures, tested by several years of EPA use, peer reviewed and scrutinized 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 FS Programs.

Glyphosate

Description

Glyphosate would typically be applied to target vegetation with a directed ground application by backpack or vehicle mounted sprayer, at manufacture’s labeled rates per acre. Mixing rates would vary depending on topography and on the amount of vegetation to be controlled. Repetitive treatments may occur in follow up years if needed. Spot applications would occur in years following the initial treatments to control future growth of weed species. Spot applications would be made at the same rate and mixture or less, but would be applied to smaller areas as needed, and typically made with backpack or vehicle mounted sprayer.

Risk Summary

The risk assessment on glyphosate is dominated by three considerations: the extensive literature available on glyphosate, the availability of numerous glyphosate formulations, and the use of surfactants either as components in glyphosate formulations or as adjuvants added to glyphosate formulations prior to application. The toxicity data on technical grade glyphosate are extensive, including both a standard set of toxicity studies submitted to the U.S. EPA/OPP in support of the registration of glyphosate as well as a robust open literature consisting of numerous and diverse

in *vivo* and in *vitro* studies. As with any complex collection of studies, the studies on technical grade glyphosate may be subject to differing interpretations. The preponderance of the available data, however, clearly indicates that the mammalian toxicity of glyphosate is low, and very few specific hazards can be identified.

The most sensitive endpoint for glyphosate—i.e., the adverse effect occurring at the lowest dose—involves developmental effects; accordingly, the EPA-derived RfDs for glyphosate are based on developmental effects. These adverse effects relate primarily to delayed development which occurs only at doses causing signs of maternal toxicity. There is no indication that technical grade glyphosate causes birth defects. Many glyphosate formulations include surfactants, and the toxicity of these surfactants is of equal or greater concern to the risk assessment than is the toxicity of technical grade glyphosate. Developmental toxicity, endocrine function, and genotoxicity are endpoints of obvious concern in any risk assessment. Based on the studies using formulations from outside the United States, there is concern that glyphosate formulations may have an impact on these endpoints and that some of these effects could be seen under typical application conditions in the United States. In the absence of comparable studies on U.S. formulations, however, is it not clear whether the studies on glyphosate formulations used outside the United States are applicable to risks posed by U.S. formulations of glyphosate. Based on the HQ method, concern for workers is minimal. At the highest labeled application rate for terrestrial applications, about 8 lbs a.e./acre, the highest HQ is 0.6, the upper bound of the HQ for workers involved in ground broadcast applications. For members of the general public, the only non-accidental exposure scenario of concern is for acute exposure involving the consumption of contaminated vegetation shortly after glyphosate is applied. For this exposure scenario, the HQ reaches a level of concern (HQ=1) at an application rate of about 1.4 lbs a.e./acre. At the maximum labeled application rate of about 8 lbs a.e./acre, the resulting HQ value would be about 5.6 with a corresponding dose of about 10.8 mg/kg bw.

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; EPA, 2017).

Imazapyr

Description

Imazapyr would be applied directly to target vegetation with a backpack sprayer, at manufacturer's labeled rates 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

While adverse effects on plants may be anticipated, there is no basis for asserting that applications of imazapyr would pose any substantial risk to humans or other species of animals. The U.S. EPA/OPP classifies imazapyr as practically non-toxic to mammals, birds, honeybees, fish, and aquatic invertebrates. None of the expected (non-accidental) exposures to these groups of animals raise substantial concern; indeed, most accidental exposures raise only minimal concern. 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, 2011b).

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 contain 60 percent metsulfuron methyl and 40 percent inert ingredients. Metsulfuron methyl would be applied directly to target vegetation with a backpack 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

There is speculation that the effects of metsulfuron methyl on the blood might be related to saccharin, which is a metabolite of metsulfuron methyl. At very high doses, saccharin caused hematological effects in mice. Appropriate tests have provided no evidence that metsulfuron methyl presents any reproductive risks or causes malformations or cancer. The compound is classified as practically nontoxic. Metsulfuron methyl also is irritating to the skin and eyes but does not produce sensitizing effects following repeated dermal exposure. 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] 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 manufacturer'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) [an oil-based formulation] 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, 2011).

Note: The SERA risk assessment for triclopyr is not accessible on the pesticide website. A copy of the current risk assessment is available by request in the process file at the district office.

Fluroxypyr

Description

Fluroxypyr 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. Fluroxypyr would be mixed with triclopyr 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 formulation (45.52% a.e.) may pose a greater risk of eye damage to workers than a diluted formulation would pose. For the 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 PA 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.

Proposed Action and Alternative 3: Other Resources

Direct/Indirect effects

The scope of the PA and Alternative 3 is less than eighteen and eight percent respectively of the project area annually, so risk to the public health and safety would be low given Forest Plan standards and site-specific protection measures. Additionally, rates of application would be according to those recommended application rates on the specific herbicide label. None of the proposed herbicides are persistent in the environment or in the human body. The herbicides proposed do not bio-accumulate in animal tissues, so there is no risk to humans by eating animals that have come into contact with the vegetation on which herbicides were applied. The greatest possible risk to the public would be due to a spill of concentrated herbicide. This is highly unlikely since the workers mixing and using the chemical would be mixing it off site and only taking with them an amount of mixed herbicide sufficient for one day's application. Herbicide application would result in a low risk environment for forest workers and forest visitors.

Cumulative effects

The project area for the NNIPS EA overlaps the project area and could potentially result in cumulative effects. Since the NNIPS EA overlaps the project area, the herbicide use protocol for the Forest has been modified. This modification requires all partners and FS personnel using herbicides to prepare and send a Pesticide Use Proposal (PUP) to a central Committee for evaluation. This Committee evaluates each proposal to insure, at a minimum, projects don't overlap and limit the amount of herbicide use in any watershed, even though there is no herbicide threshold standard for each watershed. Which would reduce/avoid the potential for cumulative effects. Additionally, as shown above, effects can be minimized or avoided by adhering to Forest wide standards, site specific protective measures, prudent hygiene, proper handling, worker protection standards and following label application rates. Generally speaking,

contamination of workers, the public or the environment shows very little indication of any high level of potential risk at the typical label recommended application rates and methods.

Alternative 1: No Action and Alternative 2: No Herbicide

Direct/Indirect effects

Neither of these alternatives propose the use of herbicides within the project area. As a result, no direct or indirect consequences to human health would occur related to herbicides.

Cumulative effects

Since there are no direct or indirect effects from these alternatives, there are no cumulative effects.

Chapter IV

Coordination and Consultation

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

Scott Kaufman, Director, Arkansas State Historic Preservation Office (SHPO)

Dr. Ann Early, State Archeologist, Arkansas Archeological Survey

U.S. Fish and Wildlife Service

Edwina Butler-Wolfe, Governor, Absentee Shawnee Tribe

Tamara Francis, Chairman, Caddo Nation of Oklahoma

Chuck Hoskin Jr., Principal Chief, Cherokee Nation of Oklahoma

Gary Batton, Chief, Choctaw Nation of Oklahoma

Deborah Dotson, President, Delaware Nation

Glenna Wallace, Chief, Eastern Shawnee Tribe of Oklahoma

Cheryl Smith, Principal Chief, Jena Band of Choctaw Indians

James R. Floyd, Principal Chief, Muskogee (Creek) Nation

Geoffrey Standing Bear, Chief, Osage Nation

John Berrey, Chairman, Quapaw Tribe of Oklahoma

Ben Barnes, Chairman, Shawnee Tribe of Oklahoma

Ryan Morrow, Mekko, Thlopthlocco Tribal Town

Joe Bunch, Chief, United Keetoowah Band of Cherokee

Terry Parton, President, Wichita and Affiliated

Warren Campbell, Newton County Judge

Frank Weaver, Madison County Judge

Jan Larson, Jasper Mayor

Mark Foust, Superintendent, Buffalo National River

Jesse Morris, Chief of Facility Management, Buffalo National River

Melissa Trenchik, Chief of Resource Stewardship, Science, Interpretation, and Education,
Buffalo National River

Dru James, Chief of Business Services Buffalo National River

Randy Scoggins, Chief of Visitor and Resource Protection, Buffalo National River

Chuck Maxell, President, Ozark Off-Road Cyclists

John Sage, Member, Ozark Off-Road Cyclists

Appendix A Maps

APPENDIX B

Public Involvement

To encourage public participation in the **Roberts Gap Project** decision process, a scoping letter including maps was mailed on January 29, 2018 to 119 neighboring landowners, Native American Tribes, and other members of the public, explaining the project proposal. The letter was also posted to the Ozark-St. Francis National Forests' planning website and published in the Schedule of Proposed Actions. The notice requested any interested public to respond with their recommendations/concerns in order to shape the proposed action of this project. This effort resulted in two responses from the Native American Tribes and numerous responses from the public.

Two public open house style meetings were conducted (one at Deer on February 27, 2018; one at Hector on March 1, 2018) to discuss this project with the public and interested parties to capture public issues and concerns. These meetings were attended by approximately 29 members of the public. This effort resulted in receiving approximately 65 additional requests from members of the public wanting to receive information and be notified when the draft EA and the 30-day comment period was open.

The District Ranger met with the Superintendent and a team of specialists from the Buffalo National River, Newton County Judge and the Jasper Mayor to discuss any concerns or recommendations they had for the Robert's Gap Project. District representatives met with the Madison County Judge to discuss the project and possible roads issues.

On three occasions the District Ranger and district representatives met with an interested volunteer mountain biking group in order to refine the portion of the proposal for additional miles of mountain bike trail within the Upper Buffalo Mountain Bike Trail System. This included a field day with the volunteer group in which ground conditions for new trail construction was evaluated.

The District Ranger and NEPA coordinator fielded approximately 100 phone calls emails and visits from interested members of the public about the Robert's Gap Project since the scoping letter was sent on January 19, 2018.

Internally, the Interdisciplinary (ID) Team met several times to develop the Proposed Action and the Alternatives which were analyzed in the EA. The ID team developed "Key Issues" from public meetings and responses received through scoping. A "Key Issue" is an issue for which an alternative has been developed and considered (analyzed) in detail.