



DECISION NOTICE AND FINDING OF NO SIGNIFICANT IMPACT

Environmental Assessment for the *Pipeline NW Restoration Project*



USDA Forest Service
Region 8
National Forests in Alabama
Talladega National Forest, Oakmulgee District
Bibb, Hale, and Tuscaloosa Counties, Alabama

DECISION

Based on the analysis documented in the EA, it is my decision to implement the Proposed Action (Alternative B) including the Management Standards listed in Chapter 2 and the Adaptive Management Protocols listed in Appendix B of the EA.

In making this decision I want to move the Oakmulgee landscape closer to the desired condition of open upland longleaf woodlands and savannahs interspersed with hardwood drains and riparian areas. I know that sustaining fire in this landscape will be a challenge given the growing wildland urban interface to the north. In part, that is why I am deciding to keep herbicides as a viable tool in the management of this area.

I also want to find a balance in providing the public safe roads to access the Oakmulgee District in a manner that we can afford to maintain. I realize that there are many legitimate uses of the current open road system and by closing these roads I am limiting this access. However, the over-zealous use of these roads and the illegal use of nearby hills and wetlands and the pipeline are compelling me to close roads to vehicle use. I remain open to collaborations and partnerships to improve the recreation access and feel that this decision can be revisited in the future.

In making this decision I am also accepting that the activities of the five project level decisions listed in Chapter 1 of EA and considered in the cumulative effects analysis of Chapters 2 and 3 are still viable actions and will concurrent and contemporaneous actions of this decision.

In summary, this decision authorizes the following:

- **Manage Forest and Woodland Ecosystems:** To restore longleaf pine species on 461 acres currently stocked with loblolly pine currently exhibiting signs of decline. These are areas predominately located on primary and/or secondary longleaf soils that have been allowed to

evolve to a shortleaf/loblolly/hardwood mix through a variety of means including planting of old fields, grazing, and/or suppression of fire. Concurrent and contemporaneous actions include commercial harvesting including construction and restoration of an estimated 0.3 miles of temporary haul roads; site preparation of herbicide (Triclopyr, Glyphosate, and Imazapyr) and fire; and/or site preparation of mechanical mulching; hand planting longleaf seedlings; followed by a release treatment of herbicide (Triclopyr and Imazapyr) 2 to 5 years after the seedlings have been established.

- **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine on 1142 acres over age 40 by establishing open park-like forest conditions by commercially thinning including construction and restoration of an estimated 1.25 miles of temporary haul roads and a follow-up midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching.
- **Manage Forest and Woodland Ecosystems:** To shift species composition from mixed loblolly and hardwoods towards longleaf on 341 acres over the age of 40, located on primary and/or secondary longleaf soils by thinning to commercially remove loblolly and hardwood and longleaf where over-stocked. Thin to establish open park-like forest conditions favoring longleaf, follow commercial harvest with midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching. Includes construction and restoration of an estimated 0.25 miles of temporary haul roads.
- **Manage Forest and Woodland Ecosystems:** To restore structure and increase resilience on 952 acres of mixed pine on longleaf soils by midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching. These stands are those treated by commercial harvest under the no action alternative along with those in conditions not suitable for commercial harvest (e.g. steep slope, low volume).
- **Manage and Restore Watersheds:** Restore 3.5 miles of abandoned pipeline by removing the pipe, where practical and resource damage can be avoided. Rehabilitate pipeline ROW to native vegetation.
- **Recovery of Federally listed Threatened and Endangered Species:** Establish and maintain suitable habitat to recruit 12 new red-cockaded woodpecker (RCW) clusters by establishing recruitment nesting habitat with a minimum of four suitable cavities, as defined by the RCW Recovery Plan, per cluster. This includes annual maintenance and replacement of artificial cavities and annual maintenance of natural cavities.
- **Nature-based Recreation/Safe and Efficient Access:** Allow year round motorized vehicle access on a locally popular travel way by changing the status of Forest Service Road (FSR) 751 from seasonally open (Oct 16 – April 30) to yearlong open.

- **Nature-based Recreation/Safe and Efficient Access:** Increase opportunities for “backcountry” dispersed recreation such as walk-in hunting and nature viewing, and to dissuade illegal off road and close road vehicle use by changing the status of FSR 712 from seasonally open (Oct 16 – April 30) to yearlong closed.
- **Nature-based Recreation/Safe and Efficient Access:** Increase opportunities for “backcountry” dispersed recreation such as walk-in hunting and nature viewing, and to dissuade illegal off road and close road vehicle use by changing the status of FSRs 706L, 706M, 721, 724, 724B, and 751A from year round open (Oct 16 – April 30) to yearlong closed.
- **Nature-based Recreation/Safe and Efficient Access:** Maintain and enhance existing and proposed year-round and seasonally open roads (Forest Service and State) by treating 52 miles of roadsides with selective herbicide (Triclopyr) to reduce encroachment of brush and woody vegetation, provide for safety of motorists, increase early successional wildlife habitat, reduce the risk of establishment of NNIS, and reduce the frequency of roadside mowing. Treatment area would extend 10 feet from road edges, totaling 63 acres. Roads would be treated with herbicide on a 2-3 year rotation. Roadside mowing would occur as needed.
- **Reduce Risk to Insect and Disease:** Suppress active SPB infestations by cutting and removing, or cutting and leaving infestation trees along with additional trees to serve as a buffer.

REASON FOR THE DECISION

The Proposed Action was selected for the following reasons:

1. It provides for the restoration of species composition and structure within native forest and woodland ecosystems (**Forest Plan Goal 1**)
2. It contributes to the recovery of federally listed threatened and endangered species, specifically the red cockaded woodpecker and provides for the conservation of sensitive species as to minimize the need for additional listings under the endangered species act (**Forest Plan Goals 11 and 12**)
3. It reduces the risks from insects and disease (**Forest Plan Goal 3**)
4. It provides habitats to support desirable levels of selected species (e.g. species with special habitat needs such as large, continuous forested landscaped, species commonly trapped/hunted, or species of special interest) (**Forest Plan Goal 16**)
5. It contributes to nature based recreation opportunities (**Forest Plan Goal 22**)
6. It enhances the safety and efficiency of the transportation system (**Forest Plan Goal 35**)

OTHER ALTERNATIVES OR INFORMATION CONSIDERED:

Northern Long-eared Bat (Threatened): On May 4, 2015, the northern long-eared bat (NLEB) was listed as a threatened species and an interim 4(d) rule was published in the Federal Register. The USDA Forest Service Southern Region has formally consulted, at a regional scale, with the US Fish and Wildlife Service on NLEB. The resulting final Biological Opinion, including any reasonable and prudent measures, terms and conditions, or any authorized incidental take, was issued by the Fish and Wildlife Service on July 24, 2015. The project-level Biological Assessment for the Pipeline NW proposed action was determined to be consistent with the Biological Opinion on August 7, 2015.

36 CFR 220.7(b) (2) states: When there are no unresolved conflicts concerning alternative uses of available resources (NEPA [National Environmental Policy Act], section 102(2)(E)), the EA [Environmental Assessment] need only analyze the proposed action and proceed with consideration of additional alternatives.

Public Involvement

Scoping Summary: Public involvement specific to this document began on May 21, 2015 with the draft of Chapter 1 of this EA uploaded into the PALS (Planning, Appeals, and Litigation system) database. Hard copy letters were mailed to 88 individuals, with 10 being returned as invalid addresses. A web link to the document in the PALS database was emailed to 185 (with 9 rejected) individuals and/or organizations expressing interest in management activities on the Oakmulgee District. The project was listed in the SOPA (Schedule of Proposed Actions) on April 1, 2014. Comments were received from May 21, 2015 to June 15, 2015. Two comments were received.

Response to Scoping: One comment was a request to stock fish in the beaver impoundments along FSR 751 to allow additional recreation. The second comment was in regard to the proposed changes in recreation access specifically the change of FDRs 751 and 751 to yearlong closure. The fish stocking request is outside the scope of the proposed action, but may likely be considered under a future action. The proposed changes to recreation access are address in Chapter 3.

Related Public Engagement and Scoping from Similar Projects: Employees of the Oakmulgee District and members of the Pipeline NW Interdisciplinary Team (IDT) are active in a variety of community programs; serve on many committees; and annually participate in tours/field trips on District management activities. The Oakmulgee District generally provides the formal opportunity to comment on two to three proposed projects a year, with each project having a scoping mailing list of 180 – 200 people. Through all of this interaction public response to similar proposed actions have been supportive, with one exception. The Pine Flat Integrated Resource Restoration Project; a project with similar proposed actions received an appeal in 2013. That appeal was upheld by the U.S. Forest Service, Southern Region, and the relevant appeal points from the Pine Flat project have been addressed within the Pipeline NW

Project EA; and the Appendix C: Response to Public Comments, from the Pine Flat Integrated Resource Restoration Project are hereby incorporated by to this document.

In 2014 while conducting scoping for the Deer Pen EA one comment was received regarding the use of Glyphosate, an herbicide that was originally proposed for use during site preparation for re-establishing longleaf seedlings and later on those same areas for releasing those seedlings from hardwood competition. Upon review, it was determined that the need for glyphosate was minimal due to the limit acreage proposed for treatment in the Deer Pen Proposed Action. Therefore, the Proposed Action was revised to remove the use of Glyphosate as a proposed treatment; and this potential conflict was considered resolved. No comments were received during the 30-day Notice of Comment period for the Deer Pen EA.

The proposed action for the Pipeline NW EA contains Glyphosate as a proposed treatment, as per the Adaptive Management Protocols (Appendix B). After consideration of the prior public response, the Pipeline NW IDT determined that the ability to use Glyphosate was necessary in the Pipeline NW planning area, largely due the juxtaposition of the area to population centers and travel-ways that may limit prescribed burning to days with winds from the north. Winds from the north affecting the Oakmulgee generally occur during the winter months. Winds during the growing seasons are more likely from the southwest, transporting smoke into the areas of concern, and potentially limiting the use of growing season burns in the Pipeline NW planning area. Thus, Glyphosate is needed to treat vegetation to augment the potential loss of effective prescribed fire which when used consistently can be a surrogate for the use of herbicides. The concerns of the individual responding to the Pine Flat project are addressed within this Pipeline NW planning area, and the formal appeal that was addressed can be found in **Appendix C: Response to Public Comments** in the Pine Flat Integrated Resource Restoration Project.

Tribal consultation was conducted concurrent to the review of the Heritage Resource Management reports for the Pipeline NW planning area.

30 DAY NOTICE OF COMMENT PERIOD:

The draft decision notice and finding of no significant impact was released for public review and comment on June 19, 2015 and the legal notice was published in the *Tuscaloosa News* on the same date.

OBJECTION OPPORTUNITIES:

No comments, meeting the definition as listed in this document, were submitted, thus the Pipeline NW Restoration Project is not subject to an objection period. This Decision Notice may be signed, the public notified, and the project implemented (§218.7).

FINDING OF NO SIGNIFICANT IMPACT:

After considering the affected interests and the environmental effects described in the Environmental Analysis, I have determined that the Proposed Action will not have a significant effect of the quality of the human environment considering the context and intensity of impacts (40 CFR 1508.27) Thus based on the following, an Environmental Impact Statement will not be prepared:

CONTEXT: The operations under this decision apply to a project of limited scope and duration. The potential effects are confined to certain components of the areas to be harvested and those areas involving road maintenance. These actions are within the scope of the Final Environmental Impact Statement for the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan).

INTENSITY: The following were considered in evaluating the intensity (severity of impact) of this project:

1. I have considered both beneficial and adverse effects in this action as described in Chapter 3 of the EA. These impacts are within the range of those identified in the Forest Plan, and this action will not have a significant effect on the quality of the human environment. Adherence to specific parameters, standards, guidelines, training, experience, and design criteria will diminish potential adverse effects. Beneficial effects far outweigh any potential adverse effects. Beneficial effects, however, have not been used to offset or compensate for potential adverse effects (40 CFR 1508.27(b)(1)).
2. The selected alternative will not result in significant effects on public health and safety, and implementation will be in accordance with project design (EA, Chapter 2 and 3).
3. The unique characteristics of the geographic area, including historical or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas will not be affected ((EA Chapter 3) (40 CFR 1508.27 (b)(3)).
4. Based on public involvement, the effects on the quality of the human environment are not likely to be highly controversial (EA Chapter 3, Section N) (40 CFR 1508.27 (b)(4)).
5. There are no known effects on the human environment that are highly uncertain or involve unique or unknown risks (EA Chapter 3, Section N) (40 CFR 1508.27(b)(5)).
6. These actions do not set a precedent for other projects proposed to meet the goals and objectives of the Forest Plan. Any future decisions considered will need all relevant scientific and site-specific information available at that time (EA Chapter 3, Section N) (40 CFR 1508.27(b)(6)).

7. This action does not represent potential cumulative adverse impacts when considered in combination with other past or reasonably foreseeable actions (EA Chapter 3) (40 CFR 1508.27(b)(7)).
8. Historic places or loss of scientific, cultural, or historic resources that may qualify for the National Register of Historic Places will not be adversely affected by this action (EA Chapter 3, Section M) (40 CFR 1508.27(b)(8)). If heritage resource sites are discovered during the implementation operations, activities in the general area of the discovery will be stopped until the site can be evaluated for significance by an archaeologist.
9. This action will not adversely affect any endangered or threatened species or critical habitat designated under the Endangered Species Act of 1973 (EA Chapter 3, Sections K and L; Biological Evaluations. (40 CFR 1508.27(b)(9)).
10. The actions will not violate federal, state, or local law or requirements imposed for the protection of the environment. Carrying out the proposed actions in a way that is consistent with the standards and guidelines, management requirements, and design criteria established in the Forest Plan will ensure this. No historic or cultural resources, parklands, prime farmlands, wetlands, wild and scenic river, or ecologically critical areas will be impacted. Riparian areas will be protected by application of the Forest Plan Standards, Guidelines and design criteria as specified in the EA Chapter 2. There are no known significant irreversible resource commitments or irretrievable loss of timber production, wildlife habitats, soil production, or water quality ((40 CFR 1508.27(b)(10)).

FINDINGS BY NFMA AND OTHER LAWS:

1. **NFMA Significance:** This project is consistent with the National Forests in Alabama Revised Land and Resource Management Plan (2004) as required by the National Forest Management Act (NFMA) (16 U.S.C. 1604). It is consistent with the Forest Plan, as amended. All proposed management actions within the selected alternative are consistent with the management objectives, standards, and guidelines for the management areas on the Oakmulgee Ranger District. It is also consistent with the State Best Management Practices (BMPs). Design criteria specified in the EA will be applied to the planned actions. The project is feasible and reasonable, and results in applying management practices that meet the Forest Plan overall direction of improving and restoring conditions, and protecting the environment while producing goods and services.
2. **Endangered Species Act and National Historic Preservation Act:** This project is consistent with the Endangered Species Act. In accordance with FSM 2672.4, Biological Evaluations were prepared to evaluate the effects of the planned activities of PETS species.

The USDI Fish and Wildlife Service concurred with the determinations of the PETS species. This project is also consistent with the National Historic Preservation Act (Reference: EA Chapter 3).

3. **Clean Water Act:** This project is consistent with the Clean Water Act. The actions either do not occur within a 100-year floodplain of a jurisdictional wetland, or as planned in this proposal, they are exempt from the requirement for a Section 404 permit under the Clean Water Act.

As required by 36 CFR 219.35, I have considered the best available science in making this decision. The project record demonstrates a thorough review of relevant scientific information, consideration of responsible opposing views, and, where appropriate, the acknowledgment of incomplete or unavailable information, scientific uncertainty, and risk. Scientific information used in the preparation of the environmental analyses and specialists reports are summarized in the EA, specifically the determination of the potential area for longleaf restoration through the use of GIS tools and PNV indices based on current NRCS soil surveys (EA pgs. 13 - 14); forest health descriptions based on current research much of which was conducted on the Oakmulgee District (EA pg. 20 and pgs. 55 - 57); RCW expansion based on the RCW Recovery Plan and current project specific monitoring information; and the NNIPS Risks Assessment Tool. For a full list of references see Chapter 4 of the EA.

For further information on this decision, contact Cynthia Ragland, District Ranger, Oakmulgee Ranger District, 9901 Highway 5 South, Brent, Alabama, 35034. She may also be reached at 205-926-9765 or cragland@fs.fed.us. The EA documenting the site-specific environmental analysis for the Pipeline NW Restoration Project is available at the District Ranger's office in Brent, Alabama or on the web at: http://www.fs.fed.us/nepa/project_list.php?forest=110801.

/s/ Cynthia Ragland
CYNTHIA RAGLAND
District Ranger

August 11, 2015
Date



**United States
Department
of
Agriculture**

**Forest
Service**

June 2015



Responsible Official:

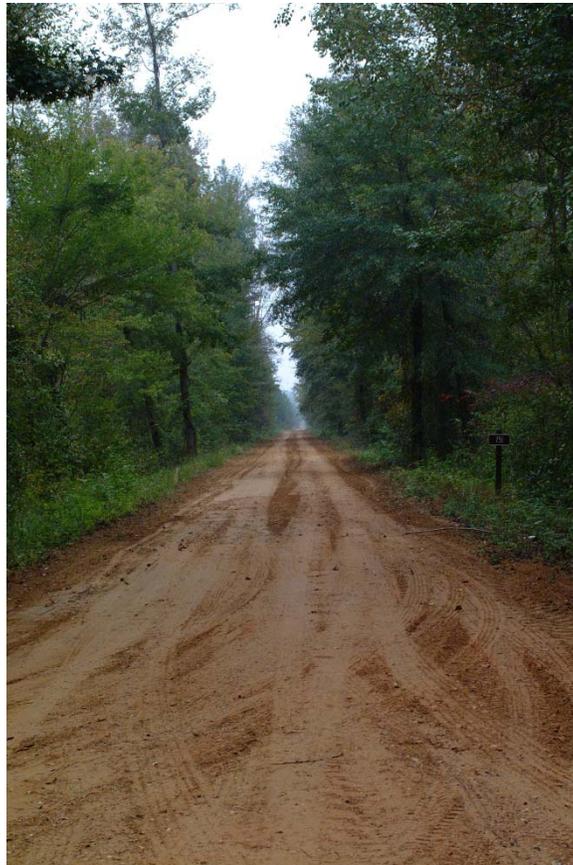
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FINAL ENVIRONMENTAL ASSESSMENT

Pipeline NW Restoration Project

National Forests in Alabama
Talladega National Forest – Oakmulgee District

Bibb, Hale, and Tuscaloosa Counties, Alabama



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Table of Contents

Introduction & Framework.....	4
Chapter 1. Purpose and Need for Action... ..	5
1. Project Area Description.....	6
2. Goals and Objectives.....	23
3. Purpose and Proposed Action.....	24
4. Issues.....	30
5. Decision to be Made.....	32
6. Public Involvement.....	33
Chapter 2. Comparison of Alternatives.....	35
Alternative A (No Action).....	35
Alternative B (Proposed Action).....	36
Chapter 3. Environmental Consequences.....	50
A. Forest Composition and Structure – Early Succession Conditions.....	50
B. Forest Composition and Structure – Forest Health.....	55
C. Forest Composition and Structure – RCW Expansion.....	59
D. Watershed Health.....	62
E. Soil Productivity, Compaction, and Erosion.....	70
F. Dispersed Recreation and Public Access.....	80
G. Forest Composition and Structure – Wildlife.....	91
H. Non-Native Invasive Plant Species.....	98
I. Climate Change.....	105
J. Economics and Operational Capacity.....	109
K. Proposed, Endangered, Threatened, and Candidate (PETC) Species.....	112
L. Regional Forester’s Sensitive Species.....	119
M. Cultural Resources.....	124
N. Other Environmental Effects Relative to FONSI Significant Factors.....	125
Chapter 4. Consultation Coordination... ..	128
Appendix A:	
Appendix B: Adaptive Management Protocols	

INTRODUCTION AND FRAMEWORK

This Environmental Assessment (EA), upon completion will document the results of a study of the potential environmental impacts of actions proposed by the United States Department of Agriculture (USDA), Forest Service (FS) to restore and maintain resiliency in native ecosystems in the Pipeline NW planning area of the Oakmulgee Ranger District on the Talladega National Forest, which is part of the National Forests in Alabama.

This EA will be prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for Federal Actions having the potential to impact the quality of the human environment; the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500 through 1508) for implementing NEPA; Forest Service Procedures for Implementing CEQ regulations (Forest Service Manual (FSM) Chapter 1950); and the Forest Service Policy and Procedures Handbook (Forest Service Handbook (FSH) 1909.15).

When complete the document will be organized into four chapters:

- *Chapter 1. Purpose and Need for Action:* This chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the FS informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. Alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3. Affected Environment and Environmental Consequences:* This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area.
- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the EA.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the EA.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project record located at the Oakmulgee Ranger Station.

Chapter 1: Purpose and Need for Action

The USDA Forest Service (USFS), Talladega National Forest (TNF), Oakmulgee Ranger District, is proposing to implement management activities on National Forest System (NFS) lands. **These activities are designed to provide resiliency and sustainability by restoring species composition, structure, and function through a series of actions designed to favor native species on native sites (i.e. longleaf on longleaf sites, hardwood on hardwood sites, etc.).** These actions will also increase adaptive capacity of resources to potential effects of climate change, natural wind events, etc. by aligning species to their respective native sites.

The proposed actions take into consideration public services, such as recreation, road use, and economic benefits, provided by NFS lands. Dispersed recreation opportunities will complement the South Sandy recreation areas (hunter camp and shooting range) with early successional habitat. Road(s) status change will, in turn, complement dispersed recreation opportunities and protect watersheds. Ultimately, the design of the proposed actions is to align recreation use with opportunities that are environmentally sound and financially sustainable.

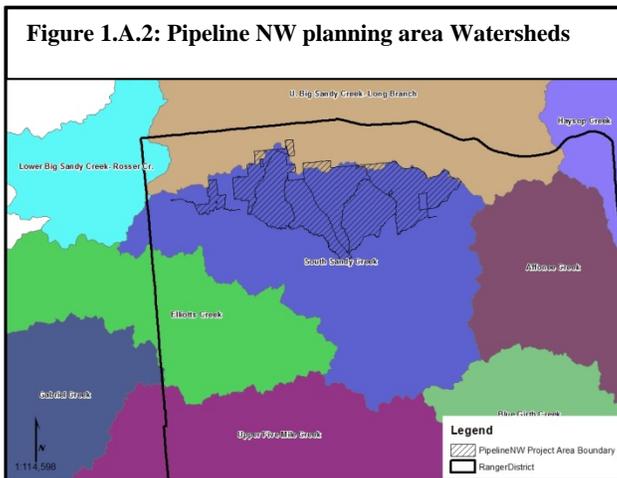
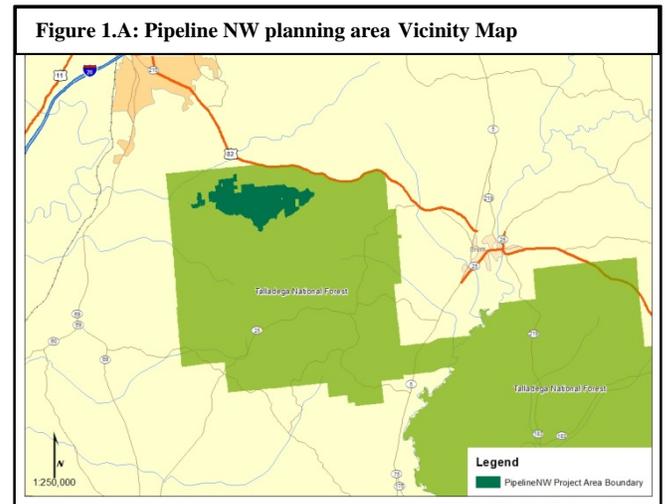
This Environmental Assessment (EA) builds on previous analysis relative to a condition known as loblolly decline. This stand condition establishes from artificially (planting, fire suppression, grazing) establishing loblolly and shortleaf on sites that, under native conditions, would have been predominately longleaf pine. The symptoms of loblolly decline become apparent as trees approach the 51-60 year age class. While there are some specific pathological concerns with loblolly decline it is directly related to altered species composition and structure (i.e. over stocked; off-site species).

This EA further seeks to provide the analysis to support a decision to implement actions designed to build a more resilient landscape capable of absorbing natural events such as severe weather, fire and insect infestations. This EA also examines a series of integrated actions and their effects related to fuel loads, fire severity, and smoke impacts. The proposed actions would further enhance the ecological function of native stands providing supportive habitat for endangered species such as the red-cockaded woodpecker (RCW) and certain game species such as turkey and deer.

1. Project Area Description

A. General Information: The Pipeline NW Restoration Project (Pipeline NW) planning area consists of 8,783 acres of NFS lands located in the northwest portion of the TNF, Oakmulgee Ranger District in Bibb, Hale, and Tuscaloosa Counties in Alabama. The area is inventoried as Oakmulgee Compartments 1 through 6. The project area lies approximately 12 miles south-southeast of Tuscaloosa, AL, and 17 miles west-north west of Brent, AL. It extends from the areas around FDR 706 in Tuscaloosa County east to Wiggins Creek, from the northern Forest Service Boundary southward to South Sandy Creek. The name Pipeline NW stems from as decommissioned gas pipeline that enters the Oakmulgee Ranger District in the project area and bisects the district to the southeast. **(Figure 1.A: Pipeline NW planning area Vicinity Map)**

- 1. Legal Description:** Township 23 North, Range 6 East, portions of Sections 1 – 3; Township 23 North, Range 7 East, Section 6 and portions of Sections 4, 5 and 7; Township 24 North, Range 6 East, Sections 35 and 36 and portions of Sections 22, 23, 25 – 28, 33, and 34.
- 2. Watersheds:** The Pipeline NW planning area lies within the Black Warrior River Basin (USGS Cataloging Unit: 03160113) and the South Sandy (12th level) sub-watershed. Approximately 60 acres lies in the Upper Big Sandy Long Branch watershed as



seen in **Figure 1.A.2: Pipeline NW planning area Watersheds**. The South Sandy sub-watershed consists of 33,482 acres of which 31,115 acres (~93%) is public land. The U.S. Environmental Protection Agency (EPA) completed a watershed assessment in 2012 covering the watersheds in this project area. EPA reported no impairment or Total Maximum Daily Load issues within this lower reach of the watershed and gave an overall status of the watershed as “Good.”

A rating of “Good” means that the watershed is fully supporting the designated uses of the watershed. EPA lists the designated uses of this watershed unit as (1) Contact Recreation, (2) Fishing, (3) Industrial and Agricultural Uses, and (4) Propagation of Fish and Wildlife.

The designated uses of the watershed relate to both current use trends and expected use trends based on state water quality standards.

3. **Unique Geographic Characteristics:** The Pipeline NW planning area contains approximately 200 acres prime farmland soils (Cahaba sandy loam and Columbus loam) in small, disjointed patches. There are no ecologically critical areas, or wild and scenic rivers.
4. **Cooperative Management Permits and Easements:** The following management Permits and Easements are in place within or affecting the Pipeline NW planning area:

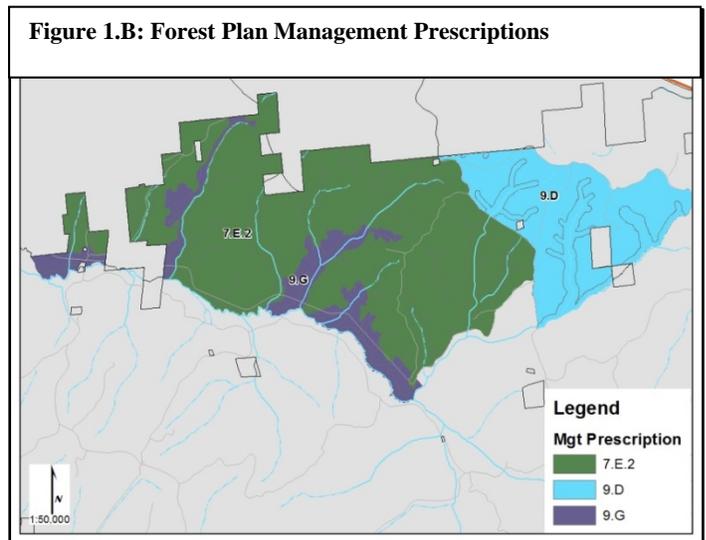
- a. One special-use authorization permit is active within the Pipeline NW planning area (**Figure 1.A.4.a: Permits within the Pipeline NW planning area**).

Figure 1.A.4.a: Permits within the Pipeline NW planning area			
HOLDER	ACREAGE	REASON	PERMIT No.
Westervelt LLC	0.15	Temporary road use	OAK 700-803

- b. Two easements are active within the Pipeline NW planning area (**Figure 1.A.4.b: Easements within the Pipeline NW planning area**).

Figure 1.A.4.b: Easements within the Pipeline NW planning area			
HOLDER	ACREAGE	ASSOCIATED ROAD	EASEMENT No.
Pearson Estate of W.W.	0.79	724	Z-634
Gulf States Paper Company	4.46	751	Z-670

B. Forest Plan Framework: The Forest Plan for the National Forests in Alabama designates the area within the Pipeline NW planning area into three Landscape Habitat Emphasis Areas; Dispersed Recreation with Vegetation Management (7.E.2), Restoration of Coastal Plain Longleaf Pine Forests (9.D), and Maintenance and Restoration of Upland and Bottomland Hardwoods and Mixed Pine-Hardwood Forests (9.G) (**Figure 1.B: Forest Plan Management Prescriptions**).



1. **Forest Plan Management Prescriptions**

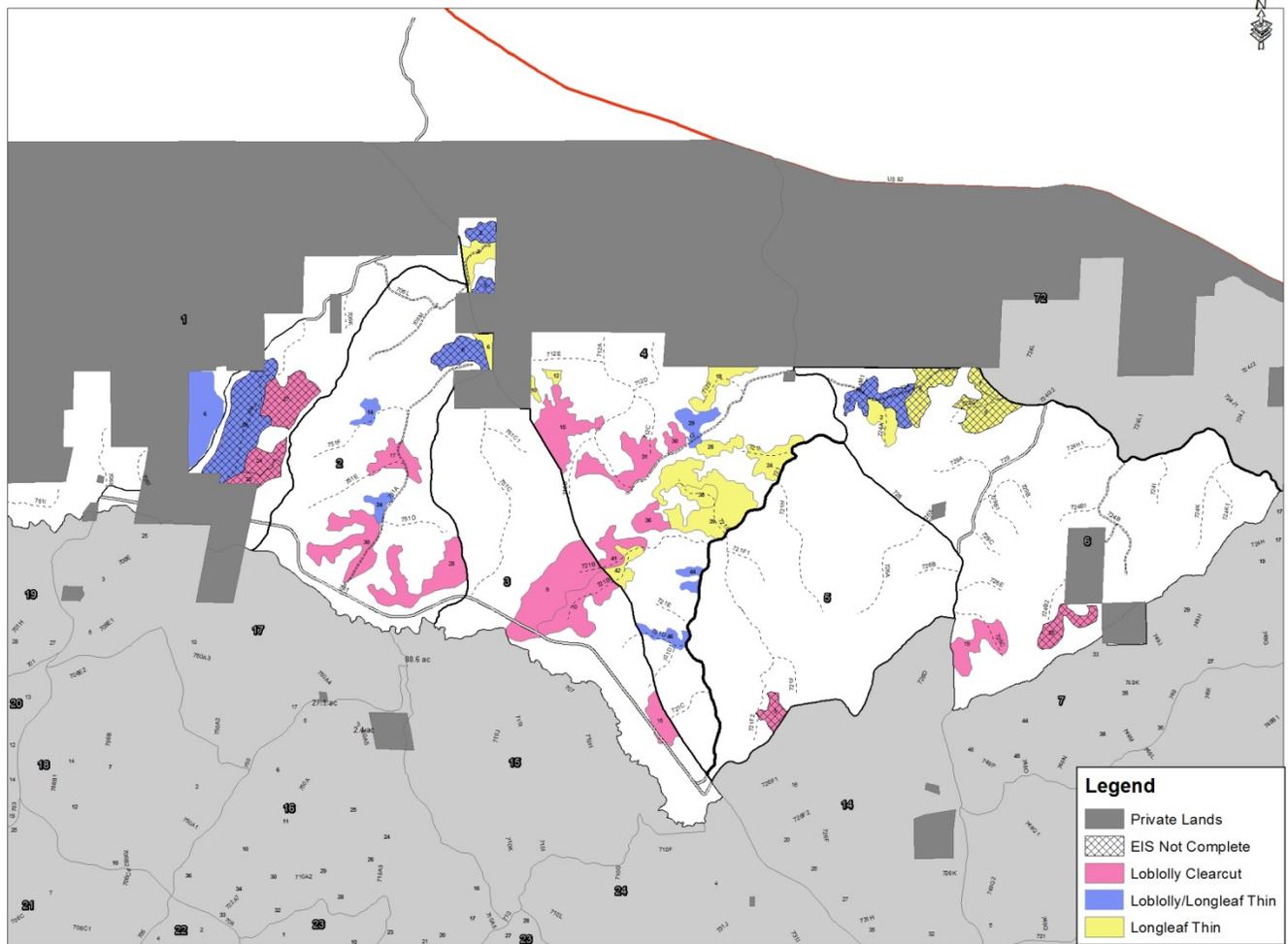
- a) **7.E.2. Dispersed Recreation with Vegetation Management:** Areas are managed to provide a variety of dispersed recreation opportunities, improve the settings for outdoor recreation, and enhance visitor experiences in a manner that protects and restores the health

and diversity of the land. Early successional forest habitat is an important condition in support of dispersed recreation opportunities. Therefore, it is desirable to provide 4-10% of the forested land in early successional forest. These areas are generally assessible by roads, but some roads may be managed through seasonal or year round motor vehicle closure. Limitations of use will occur if any dispersed activity results in, or is expected to result in, negative effects to watershed or ecosystem health. Timber harvesting and vegetative manipulation are viable tools to achieve recreational, wildlife, ecosystem restoration, or aesthetic values. The areas are characterized by easy access and capable of sustaining a relatively high number of recreationalists in a manner that protects surrounding water, soil, vegetation and wildlife. This project area lies just north, outside of the state designated Oakmulgee Wildlife Management Area (WMA) and therefore, hunting regulations for the planning area are based upon open, public land, state regulations, and not the special rules and hunting seasons specific to WMA land.

- b) **9.D. Restoration of Coastal Plain Longleaf Pine Forests:** The design of these areas is to restore and maintain native longleaf forest communities. This is accomplished through intensive silvicultural activities, including, but not limited to, prescribed burning, mechanical and chemical vegetation control, even-aged, two-aged, and uneven-aged silvicultural methods. The area is desired to be dominated by longleaf pine forest communities with open herbaceous understory. Approximately 8% of the pine forest/woodland community should be in early successional habitat condition. Small pockets of other deciduous forest types are interspersed within these areas.
 - c) **9.G. Maintain and Restore Upland/Bottomland Hardwood and Mixed Pine Forests:** Management will restore and maintain bottomland and upland hardwood and mixed pine-hardwood forest communities. These areas are suitable for timber production and other activities including prescribed burning, mechanical and chemical vegetation control, even-aged, two-aged, and uneven-aged silvicultural methods. Emphasis of certain habitat associations include mid to late successional deciduous forest associations and bottomland hardwood associations that provide suitable habitat for eastern wild turkey and white-tailed deer.
2. **Natural Resource Management Activities within Pipeline NW Planning Area during the Past 10 Years:** Five project level decisions have been made for activities within the Pipeline NW planning area in the past decade. Three decisions are programmatic decisions regarding the treatment of non-native invasive plant species (NNIPS) and are for multi-year treatments that will continue until the achievement of the set objectives, or new information is provided contrary to the current decision(s). A multi-year decision exists for ongoing operations and maintenance of permanent wildlife openings.

- a) **Wildlife Opening Maintenance Decision Memo (DM) signed May 20, 2003:** This document placed into decision maintenance activities including mowing, tilling, application of agricultural limestone and fertilizer, and sowing of cool and warm season forages on 83 permanent wildlife openings within Oakmulgee WMA in addition to the 41 wildlife openings outside the Oakmulgee WMA. Total acreage effected is approximately 150 acres, of which one wildlife opening (dove field), delineated at 20 acres, is within the Pipeline NW planning area. That area has been planted to native warm season grasses.
- b) **Longleaf Ecosystem Restoration Project Environmental Impact Statement (Longleaf EIS), Record of Decision (ROD) signed February 2, 2005:** This document placed into decision 1450 acres of restoration treatments within the Pipeline NW planning area. Additional restoration treatments included the implementation of a 2 – 5 year prescribed fire program across the project area. A discussion of the fire history of this area may be found in Section 1.C.4 Understory Conditions/Fire Condition Class. To date, there are 460 acres that have not been treated (**Figure 1.B.2.a: Summary of Prior Decision – Longleaf EIS and ROD.**)
- c) **Non-Native Invasive Plants Control Project, Decision Notice (DN) and Finding of No Significant Impact (FONSI) signed June 9, 2006:** This document placed into decision a multi-year project to utilize an integrated pest management treatment program including specific EPA approved herbicides to control specific NNIPS on the TNF, Oakmulgee District. The herbicides to be used are Triclopyr, Glyphosate, Clopyralid, and Imazapyr. The plant species to be controlled are cogongrass, kudzu, Chinese wisteria, multiflora rose, Japanese climbing fern, Japanese, Chinese, and European privet, mimosa, Nepalese browntop, sercia lespedeza, and bicolor lespedeza.
- d) **Non-Native Invasive Plant Species Advanced Control EA, Decision Notice (DN), and Finding of No Significant Impact (FONSI) signed September 30, 2008:** This document placed into decision a multi-year project to utilize an integrated pest management treatment program including specific EPA approved herbicide to control kudzu on the TNF, Oakmulgee District. The herbicide to be used is Metsulfuron Methyl.

Figure 1.B.2.A: Summary of Prior Decision - Longleaf EIS and ROD



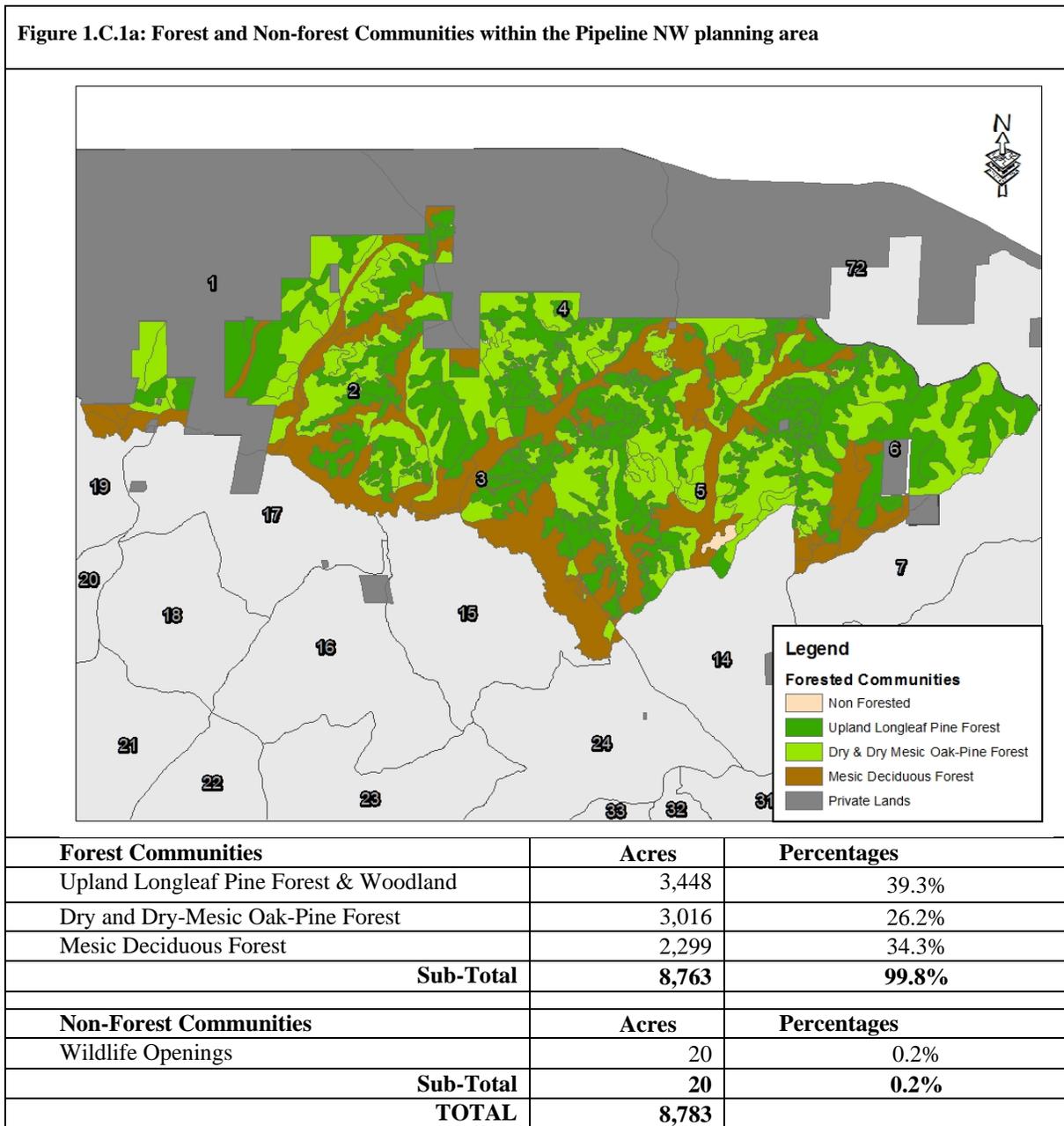
Untreated acres currently under decision	Decision (Acres)
Clear-cut w/ Reserves of Loblolly > 40 years of age	142
Thin Loblolly stands < 40 years of age	220
Thin Longleaf	98
Total	460
Prescribed fire on 2-5 year burning rotation	8783

e) **Enhanced Invasive Plant Control Environmental Analysis (EA) Decision Notice (DN) and Finding of No Significant Impact (FONSI) signed June 21, 2012:** This document placed into decision a multi-year project to utilize an integrated pest management treatment program including specific EPA approved herbicides to control specific NNIPS on the National Forests in Alabama (which includes the TNF, Oakmulgee District). Herbicides to be used are: Triclopyr, Glyphosate, Clopyralid, Imazapyr, Hexazinone, Metsulfuron Methyl, Aminopyralid, Dicamba, and Fluridone. The plant species to be controlled are those listed as Noxious in the Alabama Department of Agriculture and Industries, Administrative Code

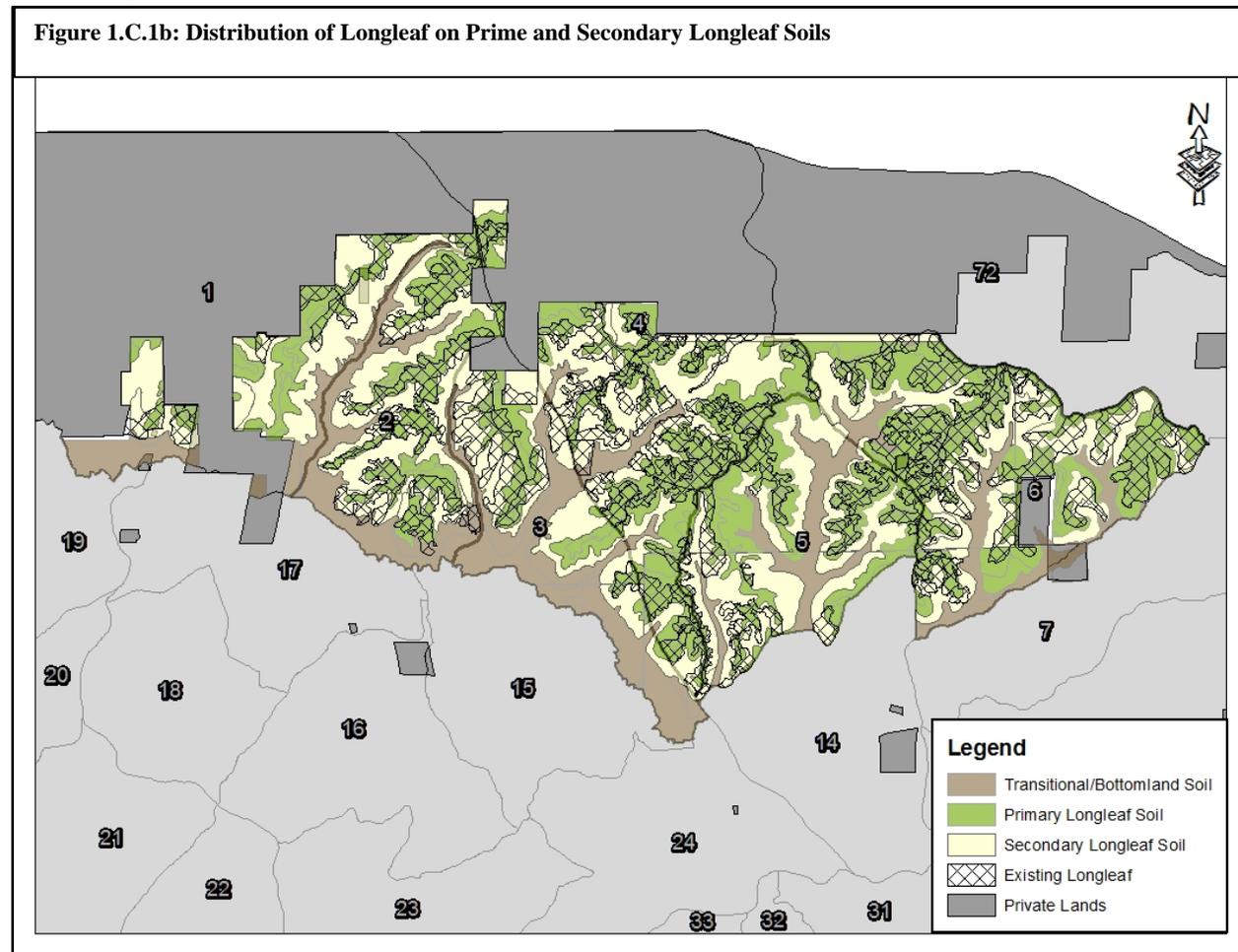
Chapter 80-10-14 Noxious Weed Rules and those species of concern to the National Forests in Alabama because of their invasive nature.

C. Project Area Assessment and Current Conditions:

- 1. Forest Communities and Potential Native Vegetation:** The Pipeline NW planning area is inventoried and mapped within three forest communities using the definitions outlined in the Forest Plan. Conditions were determined using satellite imagery and on the ground stand examinations. Acreages within each community type are displayed in **Figure 1.C.1a: Forest and Non-forest Communities within the Pipeline NW planning area.**



To assess the current conditions relative to the area’s endemic plants and its geologic composition, an index for Potential Native Vegetation (PNV) was developed. A Geographic Information System (GIS) tool was developed from USDA Natural Resources Conservation Service soil surveys to examine potential longleaf habitat relative to soil type in the Oakmulgee District. Soils classified as primary longleaf are Maubilas, Smithdales, Saffells and Suffolks occurring in various complexes comprised of portions of two or more of these soils (e.g. Maubila-Smithdale Complex). These soils exist on ridge tops and upper slopes, are highly erodible, and often are in a state of “eroded” to parent material. Another group of soils are listed as secondary soils and consists of Luvernes, Wadleys and Boykins soil series, generally in dominant complexes mixed with primary soil series (e.g. Luverne-Smithdale Complex). Longleaf pine is consistently supported when these soils are located on the tops of ridges and south facing slopes. Occasionally, secondary longleaf soils are on benches, terraces, and depressions at mid-slope (Figure 1.C.1b: Distribution of Longleaf Prime and Secondary Soils).



In the 8,783-acre Pipeline NW planning area, 3,536 (40%), acres are soils mapped as primary longleaf soils; 3,423 (39%) acres, located on ridges and south facing slopes are mapped as secondary longleaf soils for a total of 6,959 acres. Of those 6,959 acres 2,851 (41%) are currently stocked with

longleaf; 4,108 have the potential to sustain longleaf stands, and 597 acres are currently stocked with species other than longleaf.

- a) **Upland Longleaf Pine Forests and Woodland Community:** This community type is comprised of the longleaf pine forest type and the longleaf/hardwood mixed pine-hardwood forest type. On the Oakmulgee District, the longleaf pine forest and woodland community is supported on a range of soils. This community type is typically dominated by longleaf pine in native conditions, but may include other pine and hardwood tree species that are adapted to fire. Understory trees are often few and widely spaced. Ground cover varies, but includes a variety of grasses and open areas. Without fire, these communities are subject to encroachment by tree species not adapted to frequent growing season fires and conversion to other community types often occurs. Under native conditions these stands will have an overstory of predominately mature longleaf pine with little or no midstory of mostly longleaf pine regeneration, and an understory of grasses and forbs (**Figure 1.C.1.a: 10-Year Age class Distribution - Upland Longleaf Pine Forest and Woodland Community**).

Figure 1.C.1.a: 10-Year Age class Distribution - Upland Longleaf Pine Forest and Woodland Community (including 597 ac. of mixed stands)							
Causative Action	Acres in 0-10 year age class	Acres in 11-20 year age class	Acres in 21-30 year age class	Acres in 31-40 year age class	Acres in 41-59 year age class	Acres in 60+ year age class	TOTALS
Timber Sales: 1984-2015 Clear-cut with reserves	257	49	549	0	0	0	855
Natural Stands <i>(not treated within last 20 years)</i>	0	0	0	58	552	1983	2593
TOTALS	257	49	549	58	552	1983	3448
Percentages	7.5%	1.4%	15.9%	1.7%	16.0%	57.5%	

Note: All age determinations based on the year 2014

- b) **Dry and Dry-Mesic Oak-Pine Forest Community:** This community type is comprised of loblolly pine with mixed southern red oak, white oak, black oak, northern red oak, and hickory on the Oakmulgee District. Native conditions for this community occurs mid-slope as the site transitions from upland pine into moist hardwood drains. While this is a native condition, non-native conditions also exist from off-site conversions and afforestation efforts. As inventoried, there are 2683 acres of Dry and Dry Mesic Oak-Pine on sites that are suited for longleaf and woodland communities. Some of these exist naturally as mixed longleaf/loblolly pine with interspersed hardwoods. (**Figure 1.C.1.b: 10-Year Age class Distribution – Dry and Dry-Mesic Oak-Pine Forest Community**).

Figure 1.C.1.b: 10-Year Age class Distribution – Dry and Dry-Mesic Oak-Pine Forest Community							
Current Timber Type	Acres in 0-10 year age class	Acres in 11-20 year age class	Acres in 21-30 year age class	Acres in 31-40 year age class	Acres in 41-59 year age class	Acres in 60+ year age class	TOTALS
Loblolly Pine	0	0	0	101	395	254	750
White Oak-Red oak-Hickory	0	0	0	41	0	1026	1067
Loblolly pine-Hardwood mixed	0	20	0	8	0	1171	1199
TOTALS	0	20	0	150	0	0	3016
Percentages	0%	0.7%	0%	5.0%	13.1%	42.4%	

Note: All age determinations based on the year 2015

- c) **Mesic Deciduous Forests:** These forests include the River Floodplain, Dry Mesic Oak, and Mixed Mesophytic communities are found on more moist soils like the aforementioned pine communities. A “transition” often occurs mid-slope on longleaf primary and secondary soils where soil moisture and fertility from organic matter combined with less intense fire activity create stands of mixed hardwoods and pine species. Moisture content and competition from faster growing species hampers regeneration of longleaf seedlings. There are scattered longleaf in this transition zone, but insufficient numbers per acre to be considered dominate longleaf stands. Soils considered transitional include Columbus Loam, Myatt Fine Sandy Loam, and Cahaba Sandy Loam. These soils are characterized by flat floodplains often flooded by beaver activity and lower portions of steep slopes where seeps and canebrakes are visible on the surface. The transitional soils are typically managed for mixed pine hardwood stands and pure hardwood stands ranging from bottomland hardwood (gums, maples, oaks, etc.) to upland hardwood (white oak, red oak) stands. They are generally associated with riparian areas. The role of fire is limited due to high soil moisture content. Tree species include red oak, white oak, hickory, and yellow pine on the drier sites and tupelo, bay, and willow on the more moist sites. **(Figure 1.C.1.c: 10-Year Age class Distribution –Mesic Deciduous Forest).**

Figure 1.C.1.c: 10-Year Age class Distribution – Mesic Deciduous Forest							
Causative Action	Acres in 0-10 year age class	Acres in 11-20 year age class	Acres in 21-30 year age class	Acres in 31-40 year age class	Acres in 41-59 year age class	Acres in 60+ year age class	TOTALS
Bottomland Hardwood	0	0	0	0	0	959	959
Natural on-site Loblolly & Pine-Hardwood mix	0	0	29	32	62	1213	1339
TOTALS	0	0	29	32	62	2175	2298
<i>Percentages</i>	<i>0%</i>	<i>0%</i>	<i>0.8%</i>	<i>0.9%</i>	<i>1.8%</i>	<i>63.1%</i>	
Note: All age determinations based on the year 2015							

d) **Non –Forest Communities:**

- i. **Permanent Openings:** One permanent 20 acre wildlife opening is maintained within the Pipeline NW planning area to provide permanent early successional habitat.

2. **Threatened, Endangered, and Sensitive Species:**

- a) **Red-cockaded Woodpeckers (*Picoides borealis*), Status Endangered:** There are five active RCW clusters (family units) within the Pipeline NW planning area.
- b) **Mitchell’s Satyr (*Neonympha mitchelli*), Status Endangered:** One population was located in 2002 in a small, moderately open forested patch that is situated within a mature hardwood bottomland along FRD 751 that transects the southern portion of Pipeline NW planning area.
- c) **Northern Long-eared Bat:** On May 4, 2015, the northern long-eared bat (NLEB) was listed as a threatened species and an interim 4(d) rule was published in the Federal Register. The

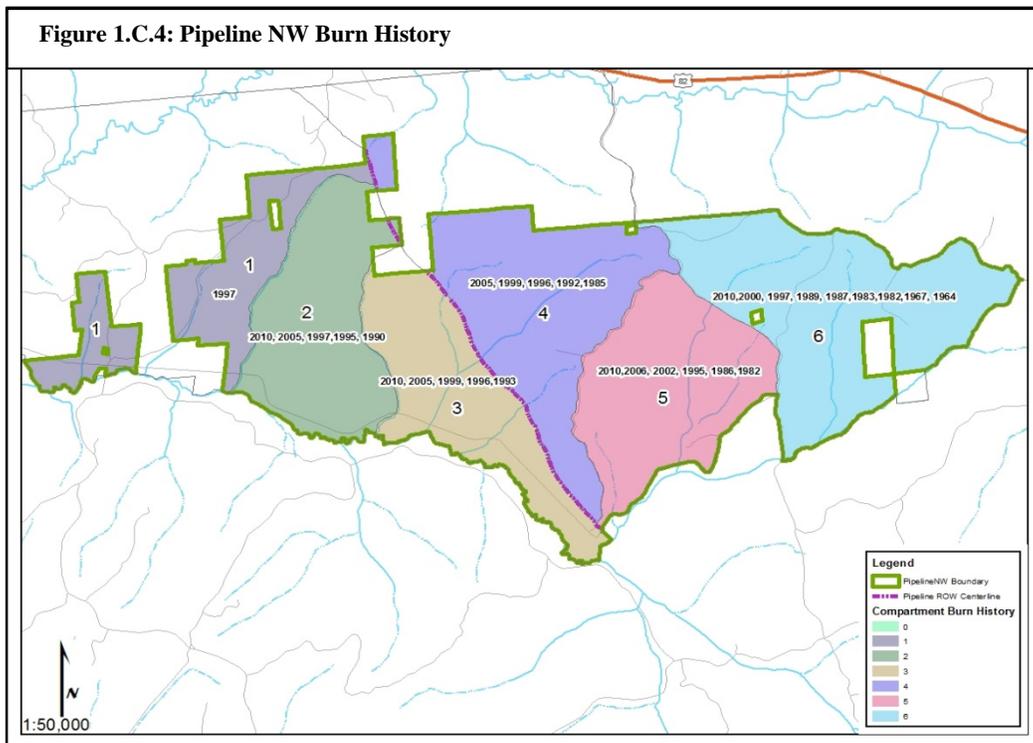
USDA Forest Service Southern Region is currently formally consulting, at a regional scale, with the US Fish and Wildlife Service on NLEB. After the issuance of the final Biological Opinion, including any reasonable and prudent measures, terms and conditions, or any authorized incidental take, this project-level Biological Assessment (BA) will be amended if needed and the appropriate project-level consultation will be completed.

3. **Regional Forester’s Sensitive Species:** Within the Pipeline NW planning area there are no records of sensitive species. Suitable habitat exists for six species (**Figure 1.C.3: Sensitive species with suitable habitat in the Pipeline NW planning area**).

Figure 1.C.3: Sensitive Species with suitable habitat in the Pipeline NW planning area.

Classification	Scientific Name	Common Name	Status
Amphibian	<i>Desmognathus aeneus</i>	seepage salamander	G3
Mussel	<i>Utterbackia imbecillis</i>	paper pondshell	G5
Vascular Plant	<i>Monotropa hypopithys</i>	pinetop	G5
Vascular Plant	<i>Nestronia umbellule</i>	nestronia	G4
Bird	<i>Aimophila aestivalis</i>	Bachman’s sparrow	G3
Vascular Plant	<i>Quercus arkansana</i>	Arkansas oak	G3

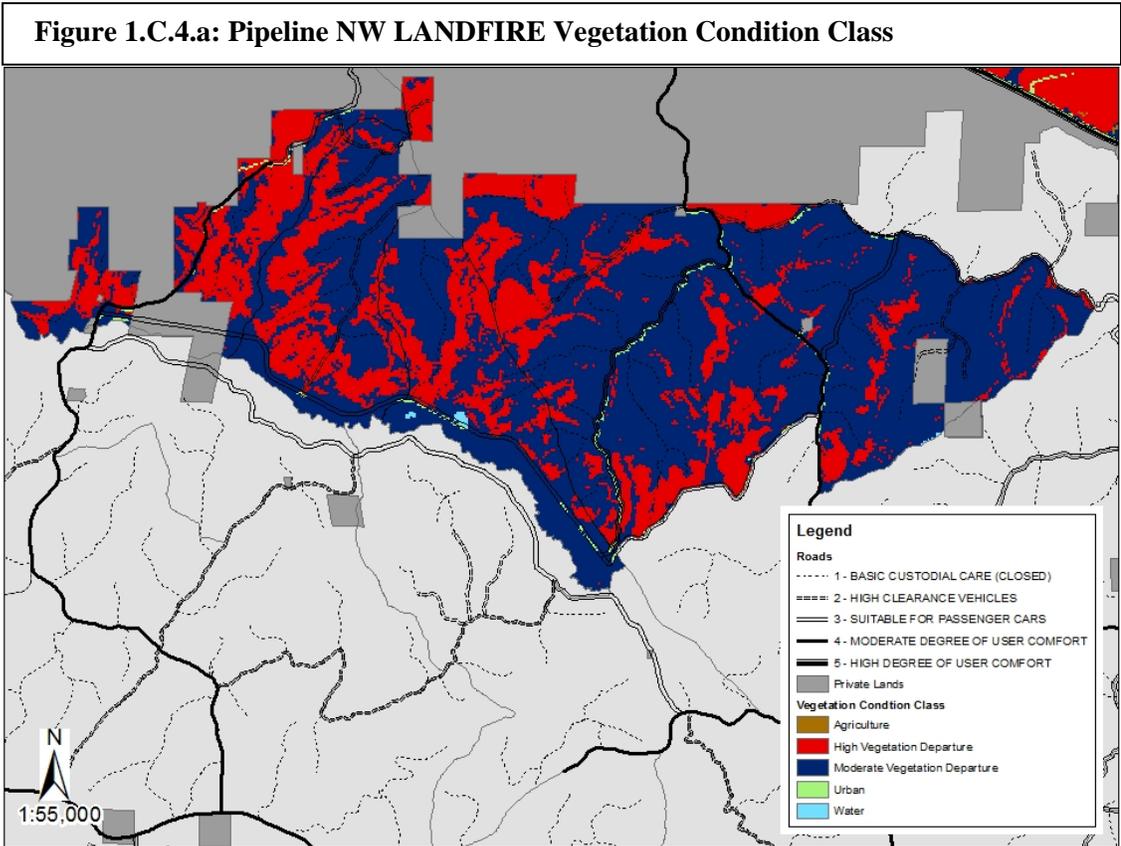
4. **Understory Conditions/Fire Condition Class:** Since the early 1990s, prescribed fire has been applied to the Pipeline NW planning area on an average of a 5 – 7 year interval. **Figure 1.C.4: Pipeline NW Burn History.**



- a) **Vegetation Condition Class:** Vegetation condition class quantifies the amount that current vegetation has departed from the simulated historical vegetation reference conditions. The Pipeline NW planning area as a vegetation condition class 3 (high vegetation departure) with the exception of streamside areas which are classed as moderate vegetation departure. **Figure 1.C.4.a: Pipeline NW LANDFIRE Vegetation Condition Class**

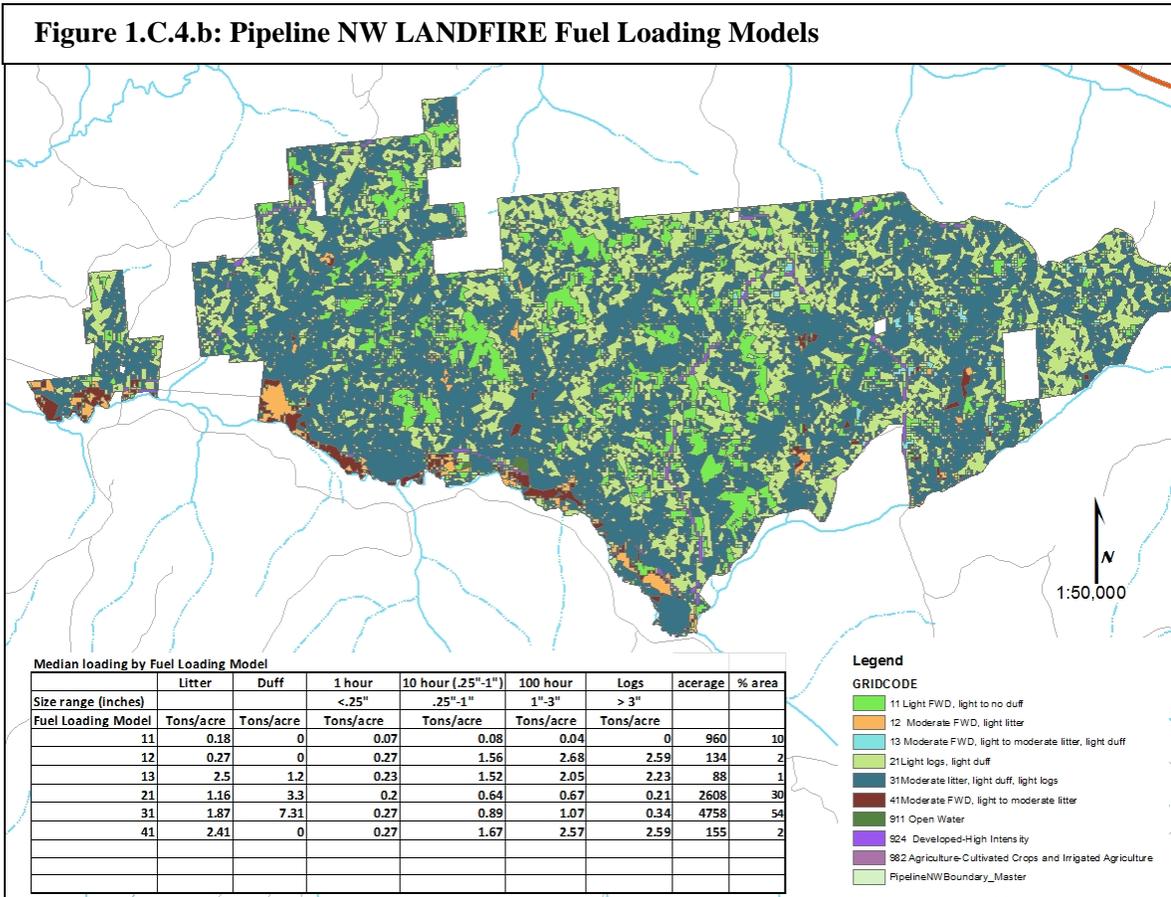
LANDFIRE (*also known as Landscape Fire and Resource Management Planning Tools*) is a cooperative program between the United States Department of Interior (DOI) and the USDA Forest Service.

LANDFIRE produces consistent, comprehensive maps and data describing vegetation, fire and fuel characteristics across the nation. These maps are derived from 22 spatial layers sourced from satellite imagery and local conditions and fire history data)



- b) **Fuel Loading:** Within the Pipeline NW planning area there are six categories of fuels as classified by the LANDFIRE Fuel Loading Models. This characterization of fuels allows managers a consistent description to classify fuels and model fire behavior and smoke emissions. Fuels are defined as any combustible material found in the wildland environment. Typical fuels found within the project area include grasses and herbaceous materials, shrub, pine and hardwood litter, as well as various size twigs, sticks and logs. The “load” refers to

the amounts usually expressed in tons per acre. **Fuel Loading Model 11** is described as light fine woody debris (FWD), with light to no duff. **Fuel Loading Model 12** is described as moderate FWD and light litter. **Fuel Loading Model 13** is comprised of moderate FWD, light to moderate litter and light duff. **Fuel Loading Model 21** is described as light logs and light duff. **Fuel Loading Model 31** corresponds to moderate litter, light duff, and light logs. **Fuel Model 41** is described as moderate FWD, and light to moderate litter **Figure 1.C.4.b: Pipeline NW LANDFIRE Fuel Models.**



- c) **Forest Health:** Loblolly pines, on upland soils, around the ages of 40 – 50 years generally begin to display poor health characteristics including thinning crowns, chlorotic crowns, and excessive cone production. These stressors lower the resilience of stands to natural disturbance events. Furthermore, younger loblolly stands on longleaf sites are generally more susceptible to insect infestation, especially when in over stocked conditions.
- i. **Insects and Diseases:** The current degraded forest health conditions provide conditions suitable for insect infestations that could result in a loss of forest resources and potentially spread to adjacent private lands. Two insects, southern pine beetles (SPB)

and Ips, are both pine beetles and the extent of their infestations are often associated with stressed trees, off-site conditions, and dense stocking.

There has been 65-documented Southern Pine Beetle (SPB), *Dendroctonus fontalis*, infestations in the Pipeline NW planning area from 1987 to present. The individual infestations were generally contained to 0.5 to 3.0 acres. In some cases, the infestation was suppressed through commercial harvest and removal of infested trees. On other occasions the infested trees were cut, felled, and left on site. These areas were left to naturally vegetate with seed sources from surrounding vegetation. These areas are dense thickets of loblolly and shortleaf saplings mixed with light seeded hardwoods such as sweetgum. There were no SPB infestations on the Oakmulgee District from 2007 to 2013. During late summer 2013, three infestations were noted on the district, none was noted in 2014.

- ii. **Non-Native Invasive Plant Species (NNIPS):** NNIPS have been tracked and treated over the past nine years. There have been ongoing control efforts and currently known infestations have been greatly reduced and limited in spread at current sites (**Figure 1.C.4.c.ii: Known non-native invasive plant species within the Pipeline NW planning area**). Of these sites, four are active kudzu sites, 12 are active cogongrass sites, eight are Persian silk tree sites, two are bicolor lespedeza sites, and there is one tall fescue site. Inventory methods to date have concentrated along roadways and those areas are under a treatment regime. There is a definite pattern of inadvertent introduction and spread of NNIPS through transport on vehicles, equipment, and through road maintenance activities. There is also reason to believe that some of these NNIPS have been introduced into non-roaded areas. These infestations are likely suppressed and not readily identifiable due to dense canopy cover and lack of prescribed fire.

Figure 1.C.4.c.ii: Pipeline NW planning area NNIPS Known Occurrence List				
Common Name	Scientific Name	No# of Sites	Priority	Total Acres
Persian Silk Tree	<i>Albizia julibrissin</i>	3	Low	3.41
Cogongrass	<i>Imperata cylindrica</i>	12	High	3.57
Bicolor Lespedeza	<i>Lespedeza bicolor</i>	3	Medium	0.36
Kudzu	<i>Pueraria montana</i>	2	Medium	5.68
Tall Fescue	<i>Schedonorus phoenix</i>	1	Low	5.60
				18.62

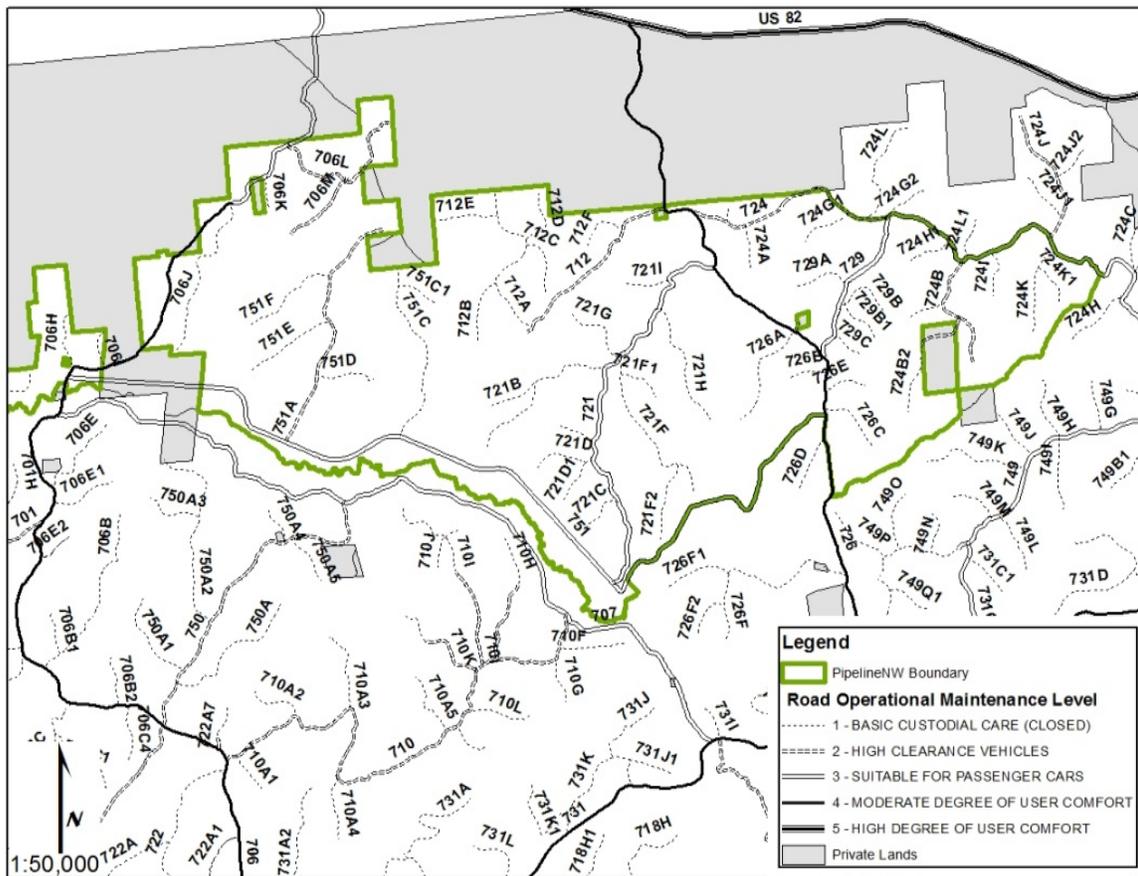
5. Infrastructure:

- A. **Roads and Road Maintenance Costs:** There are approximately 52 miles of Forest Service Roads (FSR) inventoried roads within or along the perimeter of the Pipeline NW planning area. Of the 52 miles of FSR roads, 24 miles are closed to vehicle traffic and are classified as Forest Service administrative roads. Approximately 8 miles of roads are Level 2 high clearance vehicle appropriate. There are approximately 15 miles of Level 3 passenger car suitable roads and 5 miles classified as moderate user comfort roads (Level 4).

Current yearly costs for road maintenance are based on their operational level and the length. All roads under Level 1- custodial care, which are closed to the public, cost \$400 dollars per mile to maintain. Level 2 - high clearance vehicles maintenance costs are \$1,100 dollars per mile. Level 3 - suitable for passenger cars maintenance costs are \$2,950 dollars per mile. Level 4 - described as moderate user comfort have an established cost of \$3,050 dollars per mile. Current costs associated with the Pipeline NW planning area for level 1 through level 4 roads is \$77,900 dollars a year. Associated yearly costs are displayed in **Figure 1.C.5.A: Pipeline NW planning area- Current Roads Maintenance Level & Annual Costs.**

Note: Annual road maintenance costs are based on engineering estimates of the investments needed to maintain roads to agency safety standards, based on their operational level. Annual road maintenance costs listed in this document are not the amounts currently expended by the Forest Service on the roads within the Pipeline NW project area. The costs listed in this document are for the purposes of comparison.

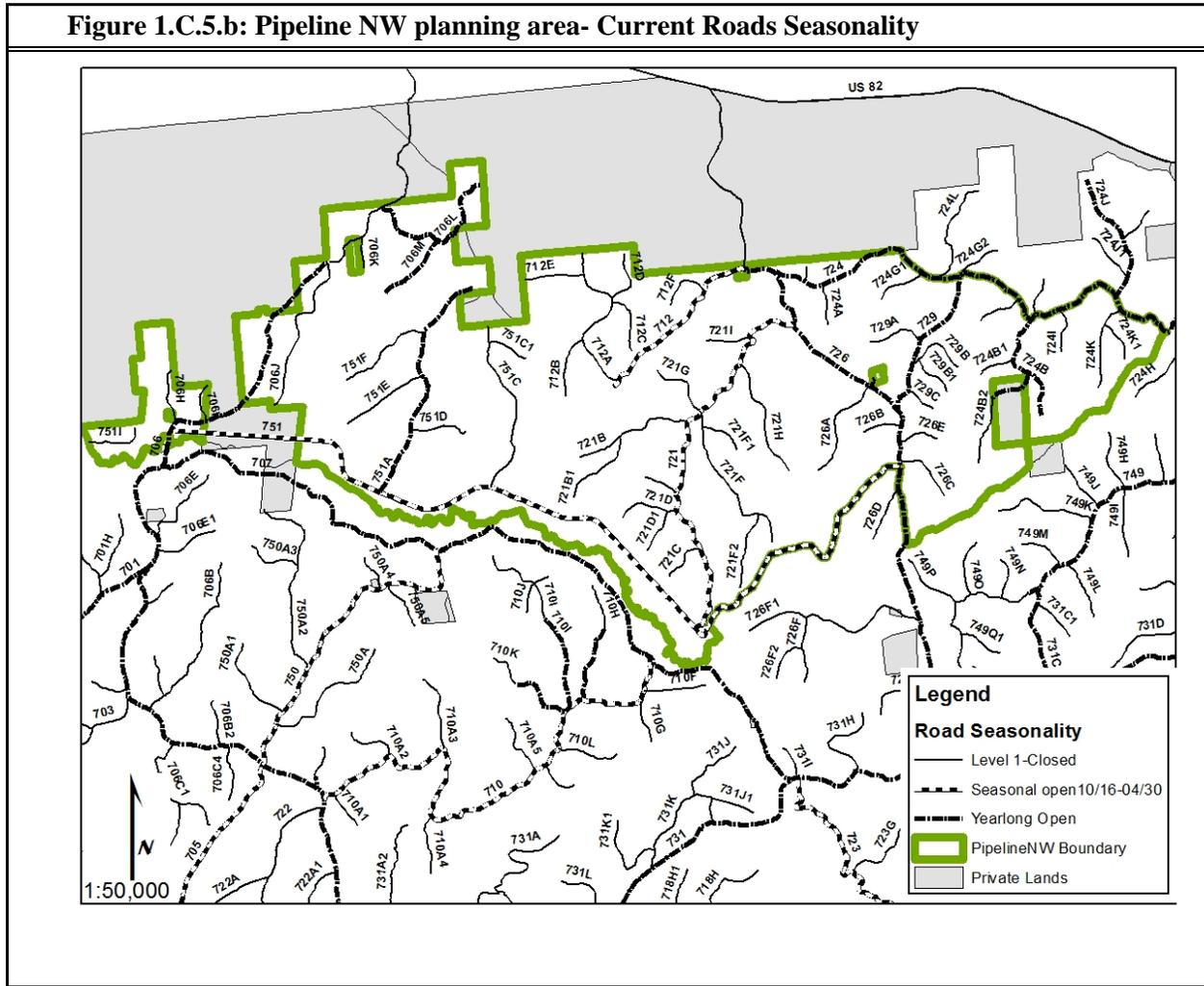
Figure 1.C.5.A: Pipeline NW planning area- Current Roads Maintenance Level & Annual Costs



Road Maintenance Level	Miles	Annual Cost/Mile	Total
1-Basic Custodial Care	24	\$400	\$9,600
2-High Clearance Vehicles	8	\$1,100	\$8,800
3-Suitable for Passenger Cars	15	\$2,950	\$44,250
4-Moderate User Comfort	5	\$3,050	\$15,250
5-High Degree of User Comfort	0	\$0	\$0
Total	52		\$77,900

Note: Annual Costs are based on road needs under a legal use scenario. Many of the roads in the Pipeline NW planning area receive illegal use resulting in an increased maintenance cost.

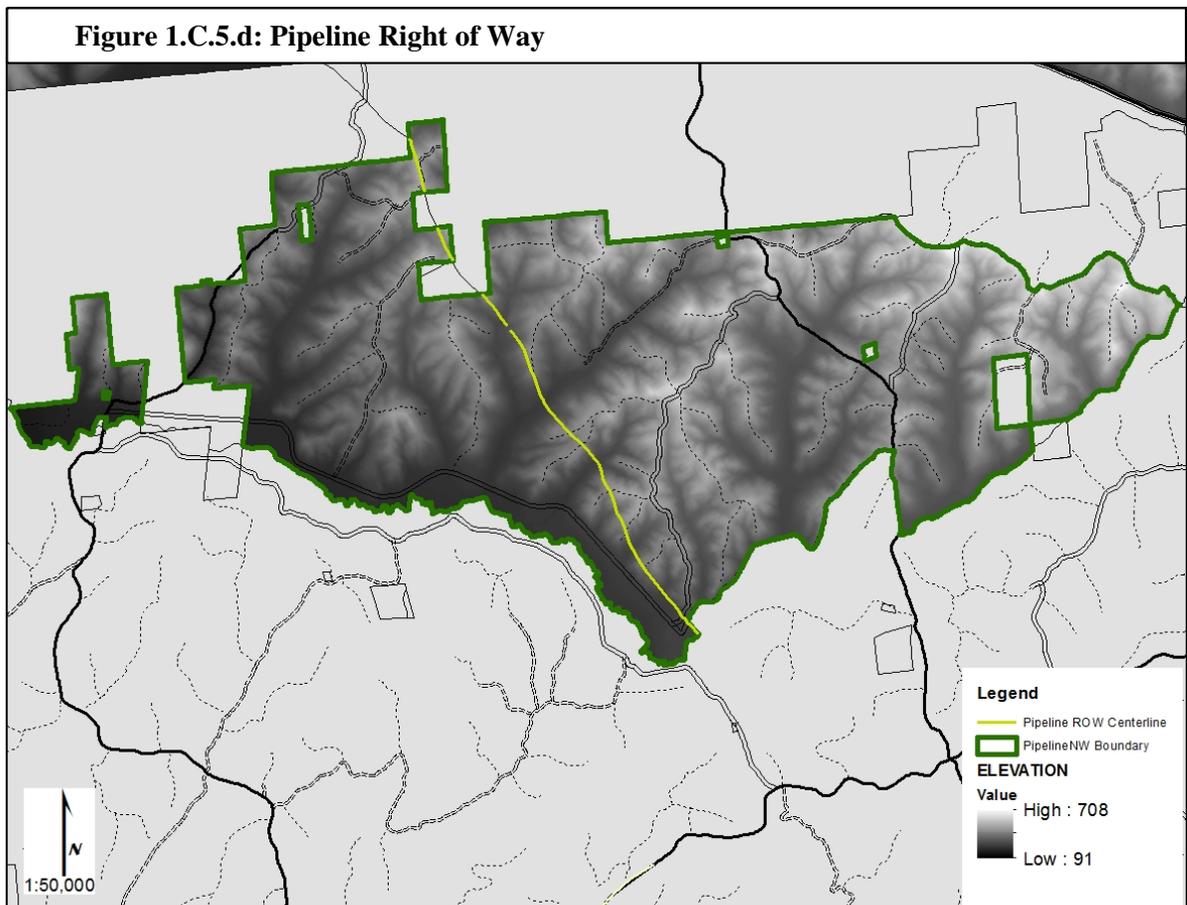
B. **Road seasonality:** Approximately 12 miles are currently classified as seasonal, open from October 16 – April 30. There are 16.1 miles open year round. Based on the project unit square mileage of 13.72, the public accessible roads during the closed season are 1.2 miles/square mile. Density of public accessible roads during the open season is two miles/square miles (**Figure 1.C.5.b: Pipeline NW planning area- Current Roads Seasonality**).



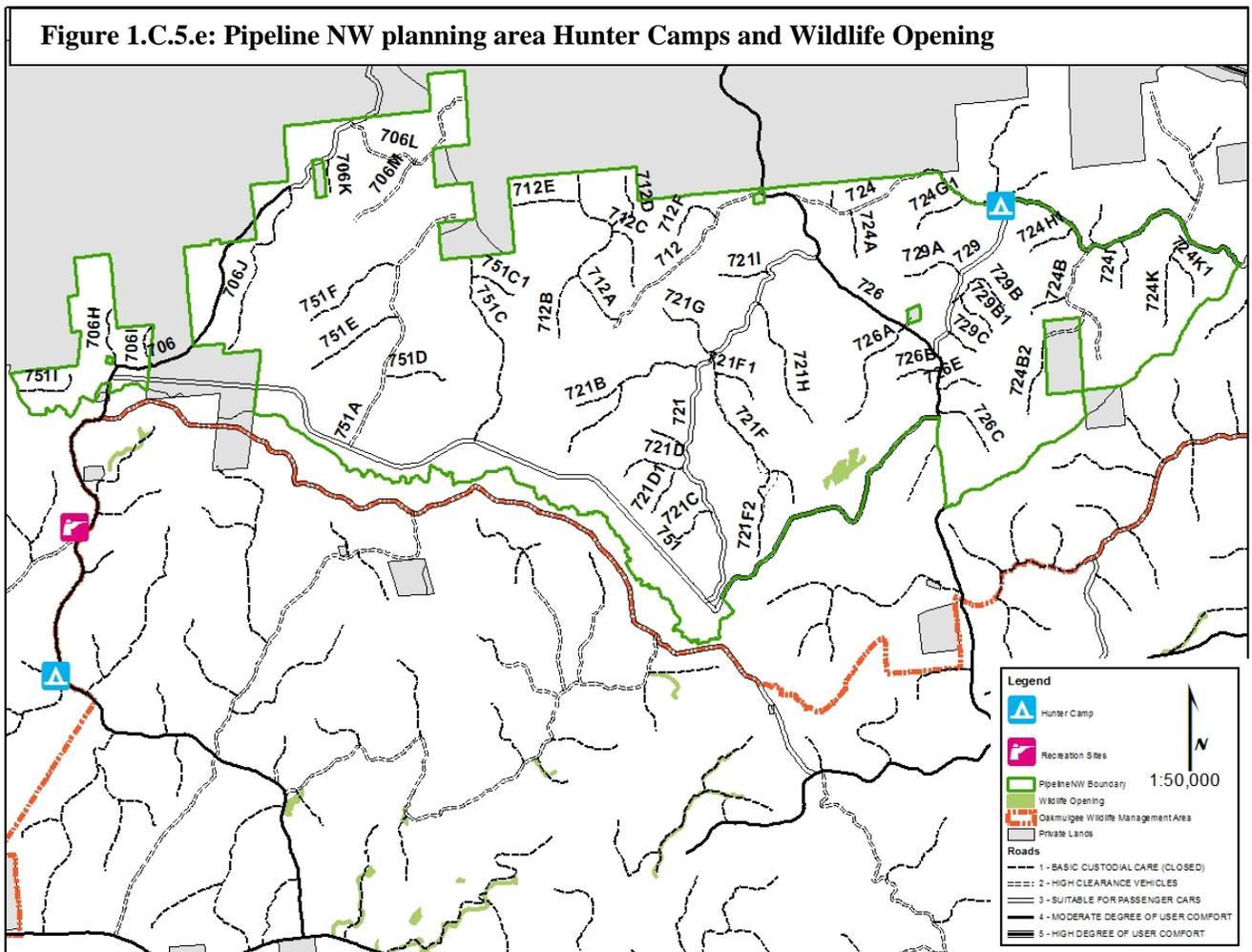
C. **Land Access:** During the open road season, 64% (5,627 acres) of the project area is within 0.25 miles of an open road, and 90% (7,967 acres) of the project area is within 0.5 miles of an open road. Ninety-nine percent of the project area (8,741 acres) is within 0.75 miles of an open road. During the closed road season, 37% (3,307 acres) of the project area is within 0.25 miles of an open road and 57% (5,042 acres) of the project area is within 0.5 mile of an open road. Sixty-nine percent (6,125 acres) of the project area is within 0.75 miles of an open road during the seasonal closures. All FSR roads within and adjacent to the project area are open to foot and non-motorized vehicle traffic.

Roads open to vehicle traffic are open to equestrian and mountain bike use. No closed or seasonally closed roads have been designated for equestrian traffic or mountain bike use.

- D. **Pipeline:** The abandoned Montgomery-Columbus Gas pipeline was permitted to Southern Natural Gas Company in October of 1945 for a 30-foot right of way. The pipeline was abandoned in the fall of 2004. The proposal to abandon included (1) depressuring the Montgomery-Columbus line between mile post 29.084 and mile post 51.150; (2) flushing the pipeline with cleaning agent followed by a water rinse to be collected and removed for proper disposal; (3) removing the above ground facilities; and (4) filling the abandoned section with water and capping each end. To date, the pipe infrastructure has not been removed. In addition, the right of way is actively being utilized for non-sanctioned recreation activities such as off road vehicle use accessed from both Forest Service and private roads. The total length within the project area is approximately 3.5 miles and 13 total acres of the right of way opening. The full pipeline corridor right of way cuts a 22 mile diagonal path from the northwest to the southeast on the western portion of the Oakmulgee District (**Figure 1.C.5.d: Pipeline Right of Way**).



E. **Hunter Camp and Wildlife Openings:** Within the Pipeline NW planning area there were two features established in support of hunting recreation opportunities. The Shiloh Hunter Camp is located on the southwest corner of the FSR 729 and the FSR 724 road intersection. The camp is a cleared area approximately less than 1 acre in size. One 20 acre wildlife opening exists within the project unit. A portion of the area (4 acres) was planted with native warm season grasses and is managed by fire and mowing as needed. It is located southwest of the FSR 726 and FSR 751 intersection (**Figure 1.C.5.e: Pipeline NW planning area Hunter Camps and Wildlife Opening**).



2. Goals and Objectives

The goals of the Pipeline NW planning area are designed to provide resiliency and sustainability by restoring species composition, structure, and function through a series of actions designed to favor native species on native sites (i.e. longleaf on longleaf sites, hardwood on hardwood sites, etc.) and to enhance the recreational opportunity spectrum. The goals were developed within the guidance of the Revised Land and Resource Management Plan (Forest Plan) for the National Forests in Alabama.

The Forest Plan provides broad program-level direction for management with the intent that future projects, such as the Pipeline NW planning area, will carry out the direction as well as develop site-specific mitigations and coordination measures.

Forest Plan goals used to guide this project are as follows:

- **To manage forest and woodland ecosystems** to restore and/or maintain native communities to provide the desired composition, structure and function. Emphasis in this project area will be to restore and maintain upland longleaf pine forest and woodland communities (**Forest Plan Goal 1**). This includes **restoring fire regimes** within or near the historical range (**Forest Plan Goal 18**), and managing forest communities to **reduce the risks from insects and disease** (**Forest Plan Goal 3**).
- **To manage and restore watersheds** to resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial water uses (**Forest Plan Goal 4**). Emphasis in this project will be the removal and restoration of the abandoned pipeline to forest communities and/or wildlife food plots.
- Contribute to the **recovery of federally listed threatened and endangered species**, and provide for the conservation of sensitive species as to minimize the need for additional listings under the Endangered Species Act (**Forest Plan Goal 11**). Contribute to **the conservation and recovery of the RCW** through the implementation of forest and population management practices described in the Revised Recovery Plan and the RCW Record of Decision (ROD) (**Forest Plan Goal 12**).
- Provide **habitats to support desirable levels of selected species** (e.g. species with special habitat needs such as large, continuous forested landscaped, species commonly trapped/hunted, or species of special interest) (**Forest Plan Goal 16**).
- **Provide a spectrum of high quality, nature-based recreation** settings and opportunities that reflect the unique or exceptional resources of the Forest and interests of the recreating public on an environmentally sound and financially sustainable basis (**Forest Plan Goal 22**) and **manage areas to provide for “backcountry” recreation experiences** (**Forest Plan Goal 24**).
- Provide a transportation system that supplies **safe and efficient access for forest users** while protecting forest resources (**Forest Plan Goal 35**) and **improve the condition of forest roads** that are adversely affecting surrounding resource values and conditions (**Forest Plan Goal 37**). accelerate the pace of **decommissioning unneeded roads** (**Forest Plan Goal 36**)

3. Purpose of and Proposed Action

1. To achieve the goals listed in **Section 2. Goals and Objectives**, within the existing conditions of the Pipeline NW planning area, the following actions are proposed. The proposed actions are described as the maximum treatment considered for the area. Maximum treatment acreage that will be evaluated to establish thresholds for significance of the potential effects. Some of the proposed actions list multiple treatments to achieve a similar result (e.g. site preparation by herbicide and by mulching). These multiple actions will also be analyzed to evaluate the cumulative effects and establish thresholds for their use. Coordination and mitigation measures specific to these actions are listed in **Section 4. Management Standards**. Further coordination and mitigation measures will be developed as the environmental effects of the proposed actions are evaluated. The issues outlined in Section E. Issues will guide the evaluation and analysis of the proposed action.

Note: The acres and/or miles proposed for treatment are estimates based on a combination of tools such as GPS and GIS. For the purposes of environmental effects, analysis the full acreage listed for each action will be evaluated. Implementation of similar actions indicates that treatments acres are often reduced due to site-specific implementation of the management standards listed in Section 4.

For a summary of the proposed actions reference: **Figure 3.A: Summary of Proposed Actions**.

1. **Manage Forest and Woodland Ecosystems:** To restore longleaf pine species on 461 acres currently stocked with loblolly pine currently exhibiting signs of decline. These are areas predominately located on primary and/or secondary longleaf soils that have been allowed to evolve to a shortleaf/loblolly/hardwood mix through a variety of means including planting of old fields, grazing, and/or suppression of fire. Concurrent and contemporaneous actions include commercially harvesting including construction and restoration of 0.3 miles of temporary haul roads; site preparation of herbicide (Triclopyr, Imazapyr, and Glyphosate) and fire; and/or site preparation of mechanical mulching; hand planting longleaf seedlings; followed by a release treatment of herbicide (Triclopyr, Imazapyr, and Glyphosate) 2 – 5 years after the seedlings have been established (**Figure 3.A.1: Map of Proposed Actions – Forest and Woodland Ecosystems**).
2. **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine on 1142 acres over age 40 by establishing open park-like forest conditions by commercially thinning including construction and restoration of 1.25 mile of temporary haul roads and a follow-up midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching (**Figure 3.A.1: Map of Proposed Actions – Forest and Woodland Ecosystems**).
3. **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf and mixed loblolly/longleaf pine by establishing open park-like forest conditions by either commercially thinning or cut and leave thinning 341 acres of planted pine less than 40 years old and a follow-up midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or

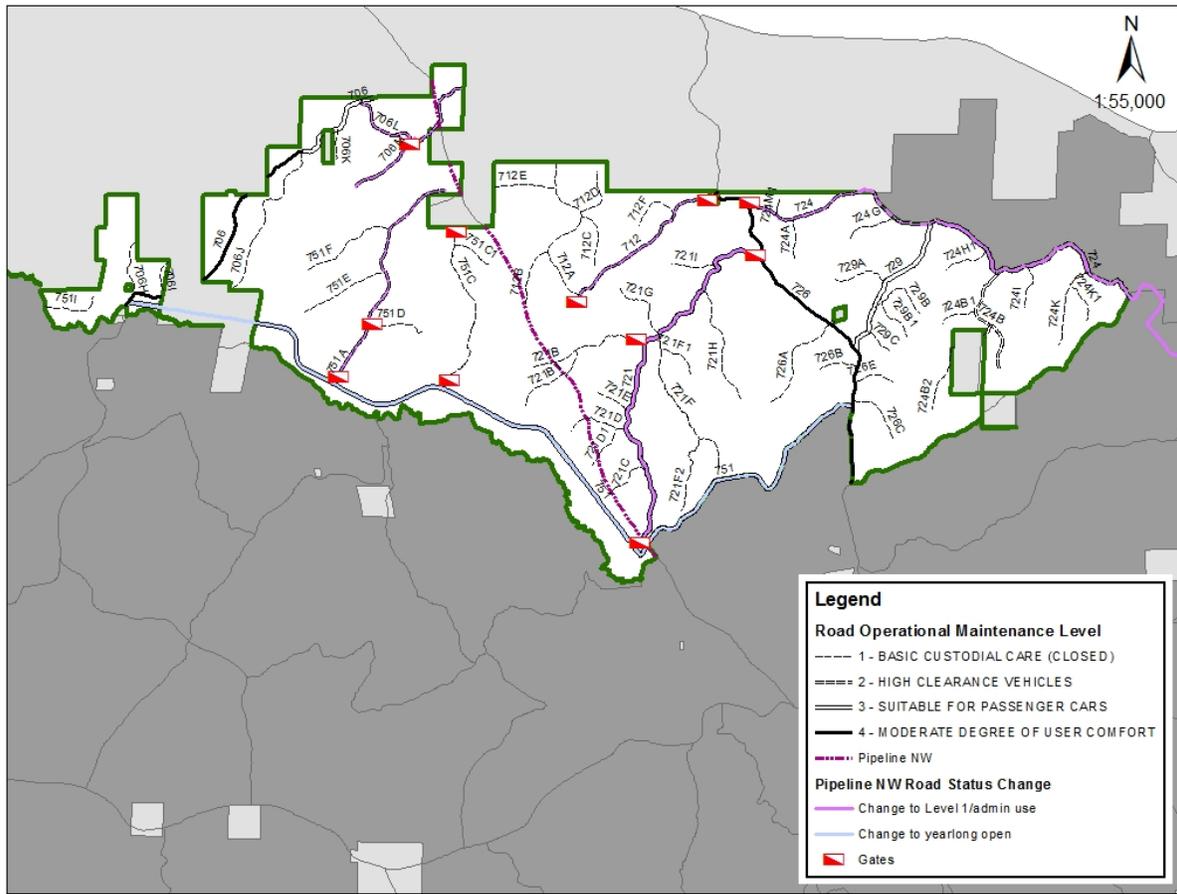
mechanical mulching. Includes construction and restoration of 0.25 miles of temporary haul roads (**Figure 3.A.1: Map of Proposed Actions – Forest and Woodland Ecosystems**).

4. **Manage Forest and Woodland Ecosystems:** To restore structure and increase resilience on 952 acres of mixed pine on longleaf soils by midstory treatment of cut and leave, and/or herbicide application, and/or mechanical mulching to establish open park-like conditions. These stands are those treated by commercial harvest under the no action alternative along with those in conditions not suitable for commercial harvest (e.g. steep slope, low volume, etc.) (**Figure 3.A.1: Map of Proposed Actions – Forest and Woodland Ecosystems**).
5. **Manage and Restore Watersheds:** Remove 3.5 miles of abandoned pipeline within the project area where practical and avoid damage to current riparian areas. Rehabilitate pipeline ROW to natural vegetation cover with potential to add wildlife food plots or linear strips to stabilize current erosion.
6. **Recovery of Federally Listed Threatened and Endangered Species:** Maintain suitable habitat of current RCW clusters as defined by the RCW Recovery Plan. This includes annual maintenance and replacement of artificial cavities and annual maintenance of natural cavities.
7. **Nature-based Recreation/Safe and Efficient Access:** Promote hunting and nature-based recreation opportunities by changing the status of FDR 751 from seasonally closed to yearlong open. Provide unique “backcountry” walk in nature based recreation activities by limiting vehicle access through road level change of approximately 14 miles of FDR roads to Basic Custodial Care (Closed) reducing annual maintenance costs approximately \$27,000. Provide gates suitable for non-motorized access. Other roads will remain under current status (**Figure 3.A.2: Pipeline NW planning area – Proposed Road Status Changes**).
8. **Nature-based Recreation/Safe and Efficient Access:** Maintain and enhance existing and proposed year-round roads by treating approximately 52 miles of roadsides with selective herbicide (Triclopyr) to reduce encroachment of brush and woody vegetation, provide for safety of motorists, increase early successional wildlife habitat, reduce the risk of establishment of NNIS, and reduce the frequency of roadside mowing. Roads would be treated on a 1 – 2 year rotation as needed with roadside mowing.
9. **Reduce Risk to Insect and Disease:** Suppress active SPB infestations by cutting and removing, or cutting and leaving infestation trees along with additional trees to serve as a buffer.

Figure 3.A: Summary of Proposed Actions

	Treatment	Units
1	<p>Commercially harvest areas currently stocked with loblolly and/or shortleaf pine over the age of 40 years exhibiting signs of decline.</p> <p>Concurrent and contemporaneous actions</p> <ul style="list-style-type: none"> • Temporary haul roads (0.5 miles) • Herbicide site preparation and prescribed fire • Mechanical mulching site preparation • Hand plant longleaf seedlings • Herbicide release seedlings from encroaching hardwood and loblolly 	461 Acres
2	<p>Commercially harvest areas currently stocked with longleaf over the age of 40 to establish open park-like area with over-stories dominated by longleaf pine. Concurrent and contemporaneous actions</p> <ul style="list-style-type: none"> • Temporary haul roads (1.25) • Midstory removal by cut and leave method • Midstory maintenance by herbicide application • Midstory removal by mechanical mulching 	1142 Acres
3	<p>Commercially harvest longleaf plantations under the age of 40 to establish open park-like area with over-stories dominated by longleaf pine. Concurrent and contemporaneous actions</p> <ul style="list-style-type: none"> • Temporary haul roads (0.25) • Midstory removal by cut and leave method • Midstory maintenance by herbicide application • Midstory removal by mechanical mulching 	341 Acres
4	Treat midstory in commercially thinned loblolly and longleaf areas, with herbicide and/or cut and leave, and/or mechanical mulching to establish open park-like conditions. (Commercial harvest listed in prior decisions)	952 Acres
5	Remove pipeline and restore ROW to forest woodland conditions or early seral stage habitat in support of wildlife and watershed health	3.5 Miles
6	Maintain suitable habitat of current RCW clusters as defined by the RCW Recovery Plan. This includes annual maintenance and replacement of artificial cavities and annual maintenance of natural cavities.	17 clusters
7a	Change FDR 751 status from seasonal (open 10/16 – 4/30) to yearlong open	7.2 Miles
7b	Change FDR 712 status from seasonal to level 1 closed and install appropriate gate	1.5 Miles
7c	Change FDR 706L, 706M, 721, 724, 724B, 751A status from year round open to level 1 closed and install appropriate gate	12.6 Miles
8	Maintain seasonal and year round open road system with integrated treatments of herbicide and mowing. (10 – 15 feet off the centerline)	52 Miles
9	Suppress active SPB infestations, by “cut and remove” or “cut and leave”	TBD

Figure 3.A.2: Pipeline NW planning area - Proposed Road Status Change



ID	Current Status	Length (MI)	Proposed Status
751	Suitable for Passenger Cars – Seasonal	7.2	Yearlong open
Total Miles to Open		7.2	
706L	High Clearance Vehicle-Yearlong	1.2	Basic Custodial Care (closed)
706M	High Clearance Vehicle-Yearlong	0.6	Basic Custodial Care (closed)
712	High Clearance Vehicle-Seasonal	1.5	Basic Custodial Care (closed)
721	Suitable for Passenger Cars – Seasonal	3.1	Basic Custodial Care (closed)
724	High Clearance Vehicle-Yearlong	4.9	Basic Custodial Care (closed)
724B	High Clearance Vehicle-Yearlong	0.9	Basic Custodial Care (closed)
751A	High Clearance Vehicle-Yearlong	1.9	Basic Custodial Care (closed)
Total Miles to Close		14.1	

4. Issues

An issue is a point of discussion, debate, or dispute about the projected environmental effects of an activity. Issues guide the analysis and provide the documentation on whether the proposed action may have a significant effect on the environment. Some issues are relevant to certain resource conditions that must, by law, be documented and analyzed to determine the effects relative to compliance with the established parameters. Other issues are developed from cause-effect relationships and/or concerns identified by the public.

According to Council on Environmental Quality (CEQ), an advisory component of the Executive Office and USFS guidance, key issues that are “significant” and in need of detailed study must be identified. Any other concerns, not as pertinent to the current analysis, may be dropped from further discussion once addressed or included in the analysis in a lesser role than key or significant issues. Issue analysis is a means to identify whether or not sufficient mitigation measures have been established to reduce the effects below a level of significance. The issue analysis will be documented in Chapter 3: Affected Environment and Environmental Consequences. Through issue analysis tracking and monitoring methods may be established to evaluate the efficacy of the initial analysis.

Specific to this project and proposed action the following issues are identified.

- a) **Forest Composition and Structure:** The desired condition prescribed by the Forest Plan for lands in the management area are as follows: Red-cockaded Woodpecker (RCW) Management Area is to provide suitable optimal habitat conditions for RCW. The desired condition is to have a maximum of 8.3% of the pine forest/woodland community in early successional stage habitat. Currently none of the forested component of the Pipeline NW planning area is in early successional conditions. The Proposed Action along with actions already under decision will further increase the early successional stage habitat for the forested land base in the Pipeline NW planning area. *The issue to be evaluated is the effects of retaining the off-site and declining loblolly stands proposed for harvest and planting to longleaf vs. the increased acreage in early succession stage habitat.*
- b) **Insect and Diseases:** Off-site trees are often stressed and more susceptible to insects and disease. While research indicates limited build-up of Ips pine bark and SPB beetles in those stressed trees, the potential for infestations exists. *The issue to be evaluated is the effects of the proposed actions on the risk of insect and disease infestations.*
- c) **RCW Population Recovery:** The long-term goal of the proposed action is to increase the acres of longleaf pine, thus sustainable RCW habitat. The short-term effects are that some of the proposed treatments may remove existing, albeit non-sustainable and currently non-occupied habitat. *The issue to be evaluated is the short term vs. long-term effects to RCW expansion and recovery.*

- d) **Watershed Health:** The proposed treatments will have some effect on annual sediment yield. Sediment movement within the watershed is a naturally occurring event, with or without management activities. A healthy environment will recover and absorb this change within what is framed as a natural range of variability. *The issue to be evaluated is the effects of proposed actions relative the natural ability of the watershed to recover and absorb the change in conditions.*
- e) **Soil Productivity, Compaction, and Erosion:** Disturbance of soils from management practices involving timber harvest, site preparation and reforestation, as well as, fire line establishment, temporary road construction and stabilization, system road decommissioning, and recurrent road maintenance will result in some form of physical, chemical and biological change. *The issue to be evaluated is the effects of proposed actions relative the natural ability of the soil properties to recover and absorb the change in conditions.*
- f) **Dispersed Recreation and Public Access:** The project areas is prescribed for dispersed recreation and the management emphasis is to provide a variety of dispersed recreation opportunities, improve the setting for outdoor recreation, and enhance visitor experiences in a manner that protects and restores the health, and diversity of the land. *The issue to be evaluated is the effects of proposed actions relative the opportunities for dispersed recreation.*
- g) **Forest Composition and Structure:** Wildlife species and their habitat relationships relative to the predicted responses from the proposed actions will be address. Emphasis is to be placed on those species of high interest to forest users and conservation organizations. *The issue to be evaluated is the effects of proposed actions relative the habitat relationships for species of high interest.*
- h) **Non-Native Invasive Plant Species (NNIPS):** The proposed action has the potential to introduce NNIPS as well as create conditions to cause the spread of existing NNIPS.
- i) **Public Health and Safety:** The proposed action will be evaluated relative to the degree it might affect public health and safety. *The issues to evaluate are fire and smoke management, safety to forest users during project implementation, herbicide risks, and increased traffic flows during project implementation.*
- j) **Climate Change:** The Forest Service has a national policy to consider climate change in the delivery of our overall mission. We are directed to make informed decisions and be responsive to changing climate, use climate change science and projections of change in temperature and precipitation patterns at the lowest geographic level that is scientifically defensible. Given the uncertainty involved and limits to modeling capability, this is most likely at much broader scales than appropriate for the project area. *The issue to be evaluated at the planning area is the relationship of the proposed actions to climate change parameters such as forest sustainability and carbon sequestration.*

- k) **Economics and Operational Capacity:** The proposed treatments may have effects on the local economies and the District's operational capacity. *The issue to be evaluated is the effects of proposed actions on fiscal viability and operational sustainability.*
- l) **Proposed, Endangered and Threatened (PET) Species:** A biological evaluation has been sent to U.S. Fish and Wildlife Service for (informal consultation) review to determine the effects of the proposed action on PET species and to provide management measures to avoid impacts that may cause a trend towards listing of a species under the Endangered Species Act, or loss of species viability. Concurrence from U.S. Fish and Wildlife Service will be required before a decision on the proposed action can be made.
- m) **Regional Forester's Sensitive Species:** The intent to of the proposed action is to avoid impacts that may cause a trend toward listing a species under the Endangered Species Act. *A biological evaluation has been submitted to determine the effects of proposed actions on a list of species compiled regionally that have been designated as sensitive.*
- n) **Historic resources:** The Pipeline NW planning area has undergone a cultural resource survey; those surveys have been reviewed by the Alabama State Historic Preservation Officer and they have concurred with our findings. Documentation will be provided in the final EA.

5. Decision to Be Made

The responsible official is the District Ranger, Cynthia Ragland, who has been designated the authority to act on behalf of, and issue the final decision for the TNF, Oakmulgee District. Within the final decision the responsible official will make the following determinations.

Whether or not to approve the Proposed Action as described in Section C. The decision to implement the action items described in the proposed action will not alter the status of previously approved treatments identified in the following documents:

- Wildlife Opening Maintenance Decision Memo signed May 20, 2003
- Longleaf Ecosystem Restoration Project, Record of Decision signed Feb 2, 2005
- Non-Native Invasive Plants Control Project, Decision Notice and Finding of No Significant Impact signed June 9, 2006
- Non-Native Invasive Plants Species Advanced Control EA, Decision Notice and Finding of No Significant Impact signed September 30, 2008
- Enhanced Invasive Plant Control EA Decision Notice and Finding of No Significant Impact signed June 21, 2012

Whether or not the Proposed Action will have a significant effect on the quality of the human environment considering both the context and intensity of these effects (40 CFR 1508.27).

Whether or not the Proposed Action is consistent with the intent of the Revised Land and Forest Plan for the National Forests in Alabama and incorporated the forest-wide goals and objectives listed as well as the standards to be implemented as mitigation measures.

6. Public Involvement

Scoping Summary: Public involvement specific to this document began on May 21, 2015 with the draft of Chapter 1 of this EA uploaded into the PALS (Planning, Appeals, and Litigation system) database. Hard copy letters were mailed to 88 individuals, with 10 being returned as invalid addresses. A web link to the document in the PALS database was emailed to 185 (with 9 rejected) individuals and/or organizations expressing interest in management activities on the Oakmulgee District. The project was listed in the SOPA (Schedule of Proposed Actions) on April 1, 2014. Comments were received from May 21, 2015 to June 15, 2015. Two comments were received

Response to Scoping: One comment was a request to stock fish in the beaver impoundments along FDR to allow additional recreation. The second comment was regarding the proposed changes in recreation access specifically the change of FDRs 721 and 724 to yearlong closure. The fish stocking request is outside the scope of the proposed action, but may likely be considered under a future action. The proposed changes to recreation access are address in Chapter 3.

Related Public Engagement and Scoping from Similar Projects: Employees of the Oakmulgee District and members of the Pipeline NW Interdisciplinary Team are active in a variety of community programs; serve on many committees; and annually participate in tours/field trips on District management activities. The Oakmulgee District generally provides the formal opportunity to comment on two to three proposed projects a year, with each project having a scoping mailing list of 180 – 200 people. Through all of this interaction public response to similar proposed actions have been supportive, with one exception. The Pine Flat Integrated Resource Restoration Project; a project with similar proposed actions received an appeal in 2013. That appeal was upheld by the U.S. Forest Service, Southern Region, and the relevant appeal points from the Pine Flat project have been addressed within the Pipeline NW Project EA; and the Appendix C: Response to Public Comments, from the Pine Flat Integrated Resource Restoration Project are hereby incorporated by to this document.

In 2014 while conducting scoping for the Deer Pen EA one comment was received regarding the use of Glyphosate, an herbicide that was originally proposed for use during site preparation for re-establishing longleaf seedlings and later on those same areas for releasing those seedlings from hardwood competition. Upon review, it was determined that the need for glyphosate was minimal due to the limit acreage proposed for treatment in the Deer Pen Proposed Action. Therefore, the Proposed Action was revised to remove the use of Glyphosate as a proposed treatment; and this potential conflict was considered resolved. No comments were received during the 30-day Notice of Comment period for the Deer Pen EA.

The proposed action for the Pipeline NW EA contains Glyphosate as a proposed treatment, as per the Adaptive Management Protocols (Appendix B). After consideration of the prior public response, the Pipeline NW IDT determined that the ability to use Glyphosate was necessary in the Pipeline NW planning area, largely due the juxtaposition of the area to population centers and travel-ways

that may limit prescribed burning to days with winds from the north. Winds from the north affecting the Oakmulgee generally occur during the winter months. Winds during the growing seasons are more likely from the southwest, transporting smoke into the areas of concern, and potentially limiting the use of growing season burns in the Pipeline NW planning area. Thus glyphosate is needed to treat vegetation to augment the potential loss of effective prescribed fire which when used consistently can be a surrogate for the use of herbicides. The concerns of the individual responding to the Pine Flat project are addressed within this Pipeline NW planning area, and the formal appeal that was addressed can be found in **Appendix C: Response to Public Comments** in the Pine Flat Integrated Resource Restoration Project.

Tribal consultation was conducted concurrent to the review of the Heritage Resource Management reports for the Pipeline NW planning area.

Chapter II: Comparison of Alternatives

Introduction: 36 CFR 220.7(b) (2) states:

When there are no unresolved conflicts concerning alternative uses of available resources (NEPA [National Environmental Policy Act], section 102(2)(E)), the EA [Environmental Assessment] need only analyze the proposed action and proceed with consideration of additional alternatives.

There were no public comments received during scoping for the Pipeline NW Restoration Project that resulted in issues requiring further consideration. The comment on recreational access and the proposed action to change the road use, was anticipated and considered during project development. There are no unresolved conflicts with the proposed action, therefore, the proposed action is the only action analyzed in this Environmental Assessment.

This chapter describes the proposed action and utilizes a no-action alternative as a means to contrast the effects of the proposed action. In certain analysis, for the purposes of contrast and comparison “current conditions” were used to assess the effects of each alternative. Quantitative comparisons of the alternatives are provided within this Chapter, as well as, a list of standard management practices common to both alternatives.

Figure 2.A.2: Expected Trends Relative to Established Goals and Objectives compares the alternatives (potential actions) in terms of their achievement of goals and objectives as listed in **Chapter I. Section B. Goals and Objectives**. For a comparison of treatments in each of the alternatives, reference **Figure 2.A.: Comparison of Alternatives**. **Figure 2.A.3: Map of No Action Alternative** and **Figure 2.A.4-6: Maps of Proposed Action Alternatives**. A listing of stands and acres for each alternative may also be found in **Appendix A: Proposed Action Treatment Areas**.

Alternative A – Continue Present Restoration, Access, and Use (No Action)

Under the No Action Alternative, ongoing management would continue in the planning area, specifically those plans listed in **Chapter I. Section A. Natural Resource Management Activities by Decision Document Occurring within Planning Area during the Past 10 Years or Planned to Occur within the Next 10 Years**. Activities initiated the environmental documents listed in Chapter 1 will continue to be implemented. However new activities will not be included in this alternative. Basic custodial forest management such as wildfire suppression and routine road maintenance would also be implemented under the no action alternative. Utilizing Alternative A, the Forest Service would not implement the action items listed in **Chapter 1. Section 3. Purpose of and Proposed Action**.

Alternative B – Proposed Action

Under this alternative the Proposed Action would be implemented as described in **Chapter I. Section C. Purpose of and Proposed Action.**

Management Standards Common to Both Alternatives

The Forest Plan provides “Forest-wide Standards” that define the rules for implementation of management actions. Standards are the specific technical resource management directions and often preclude or impose limitations on management activities on resource uses, generally for environmental protection, public safety, or to resolve an issue. The specific Standards relative to management actions listed for both alternatives are as follows:

1. **Ecosystem Restoration and Terrestrial Plant and Animal Communities:** Unless necessary for insect or disease control or to provide for public safety, den trees will not be intentionally felled during vegetation management treatments. (Forest-wide Standards 2 and 107)
2. **Ecosystem Restoration:** In even-aged regeneration areas where at least 2 snags per acre are not present or cannot be retained as residuals, at least 2 standing snags/acre will be created from the larger diameter classes within the original stand. In addition, a minimum of five of the largest living mature trees per acres will be retained to provide potential future snags during the early and mid-successional stages of stand development. Distribution of snags and live residuals may be scattered or clumped. Live den trees are not to be used for snag creation, but may count toward live residuals. (Forest-wide Standard 4)
3. **Ecosystem Restoration:** When seeding temporary openings such as temporary roads, skid trails and log landings, use only native and non-persistent non-native species. (Forest-wide Standard 5)
4. **Ecosystem Restoration:** Timber harvesting with conventional equipment is limited to slopes \leq 40%. (Forest-wide Standard 7)
5. **Ecosystem Restoration and Streamside Management:** Temporary roads will cross-streams only on temporary bridges or low-water fords. Fords may be used only when stable channel conditions exist and downstream beneficial uses, including threatened and endangered species, are not jeopardized. Temporary bridges will be removed upon completion of use. (Forest-wide Standards 8 and 66)
6. **Ecosystem Restoration:** Mechanical equipment is operated so that furrows and soil indentations are aligned on the contour (with grades under 5 %). (Forest-wide Standard 15)
7. **Ecosystem Restoration:** Mechanical equipment is not allowed in any defined stream channel except to cross at designated points, and may not expose more than 10% mineral soil in filter strips along lakes, perennial or intermittent springs and streams, wetlands, or water-source seeps. (Forest-wide Standard 17)

- 8. **Ecosystem Restoration:** All trails, roads, ditches, and other improvements in the planning area are to be kept free of logs, slash, and debris. Any road, trail, ditch, or other improvement damaged by operations is promptly repaired. (Forest-wide Standard 18)
- 9. **Ecosystem Restoration:** Weather is monitored and the herbicide project is suspended if temperature, humidity, or wind becomes unfavorable. (Forest-wide Standard 19)

Treatment Type	Temperature higher than	Humidity less than	Wind speed greater than (at target)
Hand (cut surface)	N.A.	N.A.	N.A.
Hand (other)	98°F	20%	15mph
Mechanical (liquid)	95°F	30%	10mph
Mechanical (granular)	N.A.	N.A.	10mph

- 10. **Ecosystem Restoration:** A certified pesticide applicator supervises each Forest Service application crew and trains crewmembers in personal safety, proper handling, and application of herbicide, and proper disposal of empty containers. (Forest-wide Standard 20)
- 11. **Ecosystem Restoration:** Application equipment, empty herbicide containers, clothes worn during application, and skin are not cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separate labeled containers. (Forest-wide Standard 23)
- 12. **Ecosystem Restoration:** Application equipment, empty herbicide containers, clothes worn during treatment, and skin are not cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separate labeled containers. (Forest-wide Standard 24)
- 13. **Ecosystem Restoration:** Herbicide mixing, loading, or cleaning areas in the field are not located within 200 feet of private land, open water, or wells, or other sensitive areas. (Forest-wide Standard 25)
- 14. **Ecosystem Restoration:** Herbicides and application methods are chosen to minimize risk to human and wildlife health and the environment. No class B, C, or D chemical may be used on any project, except with Regional Forester approval. Approval will be granted only if a site specific analysis shows that no other treatment would be effective and that all adverse health and environmental affects fully mitigated. Diesel oil will not be used as a carrier for herbicides, except as it may be a component of a formulated product when purchased from the manufacturer. Vegetable oils will be used as the carrier for herbicides when available and compatible with the application proposed. (Forest-wide Standard 27)
- 15. **Ecosystem Restoration:** Herbicides are applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health. Application rate and work time must not exceed levels that pose an unacceptable level of risk to human or wildlife health. If the rate or exposure time being evaluated causes the Margin of Safety (MOS)

or the Hazard Quotient (HQ) computed for a proposed treatment to fail to achieve the current Forest Service R-8 standard for acceptability (requires MOS>100 or an HQ <1 using the current SERA Risk Assessments found on the Forest Service website) additional risk management must be undertaken to reduce unacceptable risks to acceptable levels or an alternative method of treatment must be used. (Forest-wide Standard 28)

16. **Ecosystem Restoration:** Nozzles that produce large droplets (mean droplet size of 50 microns or larger) or streams are used. Nozzles that produce fine droplets are used only for hand treatment where distance from nozzle to target does not exceed 8 feet. (Forest-wide Standard 29)
17. **Ecosystem Restoration:** With the exception of permittee treatment of right-of-way corridors that are continuous into or out of private land and through Forest Service managed areas, no herbicide is broadcast within 100 feet of private land or 300 feet of private residence, unless landowner agrees to closer treatment. Buffers are clearly marked before treatment so applicators can easily see and avoid them. (Forest-wide Standard 30)
18. **Ecosystem Restoration:** With the exception of treatments designed to release designated vegetation selectively resistant to the herbicide proposed for use or to prepare sites for planting with such vegetation, no soil-active herbicide is applied within 30 feet of the drip-line of non-target vegetation specifically designated for retention (e.g. den trees, hardwood inclusions, adjacent untreated stands) within or next to the treated area. Side pruning is allowed, but movement of herbicide to the root systems of non-target plants must be avoided. Buffers are clearly marked before treatment so applicators can see and avoid them. (Forest-wide Standard 31)
19. **Ecosystem Restoration:** Critical values of the Keetch-Byram Drought Code are developed for all major vegetation-soil-landform types on which prescribed fires are conducted. Burning is allowed only on days when the Drought Code is less than this critical value. (Forest-Wide Standard - 33)
20. **Watersheds:** Timber Sale Areas and associated reforestation practices will have a minimum 35-foot no equipment zone maintained around gully heads and sidewalls. Timber may be selectively removed from within the 35-foot zone with the use of chainsaws and cable only. (Forest-wide Standard 38)
21. **Watersheds:** Resource activities that may affect water quality will implement State Best Management Practices (BMPs) as a minimum to meet water quality objectives. Revised Forest Plan Standards that exceed State BMPs will take precedence. (Forest-wide Standard 39)
22. **Watersheds:** Soil disturbing activities (excluding roads and trails) will not take place on water-saturated soils. Standing water and puddling are evidence of a saturated condition. (Soil disturbing activities are not limited to timber harvesting.) (Forest-wide Standard 40)
22. **Watersheds:** On severely eroded forest soils, any area with an average litter-duff depth of less than ½ inch is not burned. (Forest-wide Standard 41)

23. **Watersheds:** Growing season under-burns are not allowed on the same site more than twice in succession without an intervening dormant season burn. (Forest-wide Standard 42)
24. **Watersheds:** Water control structures necessary for the control of surface water movement from disturbed sites will be constructed during or within two weeks following construction for temporary roads and within two weeks following the close out of the disturbing activity for skid trails. (Forest-wide Standard 43)
25. **Watersheds and Fire Management:** Water control structures necessary for the control of surface water movement on fire lines will be installed during prescribed fire line construction. Permanent fire lines will have water control structures maintained. (Forest-wide Standards 45 and 116)
26. **Watersheds:** Timber harvesting activities are prohibited within sinkholes and within 200 feet of their defined boundary and within 200 feet of cave entrances. (Forest-wide Standard 48)
27. **Watersheds:** Herbicides will not be used within 200 feet of defined sinkhole boundaries. (Forest-wide Standard 49)
28. **Watersheds:** For protection of heritage resources, timber harvesting activities are prohibited within 100 feet of the top of all rock shelters eligible for or included in the National Register of Historic Places, and 100 feet from cliff lines of greater than 25 feet vertical drop. (Forest-wide Standard 50).
29. **Watersheds:** The maximum size of an opening created by even-aged or two-aged regeneration treatments is 80 acres for southern yellow pine types. 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. Areas managed as permanent openings (e.g. meadows, pastures, food plots, rights-of-way, wood lands, savanna, and grasslands) are not subject to these standards and are not included in calculations of opening size, even when within or adjacent to created openings. (Forest-wide Standard 51)
30. **Watersheds:** Openings created by even-aged and two-aged regeneration treatments will be separated from each other by a minimum distance of 330 feet. Such openings may be clusters closer than 330 feet, as long as their combined acreage does not exceed the maximum opening size. An even-aged regeneration area will not long be considered an opening when the certified re-established stand has reached an age of 5 years. (Forest-wide Standard 52)
31. **Watersheds:** Regeneration harvests on lands suitable for timber production must be done under a regeneration harvest method where adequate stocking of desirable species is expected to occur within 5 years after the final harvest cut. A new stand of longleaf must meet the minimum stocking level of 400 trees per acre. (Forest-wide Standard 53)
32. **Stream-side Management:** Stream-side Management Zones (SMZs) will be established on both sides of any stream course that meets the following specifications:

- On all first and/or persistence of order stream courses that exhibit contiguous scour water (i.e. connected springs and seeps)
- On all second order or higher stream courses.

Minimum SMZs widths vary according to stream order. See table below. The SMZ can be extended beyond these minimum widths in response to special considerations.

- On stream courses that have a distinct bank or edge, the SMZ will start at the bank or edge.
- For braided streams, the SMZ starts where best professional judgment determines the edge of the outermost braid.
- On stream courses that do not have a distinct bank or edge, the SMZ will start at the approximate center of the stream course. (Forest-wide Standard 56)

Stream Order	Reserved Section (Feet)	Special Section (Feet)	Total (Feet)
(1) Ephemeral scoured	0	35	35
(2) Ephemeral	15	20	35
(3) Intermittent	25	0	25
(4) Perennial	35	0	35

- Stream-side Management:** Mechanical equipment is not allowed in any scoured stream channel except to cross at designated points (Forest-wide Standard 62)
- Stream-side Management:** Remove treetops and logging debris dropped into a stream course or water body unless intended for fisheries habitat improvements and attainment of aquatic desired conditions. (Forest-wide Standard 63)
- Stream-side Management:** All sources of mineral soil exposure will not exceed 10% within the stream-side management zone except for hiking trails, fire lines, and designated crossings where mineral soil exposure will be kept to the minimum necessary to meet the management objectives and maintain desired future conditions. (Forest-wide Standard 64)
- Stream-side Management:** Temporary roads, skid trails, and plow lines are not permitted in a SMZ except at designated crossings. (Forest-wide Standard 65)
- Stream-side Management:** Ruts that are greater than 15 feet or that connect to a stream bank where water can flow into a stream will be smoothed to restore hydrology when conditions exist that does not result in further rutting. (Forest-wide Standard 67)
- Stream-side Management:** Log landings will be located outside the SMZs. (Forest-wide Standard 68)

39. **Stream-side Management:** All equipment used for harvesting operations, hauling operations or other work involving mechanical equipment will be serviced outside the riparian corridor and SMZs. (Forest-wide Standard 69)
40. **Stream-side Management:** Aerial or ground applied treatments of pesticides will not be allowed in the riparian corridor/SMZ. Cut surface treatments of pesticides are allowed. (Forest-wide Standard 70)
41. **Stream-side Management:** Plowed fire lines, outside riparian corridors, must stop within 10 feet of any scoured or wet channel, outermost channel braid, or best professional judgment of the edge of a channel. The remaining 10 feet between the plowed fire line and the channel bank can be any type of fire line that does not exceed the disturbance of a hand line firebreak. All fire line disturbances must be stabilized to prevent off site soil movement into stream channels immediately after plowing. (Forest-wide Standard 72)
42. **Stream-side Management:** On un-scoured ephemeral (order 1 and order 2) SMZs, aerial or ground applied treatments of pesticides or mechanical site preparation are not permitted within 15 feet, or each side, of the approximate center of the un-scoured drain. Cut-surface treatments of pesticides are permitted. (Forest-wide Standard 74)
43. **Stream-side Management:** On un-scoured ephemeral (order 1 and order 2) SMZs, ground disturbing activities (such as skid trails, log landings, fire lines) are not permitted in the drain except for the construction of a crossing. All crossings will be stabilized immediately after use. The number of crossings will be limited to the minimum necessary to accomplish management objectives and maintain future desired conditions. (Forest-wide Standard 76)
44. **Red-cockaded Woodpecker:** Limit restoration areas in off-site pine and pine hardwood stands to 80 acres in size. (Forest-wide Standard 90)
45. **Red-cockaded Woodpecker:** Retain on-site trees of highest importance to RCWs (very old, flat topped, potential cavity trees, and scarred old pines) regardless of silvicultural system. (Forest-wide Standard 91)
46. **Fire Management:** Protection of firefighters and the public is the first priority in all fire management actions. (Forest-wide Standard 113)
47. **Fire Management:** Fire lines used for controlled burning which expose mineral soil greater than the equivalent to a hand line fire break are not permitted in SMZs or buffers along lakes, springs, wetlands, water, source seeps, or other designated riparian areas, unless anchoring into water resources or crossing at a designated point. (Forest-wide Standard 115)
48. **Fire Management:** Fire lines will be revegetated when canopy closure is less than 50% or when conditions exist (i.e. steep slopes, entrenched fire lines) where water control structures and natural mulch from forest canopy is not sufficient to prevent moderate soil erosion. (Forest-wide Standard 117)

49. **Fire Management:** Burning of material generated by timber activities or mechanical fuel treatments is done so it does not consume all litter and duff and does not alter the structure and color of mineral soil any more than 20% of the area. (Forest-wide Standard 118)
50. **Fire Management:** Utilize backing fires when prescribe burning in riparian areas. (Forest-wide Standard 122)
51. **Fire Management:** All prescribed burning projects or programs will be conducted with full adherence to Forest Service internal guidance and the pollution control methodologies prescribed by air quality regulatory agencies. (Forest-wide Standard 124)
52. **Fire Management:** Areas are not burned under prescription for at least 30 days after herbicide treatment. (Forest-wide Standard 126)
53. **Fire Management:** During development of prescribed burn plan, identify smoke sensitive targets that may be affected by the project. Such targets include health care facilities, airports, high volume & high-speed roads, homes of persons known to have chronic respiratory illness, schools, and poultry farms. Develop plan direction to direct smoke away from sensitive targets. Obvious weather considerations include wind direction and speed. Others are fuel conditions and ignition methods that maximize the amount of smoke lifted, plus weather that promotes dispersal (e.g. mixing height, transport wind speed and improbability of air mass stagnation). For some projects, even the most diligent planning will provide no option that can avoid all smoke sensitive targets. In those cases, modify the project or contact the resident/owner to see if the impact can be mitigated. (Local mitigation)
54. **Fire Management:** During the afternoon of the day before a prescribed burn is to be executed, obtain a weather forecast to validate the prescribed weather and burning conditions. Contact the State Forestry Commission, local fire department, and local media. (Local Mitigation)
55. **Fire Management:** The morning of a prescribed burn, validate weather forecast again. If it is, begin any planned mitigation measures, light the fire, and then begin monitoring the fire and smoke for unanticipated situations. Be prepared to stop ignition and/or begin suppression if unanticipated situations cannot be controlled or mitigated. Also be prepared to patrol smoke sensitive roadways through the night if the fire is still producing significant smoke at dusk. (Local mitigation)
56. **Fire Management:** Record any significant smoke management problems in the review section of the prescribed burn plan. (Local mitigation)
57. **Scenery:** The Forest Scenic Integrity Objectives (SIO) maps and the Scenic Integrity Objectives Table will govern all new projects. (Forest-wide Standard 145)

Figure 2.A: Comparison of Alternatives

Actions & Treatments	No-Action Alternative – Prior Decisions – Not Implemented				Proposed Action	Cumulative
	WLO 2003	Longleaf EIS 2005	NNIPS EAs ¹	Administrative	Pipeline NW	
Restore longleaf on native longleaf sites. Includes concurrent & contemporaneous actions. (AOC 1 & 2)						
• Commercial harvest – clear-cut with reserves (acres)	0	0	0	0	461	461
• Site Preparation – herbicide and burn (acres)²	0	53	0	0	461	514
• Site Preparation - machine mulching (acres)²	0	0	0	0	461	461
• Artificial Reforestation – planting longleaf pine (acres)	0	53	0	0	461	514
• Release – herbicide (acres)³	0	305	0	0	461	766
Thin loblolly stands existing on native longleaf sites by removing approximately half of the existing stems. (AOC 3)						
• Commercial harvest – thin (acres)	0	53	0	0	341	394
• Midstory control – machine mulching (acres)²	0	0	0	0	341 ²	341
• Midstory control – cut and leave (acres)²	0	0	0	0	341 ²	341
• Midstory control – herbicide (acres)²	0	0	0	0	341 ²	341
Thin overstocked native longleaf, over 40 years old, and treat midstory to achieve open park-like conditions, (AOC 4)						
• Commercial harvest – thin (acres)	0	105	0	0	1142	1247
• Midstory control – cut and leave (acres)	0	0	0	0	1142	1142
• Midstory control – machine mulching (acres)	0	0	0	0	1142	1142
• Midstory control – herbicide (acres)	0	0	0	0	1142	1142
Treat midstory in upland pine areas inappropriate for commercial harvest, or treated by commercial thinning.						
• Midstory control – cut and leave (acres)	0	47	0	0	952	999
• Midstory control – machine mulching (acres)	0	0	0	0	952	952
• Midstory control – herbicide (acres)					952	952
Supplement nest cavities for active cluster sites and recruitment areas by installing and maintaining artificial cavities (inserts).						
• Insert installation and maintenance – 5 active cluster sites (structures)³	0	0	0	20-30	20-30	20-30
• Insert installation and maintenance – 12 recruitment sites (structures)³	0	0	0	0	48-72	48-72

Provide safe and efficient access while providing nature-based recreation						
• Change status of road from seasonal open to yearlong closed (miles)	0	0	0	0	14	14
• Maintain seasonal and year round open roads by mowing, blading & ditching (miles)	0	0	0	52	0	52
• Maintain seasonal and year round roads by herbicide (miles)	0	0	0	0	52	52
• Support woodland restoration activities by creation and restoration of temporary roads (miles)	0	0.1	0	0	1.75	1.85
Maintain early seral stage habitat						
• Opening maintenance (acres)	20	0	0	0	0	20
Treat non-native invasive plant species (acres)			TBD		TBD	TBD
Suppress SPB infestations (acres)	0	0	0	0	TBD	TBD
Prescribed burn on a 2 – 5 year rotation (acres)		8,783	0	0	0	8,783
<p>¹ The three EAs and DN/FONSIs for NNIPS all build on each other with the most recent decision, <i>Enhanced Invasive Plant Control</i>, signed in June 2012 being the most comprehensive. It is this last document that will be used as the authority to continue the NNIPS control treatments.</p> <p>² Includes treatment of 53 acres current under Stewardship Agreement that to be commercially thinned. The 2005 EIS did not include understory treatments.</p> <p>³ Based on RCW Recovery Plan direction of maintaining 4 – 6 suitable cavities per active cluster or recruitment site.</p>						

Figure 2.A.2: Expected Trends Relative to Established Goals and Objectives		
Objectives	Alternative A	Alternative B
Goal: Manage Forest and Woodland Ecosystems		
<ul style="list-style-type: none"> Issue: Early Successional Conditions 	<p>Places no additional acres into early successional conditions, but continues 305 acres upland longleaf pine communities from previous Longleaf EIS 2005 decision.</p> <p>Increases early successional conditions within the planning area by 3.5%</p>	<p>Places 461 acres into early successional conditions, upland longleaf pine communities</p> <p>Increases early successional conditions within the planning area by 5.2%</p>
<ul style="list-style-type: none"> Issue: Species Composition w/in Forest Communities 	<p>Establishes upland pine woodland conditions on 53 acres of loblolly, currently existing on native longleaf sites</p> <p>Increases upland longleaf pine woodland conditions on 105 acres of native longleaf greater than the age of 40.</p>	<p>Establishes upland pine woodland conditions on 341 acres of loblolly, currently existing on native longleaf sites</p> <p>Increases upland longleaf pine woodland conditions on 1142 acres of native longleaf greater than the age of 40.</p>
<ul style="list-style-type: none"> Issue: Forest Health 	Does not address suppression of active pine beetle infestation	Provides adaptive management protocols for suppression of active pine beetle infestation
<ul style="list-style-type: none"> Issue: RCW Population Expansion 	<p>Manage five current RCW clusters</p> <p>Completes 47 acres of midstory treatment</p>	<p>Adds 12 RCW recruitment areas.</p> <p>Improve RCW habitat with 952 acres of midstory control</p>
Goal: Recovery of Federally Listed Endangered and Threatened Species		
Red-cockaded Woodpecker (<i>Picoides borealis</i>) Endangered	Proposed Action not likely to adversely affect	Proposed Action not likely to adversely affect
Mitchell's Satyr (<i>Neonympha mitchellii</i>), Endangered	Proposed Action not likely to adversely affect	Proposed Action not likely to adversely affect
Wood Stork (<i>Mycteria americana</i>) Endangered	Proposed Action will have no effect	Proposed Action will have no effect
	<i>Note: Determinations from prior decision documents with concurrence from U.S. Fish and Wildlife Service</i>	<i>Note: Determinations from Biological Evaluation currently under review by U.S. Fish and Wildlife Service</i>

Objectives	Alternative A	Alternative B
Goal: Support Desirable Levels of Selected Species		
High quality of nature-based recreation	<p>Short term habitat increases for white-tailed deer and Eastern wild turkey. Little to no change in long term habitat effects.</p> <p>Little to no short term change for bob-white quail, and a long term decrease in long term habitat.</p> <p>Short term habitat increases for the prairie warbler; little to no change in long term effects to habitat</p> <p>Decrease in short term habitat for the wood thrush; and little to no change in long term habitat</p>	<p>Short term and long term habitat increases for white-tailed deer, eastern wild turkey, and bob-white quail.</p> <p>Short term habitat increases for the prairie warbler; little to no change in long term effects to habitat</p> <p>Relatively large decrease in short term habitat for the wood thrush; and a decrease in long term habitat</p>
Safe and Efficient Access		
	<p>Throughout the year, regardless of road closure season, 99% or more of the planning area is within 0.75 miles of an open road.</p> <p>Open Road Season (October 1 – April 30)</p> <ul style="list-style-type: none"> – 31% within 0.25 mile of an open road – 47% within 0.50 mile of an open road <p>Closed Road Season (May 1 – September 30)</p> <ul style="list-style-type: none"> – 42% within 0.25 mile of an open road – 91% within 0.50 mile of an open road 	<p>Throughout the year, regardless of road closure season, 76% or more of the planning area is within 0.75 miles of an open road.</p> <p>Open Road Season (October 1 – April 30)</p> <ul style="list-style-type: none"> – 42% within 0.25 mile of an open road – 58% within 0.50 mile of an open road <p>Increases visitor safety/visibility by enhanced vegetation along road sides</p> <p>Reduces road maintenance burden to tax payer by 27%% of the annual road maintenance budget on the Oakmulgee District.</p>

Figure 2.A.3: Map of No Action Alternative

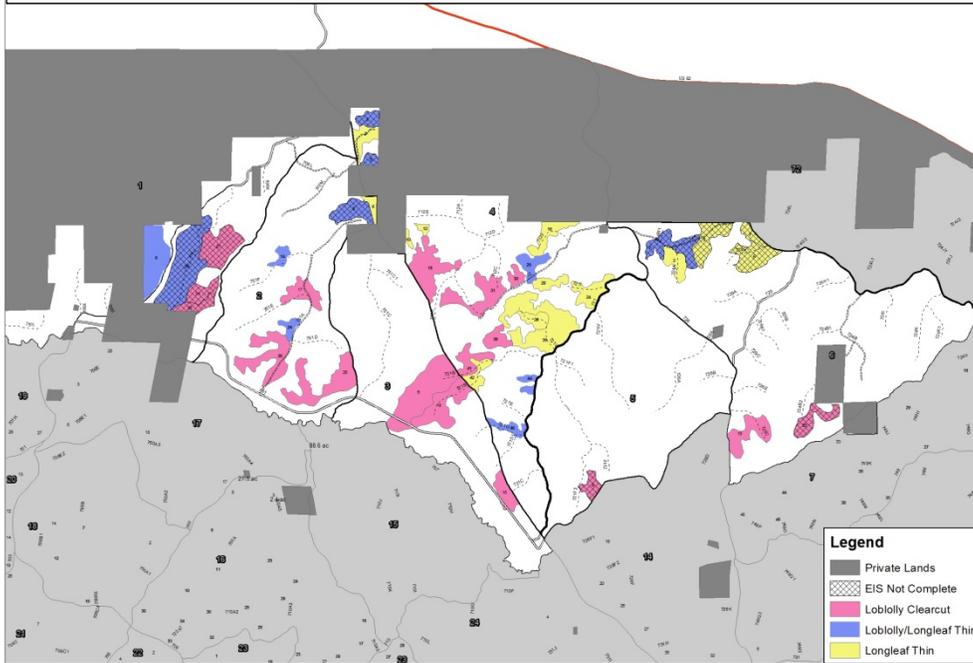


Figure 2.A.4-6: Maps of Proposed Action Alternatives.

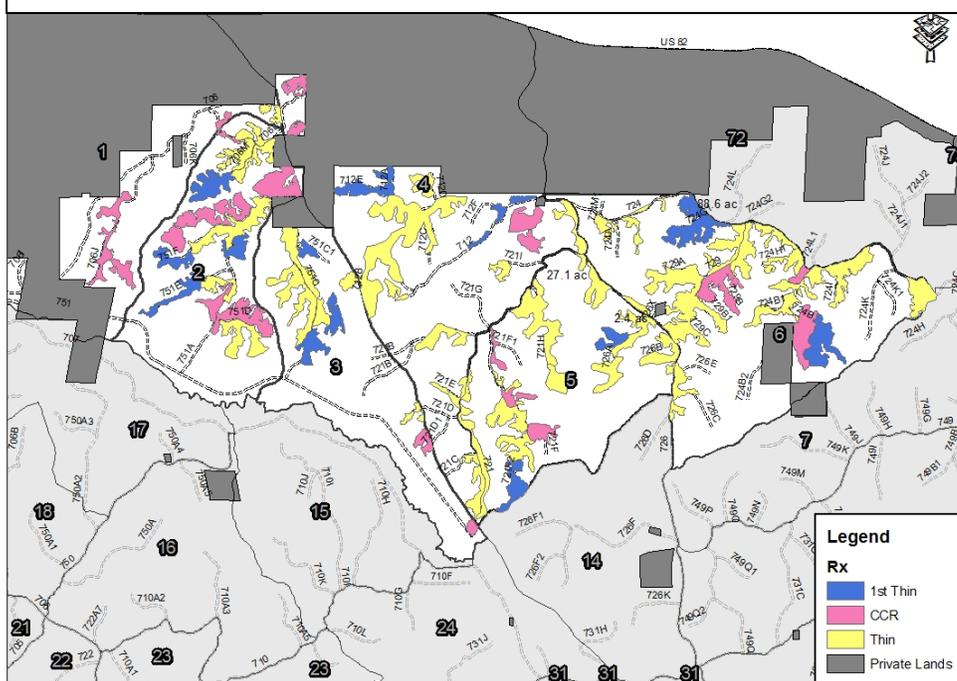


Figure 1.C.5.A: Pipeline NW planning area- Current Roads Maintenance Level & Annual Costs

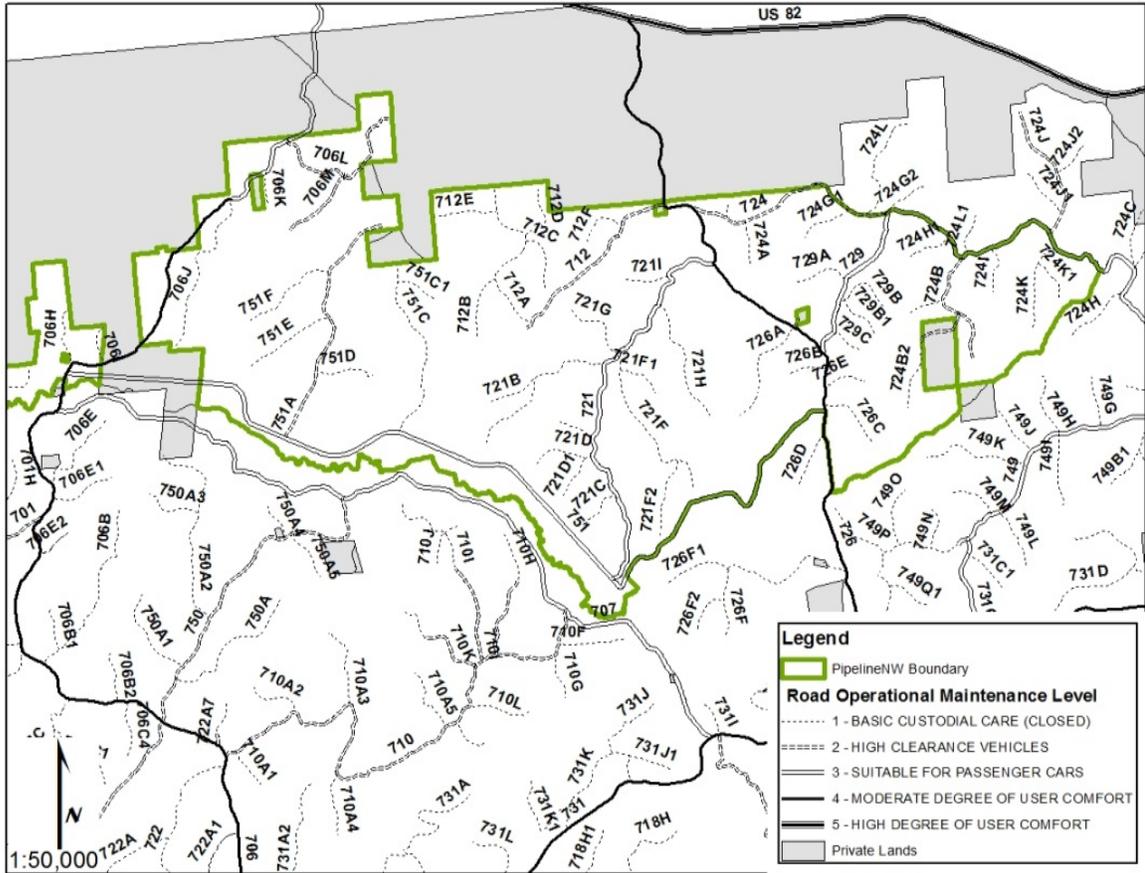
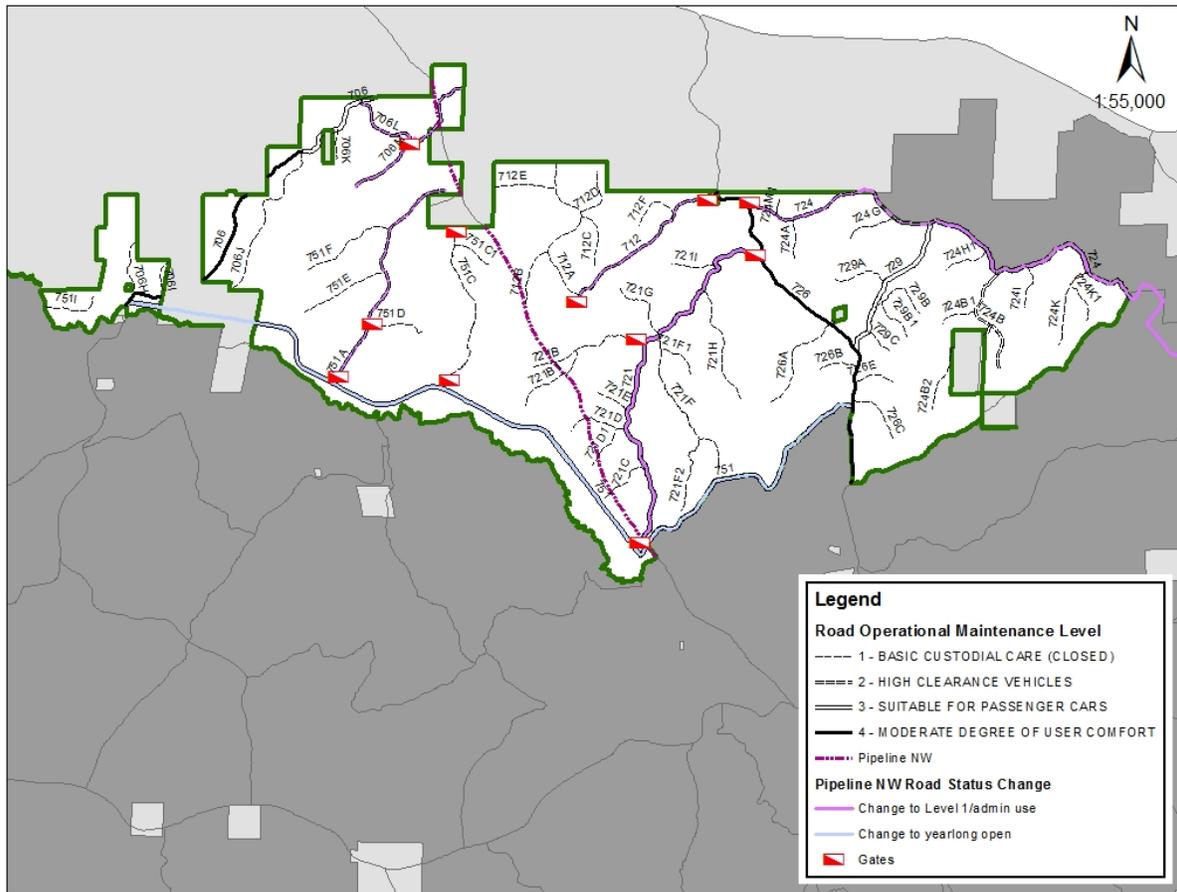


Figure 3.A.2: Pipeline NW planning area - Proposed Road Status Change



Chapter III: Environmental Consequences

This chapter describes the potential environmental effects of each alternative. The chapter is organized by resource topics and/or issues as described in Chapter I. Section 4. Issues. Through this analysis adaptive management variances and triggers are established and management standards/mitigation measures specific to this project are defined. The objective of management standards/mitigation measures is to reduce any potential impacts below a level of significance.

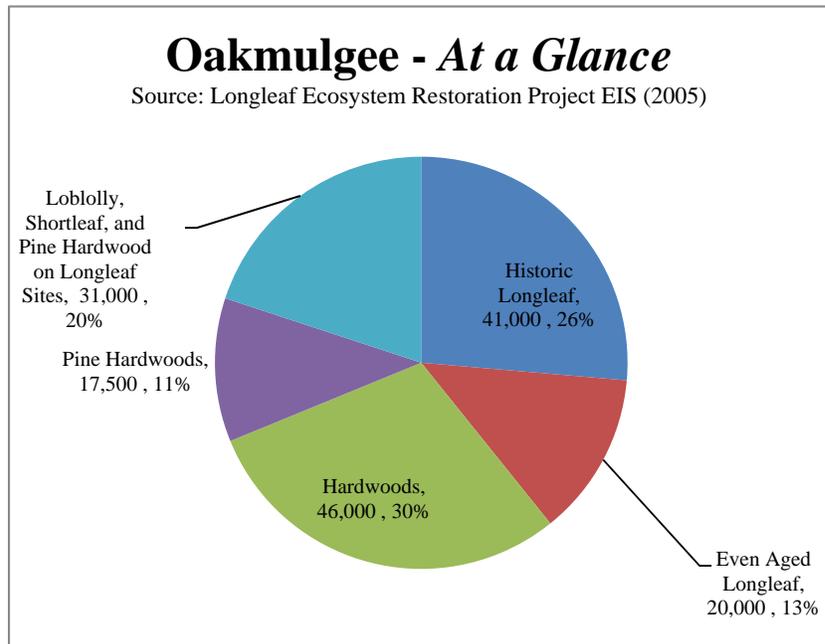
A. Forest Composition and Structure – Early Succession Conditions:

A primary goal of this project is the Forest Plan goal of managing forest and woodland ecosystems to restore and/or maintain native communities to provide the desired composition, structure, and function. Both the No Action and Proposed Action alternative focus on restoration of upland landforms, and given the soil composition for the Pipeline NW Planning Area the forest and woodland ecosystem targeted for restoration is the upland longleaf pine.

The analysis of the Longleaf Ecosystem Restoration Project EIS (2005) estimated that of the 157,000 acres managed on the Oakmulgee District; approximately 92,000 acres should have

longleaf pine as the predominant overstory vegetation. Of those 92,000 acres, an estimated 31,000 acres were stocked with loblolly, shortleaf, and hardwoods at higher densities than expected in native, healthy, sustainable conditions. Predictive modeling such as the Potential Native Vegetation (PNV) map as described in *Chapter 1*, of this document is allowing better refinement in identifying

management objectives for the 92,000 acres of suitable upland longleaf pine habitat/PNV.



Restoration of upland longleaf pine habitat on the Oakmulgee generally takes two management approaches. First, is the restoration of species composition in areas that have been planted to loblolly and/or shortleaf pine; or allowed to transition to loblolly and shortleaf pine due to the absence of fire. The Oakmulgee has been actively restoring species composition by clear-cutting off site species and planting longleaf pine on native longleaf sites. This work began in

the mid-1980s. Since that time over 20,000 acres of longleaf have been planted to seedlings and established as even-aged longleaf plantations.

The second restoration approach is to restore structure in stands where there is an existing longleaf component but it is either too dense, or contains a significant (>30%) hardwood or loblolly/shortleaf component. In these scenarios, the treatment is to commercially thin, favoring longleaf for retention, often followed by a midstory cut and leave and/or herbicide treatment.

Upland longleaf pine habitats vary in structure from forest, to woodland, to savannah characteristics. For upland longleaf pine habitats on the Oakmulgee, the red-cockaded woodpecker (RCW) is identified as the management indicator species. For the RCW the optimum ecosystem structure is woodlands and the specifics of that structure is defined in the RCW Recovery Plan. Suitable habitat is defined as stands greater than 30 years, basal areas of pine greater than 10 inch DBH averaging 40 – 70 ft²/acre, basal area of pine less than 10 inch DBH averaging 20 ft²/acre, no hardwood midstory greater than 7 feet in height, and understories of grasses and forbs. Restoration and maintenance of these habitats require active management including growing season fires. Currently, the condition of the Pipeline NW planning area is described as having a “forest” structure. The proposed activities will have a management prescription designed to achieve woodland conditions and in some cases savannas will be considered acceptable and within the range of natural variation.

Range of Characteristics and Appearances in Ecosystem Structure		
Forest	Woodlands	Savannas
Stands of trees with crowns touching (greater than 60% canopy cover)	Stands of trees with crowns usually not touching (25% – 60% canopy cover)	Scattered trees occupying no more than 25% canopy cover
Woodlands and savannas have dense herbaceous understories dominated by grasses and forbs.		

- 1. Burn Rotation:** The planning area contains six compartments that have received 1 – 9 burn treatments. The time since last burn for each compartment ranges from 5 – 18 years. The average burn interval for the entire planning area is 6.5 years. Fire treatments have been successful in lowering encroachment of hardwood species in longleaf areas, but stand densities and time between burns have prevented suitable fire effects to favor longleaf in the stands where hardwood and loblolly dominant. In order to reach the achievable future condition of a woodland and savanna structure will require using fire management as a tool in tandem with commercial harvesting, herbicide, and non-commercial harvesting.

In order to guide the restoration of species composition and structure a classification system, “Areas of Concern (AOC),” was developed in an attempt to further address the uncertainty in environmental management **Figure 3.B.: Restoration Areas of Concern (AOC)**. To make the

AOC more effective an adaptive management protocol has been developed for each of the AOC's **Appendix B: Adaptive Management Protocols.**

Figure 3.B.: Restoration Areas of Concern (AOC)		
AOC	VEGETATIVE DESCRIPTION	PRESCRIPTIVE GOALS
1	<ul style="list-style-type: none"> • Loblolly, shortleaf, and mixed hardwoods (generally light seeded species) existing at greater than 30% of overstory composition on primary and secondary longleaf soils. • Average age of overstory trees is greater than 40 years. • Loblolly pine decline is evident. 	<ul style="list-style-type: none"> • Identify manageable longleaf areas, remove the off-site species, and establish the longleaf component sufficient to certify the stand as an even-aged plantation at age three. (400 trees per acre). • Maintain the area with greater than 70% stocking of longleaf through age 20.
2	<ul style="list-style-type: none"> • Loblolly, shortleaf, and mixed hardwoods (generally light seeded species) existing at greater than 30% of overstory composition on primary and secondary longleaf soils. • Average age of overstory trees are less than 50 years. • Generally artificially established loblolly plantations. Stocking density high. • Prior history of SPB infestations leaving areas of mixed hardwoods, vines, and brush. 	<ul style="list-style-type: none"> • To identify the manageable longleaf areas, remove the off-site species, and establish the longleaf component sufficient to certify the stand as an even-aged plantation at age three. (400 trees per acre). • Maintain the area with greater than 70% stocking of longleaf through age 20.
3	<ul style="list-style-type: none"> • Loblolly, shortleaf, and mixed hardwoods (generally light seeded species) existing at greater than 30% of overstory composition on primary and secondary longleaf soils. • Average age of overstory trees are greater than 50 years • Generally artificially established loblolly plantations. Stocking density high. • Limited history of SPB infestations leaving areas of mixed hardwoods, vines, and brush. • Often in proximity to RCW clusters and serving as foraging habitat. 	<ul style="list-style-type: none"> • To identify the manageable longleaf areas and commercially thin prioritizing removal of off- site species to establish an open park-like pine stand with little to no midstory and primarily grasses and forbs in the understory. • Shift species composition towards longleaf if possible. Otherwise strive for a loblolly stand mimicking longleaf conditions
4	<ul style="list-style-type: none"> • Longleaf at greater than 70% of overstory composition on primary and secondary longleaf soils. • Average age of overstory trees is greater than 40 years. 	<ul style="list-style-type: none"> • Establish an open park-like stand with little to no midstory and primarily grasses and forbs in the understory.
5	<ul style="list-style-type: none"> • Mixed pine at greater than 70% of overstory composition on primary and secondary longleaf soils. • Certified as even-aged plantations • Average age of overstory trees is less than 40 years and greater than 20 years. 	<ul style="list-style-type: none"> • Begin to naturalize even-aged stand by thinning to establish an open park-like stand with little to no midstory and primarily grasses and forbs in the understory. Favor longleaf and fire tolerant hardwoods.

2. **Successional Conditions Direct Effects:** The Forest Plan prescribes the conditions for the Red-Cockaded Woodpecker Management Area as desirable conditions when total pine forest acreage is between 83% of the mid to late successional pine forest/woodland conditions (greater than 20 years old) and at least 50% of the total pine acreage should be in late successional conditions (greater than 60 years old). Ideally, 8.3% of the pine forest/woodland community should be in early successional grass/forb and shrub seedling habitat, in patches greater than 10 acres. It is desirable to have 4 – 10% of the total forested landscape in early successional forest (0 – 10 year age class) **Reference Chapter 1, Figure 1.B: Forest Plan Management Prescriptions.** The condition prescribed by the Forest Plan for the affected management area, Dispersed Recreation Areas with Vegetation Management states that it is desirable to have between 4 – 10% of the forested land base in early successional forest.

Specific to the Pipeline NW planning area, 275 acres (3.13% of the Pipeline NW planning area) are currently in early successional conditions as a result of southern pine beetle infestations and stands that are being restored to Longleaf Ecosystems per the Longleaf EIS decision (**Reference Figure 1.B.2.a: Summary of Prior Decision – Longleaf EIS and ROD**). Alternative A will move 646 acres into early successional habitat increasing the total acreage for Pipeline NW to 11.25%. The implementation of Alternative A would create several hundred acres more early successional habitat than prescribed in the Forest Plan for RCW management areas as well as Dispersed Recreation areas. Alternative B would only move 203 additional acres (2.31%) into early successional conditions, similar to current conditions (**Appendix A: Pipeline NW planning area Stand Treatments**).

3. **Forest Structure Direct Effects:** The remaining treatments of the proposed action are designed to move forest structure from a dense “forest” condition to “woodland” conditions. Alternative A establishes 244 acres of upland pine woodland conditions of loblolly stands, currently existing on native longleaf sites, increases upland longleaf pine woodland conditions on 537 acres of native longleaf greater than 40 years, and increase upland longleaf pine woodland conditions for 36 acres on restored longleaf that is less than 40 years. Alternative A brings a cumulative of 817 acres towards the goal of woodland conditions as prescribed in the forest plan. Alternative B establishes upland pine woodland conditions on 123 acres of loblolly, currently existing on native longleaf sites, increases upland longleaf pine woodland conditions on 951 acres of native longleaf greater than the age of 40, and increases upland longleaf pine woodland conditions on 620 acres of restored longleaf less than the age of 40. Alternative B would move a total of 1694 acres into woodland conditions. The follow-up treatments of herbicide, cut and leave, and/or mulching will allow the understory to remain open and in a grass/herbaceous condition after the initial disturbance (**Appendix A: Pipeline NW planning area Stand Treatments**).
4. **Forest Composition and Structure Indirect Effects:** The proposed action (Alternative B) will shift acres currently mapped as Dry Mesic Pine-Oak communities existing on upland longleaf

soil to areas that are predominately longleaf. Residual loblolly on the site will continue to grow, although in more stressed conditions. Prescribed fire is essential to control the re-establishment of loblolly in the understory and midstory. The use of fire to control loblolly regeneration there will likely be opening or savannas interspersed on the landscape. These are considered desirable conditions for the Pipeline NW planning area.

- 5. Forest Composition and Structure Cumulative Effects:** The proposed action will make a shift in both the forest composition and structure, specifically the early successional conditions and establishment of woodland conditions. The action does bring the Pipeline NW planning area closer to the desired conditions of restored native communities, and it places the Vegetation Management, with Dispersed Recreation closer to the conditions outlined in the Forest Plan, but additional management for early successional conditions will need to be monitored closely.

The complete implementation of Alternative B within the Pipeline NW planning area will position the area for successful maintenance through prescribed burning. It will also position the area for the transition to multi-aged or uneven aged management, where the upland longleaf pine communities sustain woodland conditions. **Appendix B: Adaptive Management Protocols** will guide the application of the concurrent and contemporaneous treatments.

B. Forest Composition and Structure – Forest Health:

1. In the 8783-acre Pipeline NW planning area, 3536 acres (40%) are soils mapped as primary longleaf soils; 3422 acres (39%) are mapped as secondary longleaf soils for a total of 6958 acres. Of those 6958 acres, 2817 acres (32%) are currently stocked with longleaf; 4320 acres (49%) are currently stocked with loblolly pine, shortleaf pine, and mixed pine-hardwoods. The presence of these species on primary and secondary longleaf soils is considered “off-site.” The loblolly and shortleaf over the age of 50 years on these sites generally display poor health characteristics such as thinning crowns, chlorotic crowns, and excessive cone production.

As loblolly and shortleaf age, their resistance to natural disturbance events, such as insects, disease, wind, drought, etc. is significantly lessened. Over time, this lowering of resistance results in the trees becoming susceptible to a buildup of insects to the point of hosting infestations and potentially epidemics. When these stressed trees are in dense, overstocked conditions their risk of insect infestation increases due to the ease at which insects can spread from one tree to another. These overstocked conditions combined with natural disturbance events elevate the concern of whether the no action and proposed action alternatives will create additional stress in excess of what the system can absorb. The stressed conditions are often conducive to insect infestations particularly, and these outbreaks can result in a loss of forest resources and the potential spread to private lands.

The two insects of most concern for the Oakmulgee Ranger District are the SPB and Ips, both bark beetles, whose infestations often are associated with stress trees, off-site conditions, and dense stocking levels. To determine current risk and stay aware of population trends the Oakmulgee participates in a South-wide monitoring survey of populations of SPB and their associated predatory clarid (Family Claridae) beetles. Each spring traps baited with SPB attractant are set out in the forest. This trapping regime is repeated on federal, state, and private lands across the south for a 4 – 6 week period. From this trapping, predictive indicators are used to provide a forecast level of SPB activity. Indices related to the number of SPB/trap/day, the ratio of the predatory clarid beetles to the prey SPB, and the percentage SPB are applied to the SPB prediction model. Oakmulgee survey data from 2008-2014 indicates populations well below the threshold for declining populations. Additional trend data from other sample sites in the state predicts SPB populations in Alabama to be categorized as Static/Low for the same period.

2. **Direct Effects:** Of the estimated 2683 acres determined to be off-site, the 170 acres less than 40 years old are at the greatest risk to bark beetle infestation. These areas are composed of loblolly, white oak-red oak-hickory, and loblolly pine-hardwood mixed stands (**Figure 1.C.1.b: 10-Year Age class Distribution – Dry and Dry-Mesic Oak-Pine Forest Community**). The established practice to improve the stand health, and thus reduce the risk of bark beetles, is to commercially

thin the stand to a 50 – 60 ft²/acre basal area. Commercial thinning of these dense stands accomplishes two objectives: 1) it increases the vigor of the residual trees by allowing them greater access to nutrients, moisture, etc. and 2) it increases the distance between trees making the spread of SPB from one individual to another more difficult.

The No Action Alternative A prescribes a commercial thinning for 158 acres with no additional clear-cutting. Alternative B prescribed 1545 acres to be commercially thinned, and another 451 acres will be clear-cut (**Figure 3.B. Comparison of Treatments to “At Risk” Stands**).

Figure 3.B. Comparison of Treatments to “At Risk” Stands		
	Alternative A	Alternative B
Clear-cut with reserves, re-establish longleaf	0	451
Thin, favoring longleaf, to achieve open park-like conditions	158	1545

- 3. Indirect Effects:** Alternative B places an additional 461 acres into a species composition better suited to the soils. Once these acres are established in longleaf they will be more adaptable to prescribed fire, which will be applied across the planning area.

The remaining 1483 acres proposed for thinning are currently sufficiently stocked with timber to support a viable commercial operation. Yet, in the long-term, acres with suitable soil types should be moved toward a longleaf woodland species composition which will have the benefit of promoting wildlife species such as RCW, while also increasing the resiliency of the stands to natural disturbances.

- 4. Cumulative Effects:** Since 2005, the Oakmulgee District has clear-cut and planted to longleaf over 3000 acres of heavily stocked, “off-site” loblolly stands on the western portion of the District. The District has thinned over 730 acres of heavily stocked loblolly. The acres addressed in this project add increase that amount to 461 acres of clear-cutting and over 1480 acres of thinning. Approximately 3,500 acres remain in an “at risk” condition on the western portion of the Oakmulgee, based on current inventories. As referenced in the data from the Spring SPB Pheromone Survey, SPB indices have been relatively low since 2005, thus it is impossible to determine if the preventative treatments have been successful in hindering the chance of infestation or rate of spread in the event of an infestation. We do know that the stands that were clear cut and planted to longleaf are at a lower risk to SPB, and those stands that were thinned appear to be healthy.

Based on current knowledge of SPB lifecycles, treating the 8,783 acres within the Pipeline NW planning area should have positive effects to the Oakmulgee’s overall capacity to withstand insect and disease infestations. Alternative B will allow a more permanent shift in stand vigor by addressing species composition now as opposed to later. In summary, Alternative B provides

better goal attainment in restoring natural forest communities while improving the overall forest health of the treatment areas and surrounding forest.

In the event that there are, SPB infestations within the Pine Flat planning area the following criteria for suppression will be included in the Decision Notice and subsequent implementation documents such as contracts and agreements.

5. Design Criteria for Suppression of Active SPB Infestations:

- The availability of suppression crews, current market conditions for beetle-infested timber and the priority of the spot for treatment during SPB activity will determine treatment type.
- SPB spots within active RCW clusters will be treated based on site-specific needs, with consideration given to retaining nest trees and potential nest trees. Felling of buffer trees ahead of the infestation will be reduced if possible. Once SPBs are detected within active RCW clusters, there will be intensive monitoring and contingency planning for augmentation if needed.
- Every practical effort will be made to treat active SPB infestations commensurate with life-cycle emergence of SPB reproduction -- generally a 30-day cycle. Detection flights will utilize aerial GPS units to locate potential SPB infestations, thus aiding on-the-ground evaluation.
- Removal of infested trees through commercial harvest will be a priority when access is feasible and there are no other constraints. Removal will reduce the fuel loading in the area of infestation, and commercial harvest places the least burden on the tax payer.
- Site-specific control procedures will be compliant with the goals, objectives, and standards found in the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan).
- Monitoring will take place through the guidelines established for reporting the Southern Pine Beetle Information System (SPBIS). SPBIS allows the tracking of size of infestations, response time, and effectiveness of control.

Adaptive Management Variances for SPB Infestations	
IF....	THEN....
<p>There are a minimum of 5 – 10 freshly SPB attacked trees present in a grouping, and....</p> <ul style="list-style-type: none"> • There are suitable host trees (live pines) available for additional infestation, <i>and</i> • The infested trees and nearby suitable host trees are of merchantable size (> 4.9 inches DBH), <i>and</i> • It is determined that a suitable market exists 	<ul style="list-style-type: none"> • The infested trees plus a buffer of 10 – 100 feet will be designated for commercial harvest/removal. • Contract limits will be set to encourage expedient removal. • Infestations near active RCW clusters and private lands with suitable host trees will receive priority for treatment. • Site-specific control procedures will be compliant with the goals, objectives, and standards found in the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan).
<p>There are a minimum of 5 – 10 freshly SPB attacked trees present in a grouping, and....</p> <ul style="list-style-type: none"> • There are suitable host trees (live pines) available for additional infestation, <i>and</i> • The infested trees and nearby suitable host trees are NOT of merchantable size (> 4.9 inches DBH), <i>and</i> • No suitable market exists 	<ul style="list-style-type: none"> • The infested trees plus a buffer of 10 – 100 feet will be designated for cut and leave treatment. • Contract limits will be set to encourage expedient treatment. • Infestations near active RCW clusters and private lands with suitable host trees will receive priority for treatment. • Site-specific control procedures will be compliant with the goals, objectives, and standards found in the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan).
<ul style="list-style-type: none"> • Any resulting opening left after treatment of SPB infestations will be treated as a natural disturbance and natural succession allowed to determine species composition, unless the area is covered under a prior decision. In that scenario, the intent of the prior decision would dictate management actions. 	

6. Mitigation Measures:

- Should epidemic conditions occur during the implementation of this project, steps will be taken to avoid mechanical treatments in at-risk stands during the periods of SPB dispersal (March – May). Appropriate restrictions will be added to contracts.
- Should epidemic conditions occur during the implementation of this project, prescribed fire during period of SPB dispersal will be avoided.

C. Forest Composition and Structure – RCW Expansion:

The Oakmulgee has approximately 110 active RCW clusters. The majority of these occur on the western half of the district. There are five active and one recently inactive RCW clusters (family units) within the Pipeline NW planning area. Currently, none of the stands containing cluster trees meets the definition of Good Quality Foraging Habitat (GQFH) as defined by the RCW Recovery Plan. Monitoring conducted during the 2014 nesting season documented that each of the five active clusters has a Potential Breeding Pair. Prior monitoring indicates that each of these clusters has successfully nested for the last ten years. Habitat inventory within the clusters shows that the basal area and midstory density levels are outside the GQFH criteria.

Efforts to expand populations into areas with acceptable habitat conditions include spatial analysis of relative distances to existing clusters and analysis of available forage habitat. The resulting analysis provides *likely* locations for placement of artificial cavities in an attempt attract offspring from nearby active clusters, recruiting these offspring to form new Potential Breeding Groups (PBGs). Spatial analysis of the Pipeline NW planning area reveals twelve highly likely candidate areas for placement of recruitment clusters as shown in **Figure 3.C-1.: Candidate Areas of Recruitment Clusters.**

The recruitment clusters are labeled using letters “A – L” to avoid confusing recruitment clusters with existing clusters currently assigned numerical labels. Forage partitions ¼ mile in radius contain a maximum of 125 acres each. The average acreage for Oakmulgee ¼-mile forage partitions is 64 acres or 51.2% of the partition. Forage habitat within each of the ¼-mile radius partitions is listed in **Figure 3.C-2.: Forage Habitat.**

Actual locations of cluster centers and cavity locations greatly depend on individual tree diameters and height to crowns. All locations shown for analysis are approximate. Recruitment cluster creation will not take place until implementation of timber harvest is complete and individual trees are selected for cavity placement.

Figure 3.C-1: Candidate Areas of Recruitment Clusters

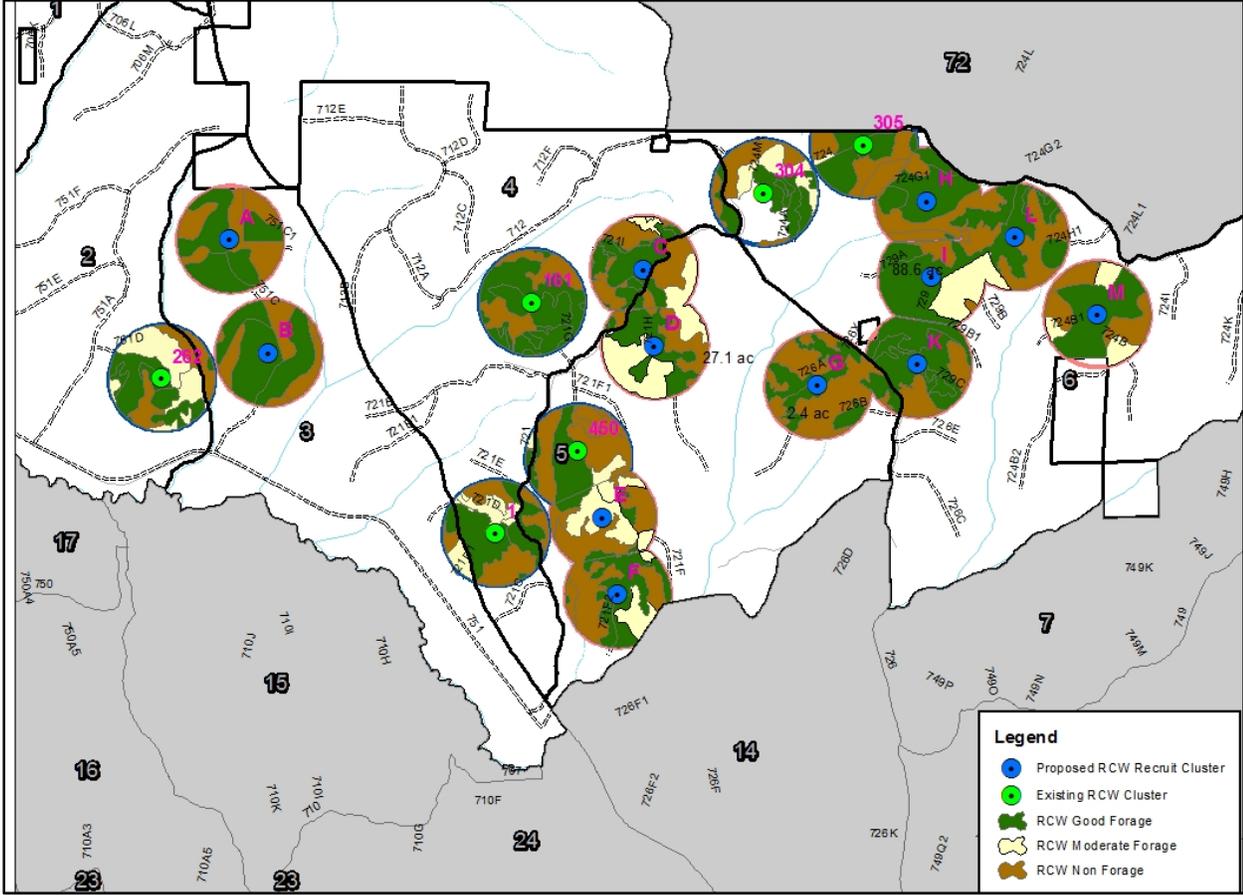


Figure 3.C-2: Forage Habitat

Recruitment Cluster #	Acres of Potential Forage Habitat	Percentage of Partition
A	103	82.4%
B	99	79.2%
C	77	66.9%
D	102	89.5%
E	60	60.6%
F	53	45.9%
G	65	52.0%
H	65	61.9%
I	65	62.8%
J	65	54.6%
K	65	53.7%
L	81	64.8%

Providing all six recruitment clusters are inhabited by nesting RCW, the Pipeline NW planning area will have achieved a 300% increase in active RCW clusters, while the Oakmulgee Ranger District will have achieved a 5% overall increase to meet the requirements in the RCW Recovery Plan. Long-term benefits from the proposed action could potentially result in additional foraging and nesting habitat as acres currently proposed for restoration to longleaf mature and provide trees suitable for nest excavation or artificial cavity installation.

D. Watershed Health:

- 1. Affected Environment:** The proposed project area falls within the boundaries of one assessment watershed, South Sandy Creek. Public ownership within the South Sandy Creek watershed is approximately 94%. Acre distribution is shown in the table below. **Reference Figure 1.A.2: Pipeline NW planning area Watersheds**

6th level Watershed	South Sandy Creek
Public Ownership Acres	31,390
Private Ownership Acres	2,053
Total Watershed Acres	33,443
State Designated Water Classification	Fish & Wildlife

Named creeks affected by land management within this analysis are Mayfield Creek, Ragland Branch, and Wiggins Creek. State designated water classification for each of the named creeks is Fish & Wildlife. Within the assessment watershed, overall public and private lands are rated good. Forest Service watershed condition assessment rates roads as having a moderate impact on watershed condition and wild fire as a severe impact on the watershed. Annual precipitation averages about 54 – 56 inches across the assessment watershed. Precipitation is unevenly distributed throughout the year often causing alternate periods of drought and excessive rainfall. Excessive rains generally occur during spring and summer months.

The assessment watershed portrays a palustrine riparian containing beaver ponds. The assessment watershed portrays a dendritic drainage pattern meaning the stream networks follow a random pattern. The watersheds are considered a headwater basin and mostly support small to medium sized streams that can be braided. Median 7-day low flow is generally very good [0.3 – 0.5 cubic feet per second per square mile (cfs/m)]. Average discharge is about 22 inches (1.5 cfs/m). Channel substrate in the assessment watershed is dominated by sand with a clay substrate. A vast majority of the stream network is composed of first and second order streams. Many of the stream bottom lands are narrow with small pockets of wetlands.

The groundwater on the Oakmulgee Division of the Talladega NF is contained in the Southeastern Coastal Plain aquifer system. The majority of the groundwater can be found within sand and gravel formations. This aquifer system can be best described as extremely stratified by silt and clay confinement layers. This aquifer system has lateral communication with the surface as evident by re-emergence of water through springs and seeps. The productivity of this aquifer system is generally good (Miller, 1990). There are no public water supply sources in or within 100 feet of the proposed treatment stands

2. Environmental Effects:

- A. Direct, Indirect Effects of the No Action Alternative:** The No Action Alternative does not propose any new ground disturbance. Analysis for treatments listed under the No Action alternative are included in their respective decision documents and hereby incorporated by reference into this document.
- B. Direct, Indirect Effects of the Proposed Action Alternative:** South Sandy watershed will be less than 6 % affected from proposed timber harvest actions reflected in the table below. Mid-story treatments will affect less than 7% of the watershed. Prescribe burn affects approximately 13% of the watershed. Mechanical mulching and herbicide treatment acreage assume each treatment to occur on all acres prescribed but actual treatment will be by site needs and will probably occur on less acres. Assuming full treatment does occur, then approximately 8% of the watershed will be treated by herbicide and mechanical mulching. Streams within the assessment watersheds should be adequately protected from sedimentation and off-site effects by mitigation practices. The effectiveness of the mitigation practices, particularly the application of SMZs, has been confirmed from on-site inspections (NF in AL, 1993, 1994, 2004 and 2007).

6th Level Watershed	South Sandy Creek
Watershed Acres	33,443
Proposed Thin Acres	1,483
Proposed Clear Cut Acres	461
Proposed Mid-story Removal	2,324
Proposed Mechanical Mulch	2,785
Proposed Herbicide Application	2,785
Prescribe Burn Acres	4,268

- C. Silvicultural Practices:** Clear cut and thinning (including mid-story treatments) are known to potentially affect water quality and water quantity. Timber harvest, both clear cut and thinning, has the potential to cause the following direct effects: erosion, changes in ground cover condition, and changes in stand composition (Golden et al., 1984; Ursic, 1986; Belt et al., 1992; Brown and Binkley, 1994). Indirect effects could include sedimentation, changes in stream nutrient levels (particularly nitrates), increases in water yield, and changes in stream flow behavior (Golden et al., 1984; Brown and Binkley, 1994). The proposed action calls for the clear cutting of approximately 461 acres, thinning of approximately 1483 acres, mid-story treatment on approximately 841 acres which involves either cut stems and leave on site, use of herbicides, or mechanical mulching or combinations of herbicide and mulching. In addition mechanical mulching may occur on an additional 1944 acres for a total of potentially treating 2785 unique acres. Prescribe burn is proposed for an average 1400 acres yearly over a 3 year return.

Surface water runoff and erosion impacts during timber harvests are typically short-term, lasting until understory and forest vegetation in the affected area re-establishes. Nutrients, including nitrogen and phosphorous can enter water bodies attached to sediment, dissolved in

water runoff, or through the air. Nutrient losses tend to increase proportionately with sediment losses. Increased nutrient runoff to streams can have either adverse effects or potentially beneficial effects, depending on the level of nutrient runoff, and the current nutrient content of the streams. The potential increase in sediment yields to the four watersheds listed would be negligible overall and would have temporary effects in the headwater streams and impacts would diminish further downstream in larger, mid-order streams. No timber harvest will occur in riparian corridors when they are flooded, saturated, or wet. Minimal soil disturbance is expected to occur in streamside management zones and no soil disturbance in wetland communities since no timber harvests would occur in these areas. Effects to water resources from potential increases in water, sediment, and nutrient yields from timber harvest would be minimized by implementing forest plan mitigation measures designed to reduce erosion and sediment. Dissolved organic/inorganic nutrients and sediment in water runoff can impair stream water quality and beneficial uses.

Changes in water yield would occur in response to timber harvest and silvicultural activities. These activities would increase water yield by decreasing the interception of precipitation by trees and the loss of soil water due to transpiration. Stream flow increases do not last long in the southeastern U.S. due to the rapid regeneration of dense new stands on cut areas. Although increased yields are possible from 5 – 10 years after harvest, almost all of the increase is over after 5 years for clear cuts and within 1 to 3 years when less than 50% of the basal area is removed (Swank, Vose and Elliot 2001).

D. Temporary Roads will have an adverse effect on water quality. Adverse water quality impacts from temporary road construction and use for timber harvest activities are typically short-lived, occurring at the highest levels during and for a few years after construction. Temporary roads associated with timber harvest cuts are also known to potentially affect water quality, water quantity, channel morphology, and downstream designated uses. There are approximately five miles of temporary roads associated with the proposed action. Temporary roads pose the greatest threat to the sustainability of the downstream designated uses. The effects of these temporary roads may be evident for the entire two years of their recovery period. State Best Management Practices as well as Forest soil and water standards (refer to Chapter 2) will be applied to these roads as mitigation measures. Temporary roads are closed after harvest and impacts decrease in intensity as the road surface and cut-fill slopes stabilize, and roads begin to re-vegetate following completion of activities. Design and construction of water controlling structures such as dips and waterbars during construction helps to alleviate one of the main causes of sediment to streams.

E. Herbicides can cause water pollution during storage, transport, application, clean up and/or container disposal. Direct effects of herbicide application are potential chemical contamination of surface waters and ground waters (Michael and Neary, 1993; VM EIS IV-103). Indirect effects are potential increases in sediment and water yield (VM EIS IV-103).

Slight increases in stream nutrients, particularly nitrated (Neary et al., 1993), may also occur as an indirect effect. This alternative proposes the use of Glyphosate, Imazapyr and Triclopyr. The following characterizes these three chemicals:

I. Glyphosate:

- *Solubility:* Glyphosate dissolves easily in water.
- *Potential for Leaching into Groundwater:* The potential for leaching is low. Glyphosate and the surfactant in Roundup are strongly adsorbed to soil particles. Tests show that the half-life for glyphosate in water ranges from 35 to 63 days. The surfactant half-life ranges from 3 – 4 weeks.
- *Surface Waters:* Studies examined glyphosate and aminomethylphosphonic acid (AMPA) residues in surface water after forest application in British Columbia with and without no-spray streamside zones. With a no-spray streamside zone, very low concentrations were sometimes found in water and sediment after the first heavy rain. Where glyphosate was sprayed over the stream, higher peak concentrations in water always occurred following heavy rain, up to 3 weeks after application. Glyphosate and AMPA residues peaked later in stream sediments, where they persisted for over 1 year. These residues were not easily released back into the water.
- *Soils:* Glyphosate is not soil active or soil mobile, it is rapidly broken down by soil microbes.

II. Imazapyr:

- *Solubility:* Imazapyr is soluble in water.
- *Potential for Leaching into Groundwater:* Imazapyr has a low potential for leaching into groundwater.
- *Surface Waters:* Imazapyr may move from treated areas in streams. Most movement of imazapyr was found in runoff from storms. Use of a streamside management zone can reduce the amount of offsite movement of Imazapyr in stormflow. The half-life of imazapyr in water is about 4 days. (*Additional Mitigation: Do not apply on irrigation ditches. Do not apply where runoff water flow onto agricultural land. Do not apply to water or wetlands.*)
- *Soils:* Imazapyr is strongly absorbed by the soil, usually only found in the top few inches. It is soil active with soil mobility being relatively low. Imazapyr can remain in the soil from 6 months to as long as 2 years. Exposure to sunlight assists with breakdown in soil as well as soil microorganisms.

III. **Triclopyr:**

- *Solubility:* Triclopyr dissolves moderate to low in water
- *Potential for Leaching into Groundwater:* The potential for leaching depends on the soil type, acidity, and rainfall conditions. Triclopyr should not be a leaching problem under normal conditions since it binds to clay and organic matter in soil. Triclopyr may leach from light soils if rainfall is very heavy.
- *Surface Waters:* Sunlight rapidly breaks down Triclopyr in water. The half-life in water is less than 24 hours.
- *Soils:* Triclopyr is not highly mobile in soil. It is rapidly broken down by soil organisms.

The potential for surface or ground water contamination from an application of Glyphosate, Imazapyr, and Triclopyr is very slight. Foliar hand and mechanical applications offer very little potential for drift. Herbicide applications would be expected to meet label requirements, and follow forest plan standards and mitigation measures. The dispersed nature of herbicide application in combination with the low frequency and low application rates should present a low risk of pollution to surface and groundwater. Streams would be protected from herbicide translocation by limiting herbicide application distances to streams, riparian and aquatic zones. Streamside management zones would absorb any limited movement without noticeable effect on land or aquatic vegetation. Placement of an untreated SMZ parallel to the channel greatly reduces the potential for direct contamination of water resources and these no treatment zones absorbs any movement without noticeable effect on aquatic vegetation. The herbicide Imazapyr is a soil activated herbicide. The method of treatment and the characteristics of the herbicide in regard to soil degradation and movement limit the risk of leaching and water contamination.

- F. Prescribe Burn and Site Preparation Burning:** Direct effects are potential changes in ground cover and increase in the hydrophobicity (water repellency) of a soil as well as erosion from plowed fire lines (VM EIS, Appendix B; Shahlac et al., 1991). The severity of indirect effects depends on the intensity of the fire. Indirect effects are potential increase in sediment, storm flows, and nutrient levels in the water column (VM EIS, IV-114). Prescribe burn activities have the potential to increase the solubility of some locations in the forest floor, but would not diminish water quality (Knoepp and others 2004). Streamside areas would be minimally impacted by the burns since no harvest would occur in riparian corridors and logging slash would not exist. Fires would be allowed to back down into streamside areas, but typically do not carry far into these damper areas. Very little vegetation is killed in riparian areas by the low intensity fire. There would be little, if any, change in runoff from the burned areas. Fire line construction exposes the mineral soil by removing vegetation, leaf litter, and duff. Construction of fire lines increases soil exposed area's susceptibility to soil erosion and displacement of nutrients, organic matter, and sediment offsite. Fire lines can recover quickly when they accumulate litter from a forest canopy and/or treated with erosion

control measures to control concentrated flow and reduce soil exposure through re-vegetation efforts.

- G. Mechanical mulching:** The potential to affect the water resource through sedimentation exists through the process of mechanical mulching. Direct effects from are changes in ground cover, soil exposure and compaction from equipment. Indirect effects are increase in sediment, storm flows, nutrient levels in water column and surface storage of runoff. Unlike mechanical forms of site preparation, mulching usually does not involve exposing soil. Treatment of vegetation by mulching breaks up vegetation leaving the residue in place. With organic matter left on the surface, expected intermittent soil exposure is not anticipated to result in extensive soil erosion and subsequent sediment to nearby waterways.
- H. Reforestation** by hand planting is proposed. Hand planting of trees has no potential for direct/indirect impacts to the water resource.
- I. Red cockaded Woodpecker Management** has no potential for direct/indirect impacts to the water resource.
- J. Road maintenance:** Road maintenance and brush control can adversely affect water quality through removal of vegetation and litter cover, compaction, exposure and disturbance of soils and aggregate materials on the road surface, ditch line, and shoulders. Attempts to conduct work during storm periods are important to limit fines from reaching streams.
- Road maintenance benefits nearby water resources by minimizing soil movement, ensuring that drainage culverts are functioning properly and that road banks maintain adequate vegetative cover. Although maintaining roads would contribute to sediment movement because it involves disturbing the soil, mitigation measures help to minimize negative impacts.
- K. Southern pine beetle (SPB) suppression** can affect the water resource similar to those discussed under silvicultural practices. Treatment method used is usually cut and remove or cut and leave. The cut and leave method is similar to mid-story treatments whereby soil compaction and erosion are less than extracting the trees from site. Trees can be either cut by machine or chainsaw. SPB sites are usually small when caught early averaging less than 5 acres but can be extensive under epidemic stages. The greatest potential impact is from temporary roads accessing SPB sites. Few scattered sites have a low potential for sediment reaching nearby streams from SPB treatment. Epidemic scale infestations can result in numerous sites of varying size being treated, which creates a high potential for sediment reaching nearby waterways. Application of forest soil and water standards mitigates

sediment from affecting the water resource. In rare cases of heavy SPB infestation, site-specific soil and water standards may need to be developed.

3. Cumulative Effect of the No Action and Proposed Action Alternatives

A. No Action Alternative: Cumulative effects from past and present activities generally result in localized soil erosion which contributes to sedimentation of nearby streams. Cumulative effects from existing roads, implementation of the Longleaf Ecosystem Restoration Project EIS, and implementing a 3 year return interval prescribe burn program, control of non-native invasive species, past prescribe burn and other small scale land practices would continue to occur. Activities, on NF, that are reasonably foreseeable would be implemented under the standards for protecting the water resource listed in the Revised Land and Resource Management Plan for the National Forest in Alabama; therefore, cumulative effects from these actions are expected to be minimal and meet the State designated water classification of Fish and Wildlife. Activities on private lands are expected to continue cumulative effects within the watersheds.

The cumulative risks of impairment from the combined activities under decision in this alternative within the assessment watershed is expected to be short term. Actual ground disturbance on public lands would be a very low percentage of the watershed and would be dispersed over the landscape. Temporary roads pose a short term risk to warm water fisheries, water quality, and aquatic organism from sediment. Private land-use practices would present slight to moderate risks in the assessment watershed.

B. Action Alternative: Cumulative watershed effects that result from past and current conditions in the South Sandy Creek watershed are described under the No Action Alternative. The Action Alternative would result in additional disturbance within the watershed from implementing the timber harvest proposal, mid-story treatments, mechanical mulching, proposed temporary road construction and pre-haul maintenance activities on system roads associated with use during timber harvest, and prescribe burning. Actual ground disturbance on NFS lands would be a very low percentage of the watershed within the analysis area and would be dispersed over the landscape. Combining remaining previous decision vegetative (timber clear-cut and thinning) treatment acres and proposed vegetative (timber clear-cut and thinning) treatment acres results in approximately 15% of South Sandy Creek watershed having ground disturbance. Adding acres disturbed from the proposed action outside of vegetation treatments, i.e. prescribe burn, mechanical mulch, mid-story treatment, cumulative effects to the water resource are expected on approximately 10 – 15% of the watershed.

The cumulative effects associated with the Action Alternative would occur in the years 2016 through 2018. The risk from vegetative management begins to be reduced by 2018 returning to

pre-existing conditions by the year 2019 (except for existing roads and periodic under burning). The risk from private land-use practices would continue indefinitely.

Downstream beneficial uses and other watershed indicators within the assessment watershed should be adequately protected by mitigation measures, particularly the application of SMZs which will encompass every scoured channel. The effectiveness of SMZs in protecting the water resource is discussed by Belt and others (1992) plus Brown and Binkley (1994). SMZs will not, however, offset increases in water yield. Water yield will probably increase in response to the reduction in evapotranspiration and could remain increased for up to 5 years after the harvest treatments (Douglas and Swank, 1975). It is not anticipated that any water yield resulting from the proposed action will negatively affect channel morphology or stream flow behavior.

E. Soil Productivity, Compaction, and Erosion:

- 1. Affected Environment:** Soils within the boundaries of the proposed project are located primarily in the Gordo Formation Landtype Association (LTA) of the Upper Clay Hills Subsection and the Coker Formation LTA of the Middle Coastal Plains - Upper Loam Hills Subsection. Both LTAs are located in the northwest and central west portions of the Forest. Both LTAs have geology made up of marine sediments consisting of layered clays and sands that weathered into deep sandy soils or soils with sandy surfaces and clay sub-surfaces. The Gordo Formation tends to be more clayey than the Coker Formation(s). Land surface form is characterized as moderately dissected uplands with either low relief or moderate relief and an overstory component of primarily pine-oak.

An Order 2 Soil Resource Inventory mapped at a 1:24,000 scale identified eight soil map units within the proposed project boundary located in Hale County.

Eight primary soil series are identified within the map units listed below. Inclusions of similar and dissimilar soils can be found within each map unit identified. A total of approximately 1919 acres of wetlands/floodplains (hydric soils) soils are identified for the vegetation management section of the action alternative. Stand layout and delineation of riparian areas, prior to implementing management prescriptions, will eliminate management activities within any wetland or floodplain soils on approximately 1919 acres. Maps and soil descriptions are available for viewing at the Forest Supervisor's Office, Montgomery, AL.

Soil Resource Inventory Map Units:

- Mantachie, Iuka, and Kinston soils, 0-1 % slopes, frequently flooded
- Columbus loam, 0-2 % slopes
- Bibb fine sandy loam, Iuka sandy loam, 0-1 % slopes
- Maubila flaggy loam, 2-8 % slopes, eroded
- Maubila-Smithdale-Boykin complex, 5-20 % slopes
- Maubila-Smithdale complex, 35-45 % slopes
- Smithdale sandy loam, 2-8 % slopes
- Wadley loamy sand, Smithdale sandy loam, Boykin loamy sand, 5 – 20% slopes

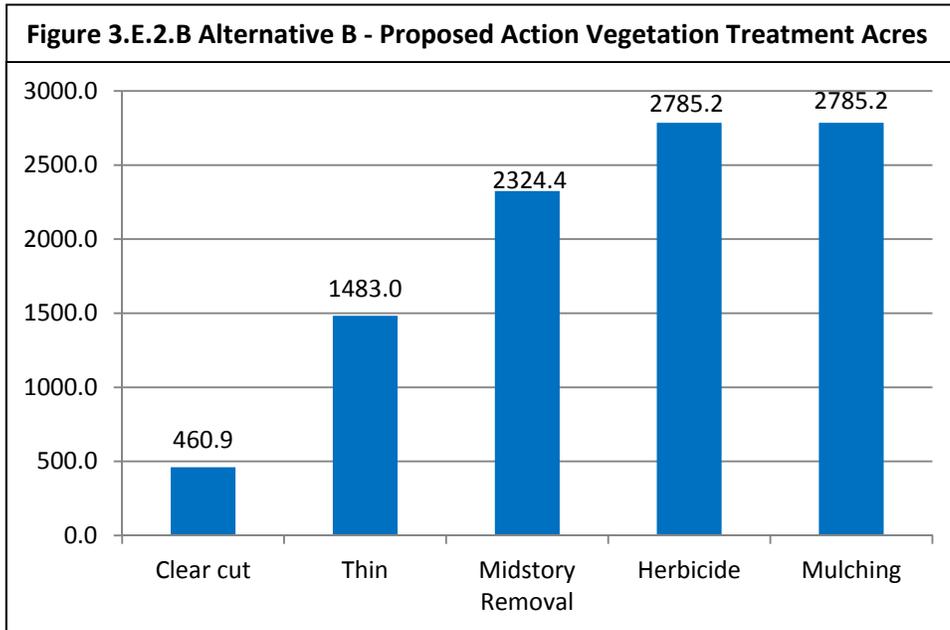
Primary past agricultural soil use on the Oakmulgee Division was small subsistence farms occurring on narrow ridge tops and upper slopes. The steep side slopes were not conducive to large-scale agriculture. Most of the area remained in a forested condition that was cut over when acquired as public lands. Surface soil textures are still present over the majority of the acreage (except facility sites and roads/trails). Past erosion has reduced the surface soil layer by an unknown amount and in some cases has removed the surface layer entirely. Slopes of less than

10 % were more than likely farmed over a short period at some point in time. Slopes greater than 10 % more than likely remained in some form of brush/forested condition as a result of the broken landscape where ridges are narrow and undulating rendering smooth, flat land almost non-existent.

Maubila soils have flaggy (small stones) loam surface textures 3 inches or less with clay loam subsurfaces. Maubila soils are located on narrow ridge tops and lower slopes. The surface horizon on ridge tops has been eroded leaving a mixture of loam and clay loam surface textures with small pieces of ironstone rock. The side slope positions for Maubila soils have also been eroded with surface textures having thin loam surface textures over clay loam subsurfaces. Smithdale soils are located on ridge tops and upper side slopes. Surface textures average 6 inches over either sandy loam or clay loam subsurface textures. Boykin soils are deep sands located on broad ridge tops, upper side slopes, and toeslopes. Surface horizons average 40 to 50 inches consisting of sand and or sandy loam textures. Wadley soils typically occur on convex side slopes with loamy sand surface textures up to 60 inches deep. Iuka, Kinston, Bibb, Columbus, and Mantachie soils are located in floodplains that frequently flood. These soils will be excluded from management thru streamside management zone standards and riparian standards implemented during the process of laying out timber stands prior to harvest.

- 2. Environmental Effects:** Disturbance of soils from timber management practices involving timber harvest, site preparation, and reforestation will result in some form of physical, chemical, and biological change. Direct effects to the soil resources are changes/loss of soil organic matter content, soil erosion, soil compaction, and nutrient leaching and/or displacement. Indirect effects are accelerated weathering, loss of soil as sediment, alteration of organic matter formation, and alteration of soil permeability/water infiltration.
- A. Direct, Indirect Effects of the No Action Alternative:** Direct and indirect effects upon the soil resource as a result of the No Action Alternative were analyzed by their supporting decision documents (Longleaf Ecosystem Restoration Project EIS). Cumulative effects from the treatments implemented by the Payne Lake #1 timber sale were expected to peak in 2011 and continue through 2014. Similar expectations exist for treatments from the decision documents that are not yet implemented. That is, soil erosion is expected to last from 2 – 3 years from date of treatment. While there is no long-term (3+ years) soil loss expected, short-term (1 – 3 years) loss is expected on temporary roads and fire lines. Current rates of soil building, soil erosion, and sedimentation would continue. Effects from existing roads and implementation of other small-scale land practices would continue to occur.
- B. Direct, Indirect Effects of the Proposed Action Alternative:** This alternative proposes approximately 1483 acres of thinning, approximately 460 acres of clear cutting, approximately 841 acres of mid-story treatment (cut and leave), approximately 2,785 acres of herbicide

application, approximately 2,785 acres of mechanical mulching (**Figure 3.E.2.B.: Alternative B – Proposed Action Vegetation Treatment Acres**), and 1.75 miles of temporary roads. Also proposed are road decommissioning, SPB treatments as they occur and associated treatments with vegetation management i.e. use of herbicides. The proposed treatments are listed as duplicate treatments for many areas. The actual treatments will be less than the acres proposed when the Adaptive Management Protocols (**Reference Appendix B**) are applied.



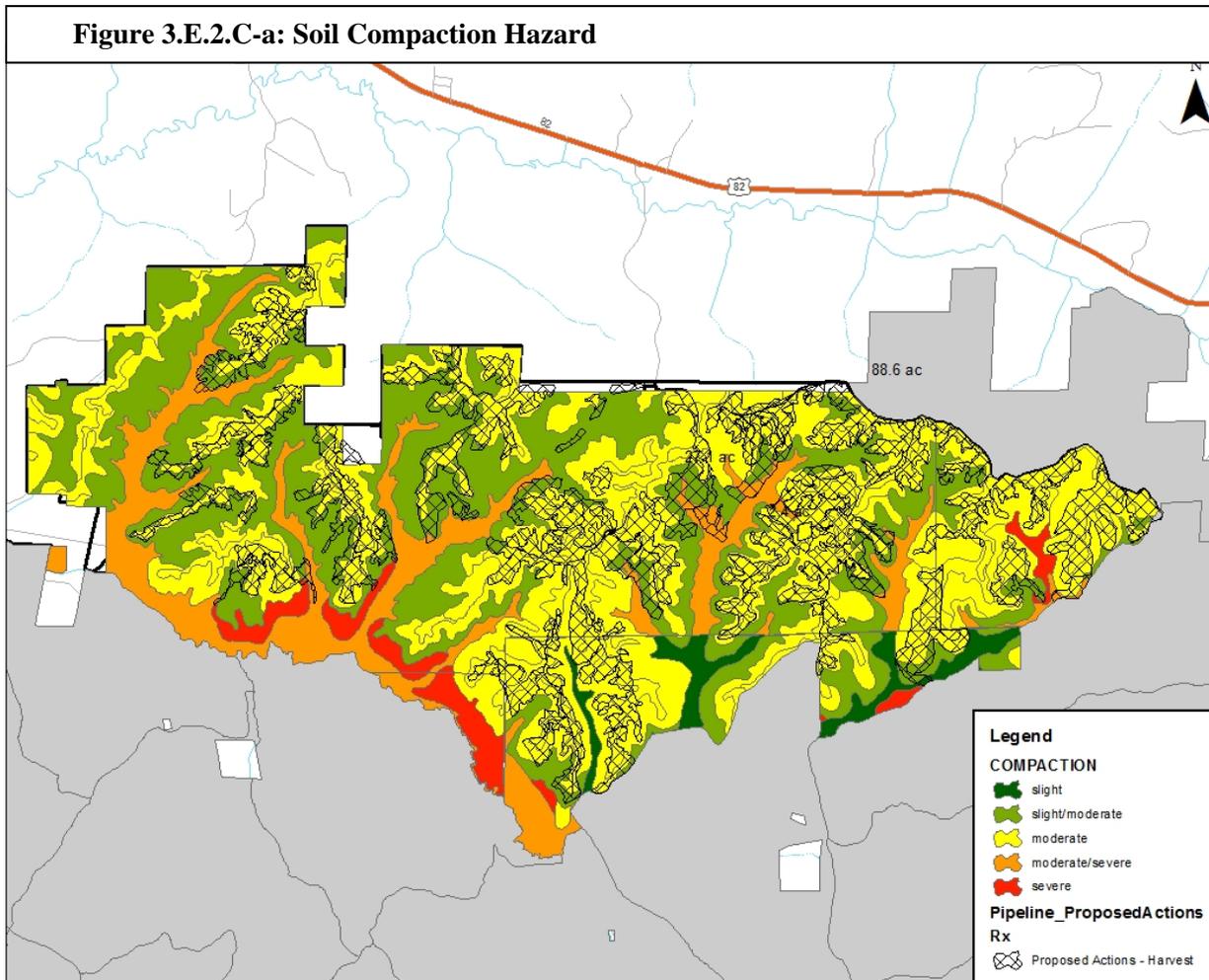
C. Silvicultural practices (clear-cut and thinning) are known to potentially affect the soil resource primarily through nutrient removal. Tree harvest methods prescribed by the proposed action involve treatments by clear cutting and thinning. Proposed thinning and restoration activities will harvest the stem only with tree boles and needles remaining scattered on site. Nutrient removal from thinning or restoration, where harvesting the stem only, reduces nutrient removal by 50 – 60% (Pritchett and Fisher, 1987). Nutrients loss from stem removal is believed replaced by soil weathering and natural inputs (Grier et al., 1989, Jorgensen et al, 1971, Wells, 1971 and Pritchett and Fisher, 1987).

When vegetation (living biomass) is removed from a site, a portion of potential organic matter and its availability to be recycled into nutrients to the soil is removed, and more sunlight and moisture reach the soil surface. The resultant open canopy condition would reduce evapotranspiration and affect soil temperature, soil moisture, and nutrient cycling. Canopy reduction would increase soil moisture (due to reduced evapotranspiration) and temperature in the topsoil. These conditions would increase soil organic matter decomposition rate and increase

available nutrients on the treated area. Other parts of the tree would remain on site to recycle into the soil system over time. Much of this increase in plant available nutrients would be taken up by the stump sprouting of hardwood trees, the root systems of the remaining vegetation on the treated area, and by increasing herbaceous growth.

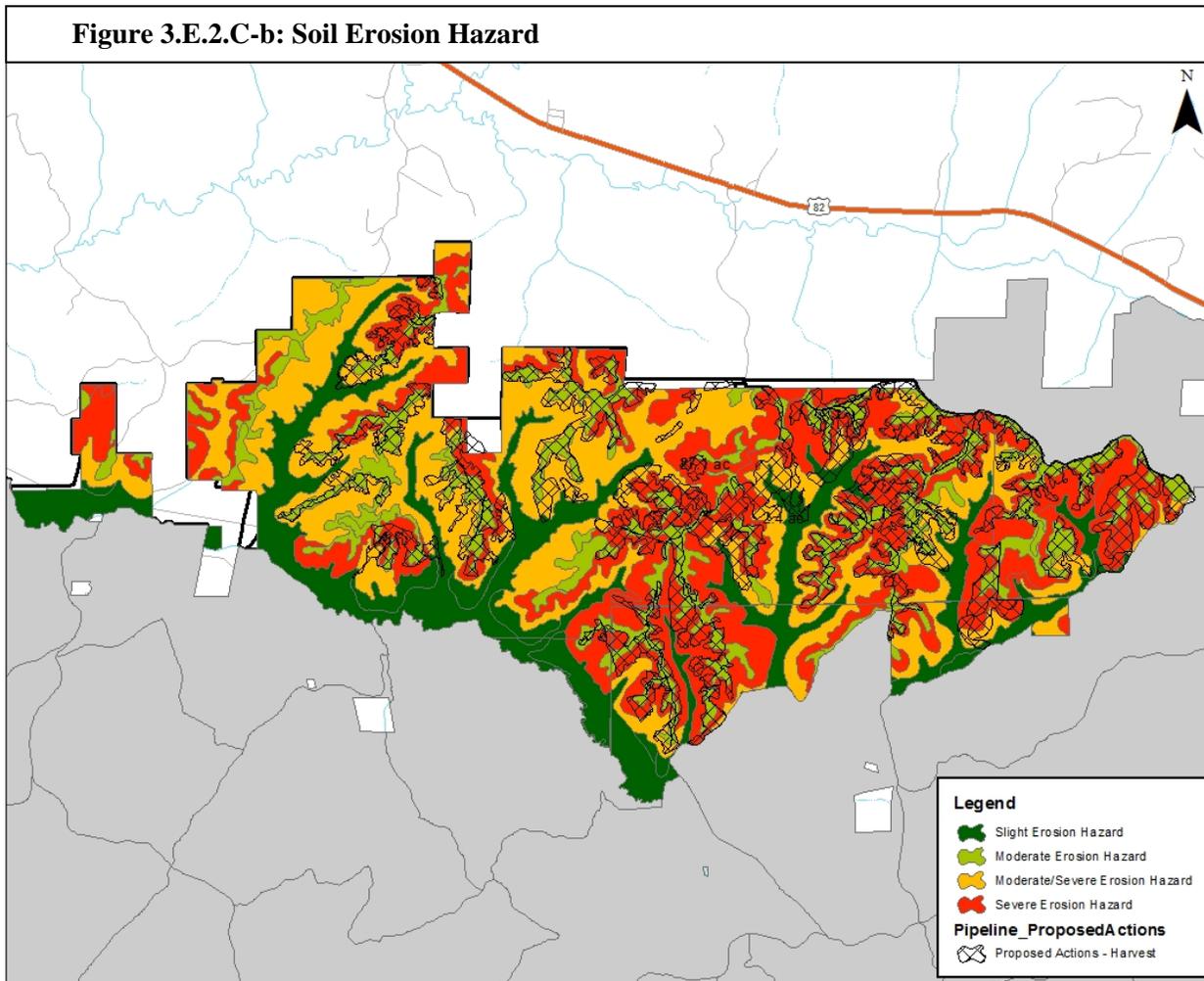
Almost all of the acreage to be thinned and clear cut has a moderate to moderate/slight rating for soil compaction. Approximately 20 acres have a moderate/severe to severe potential for soil compaction (**Figure 3.E.2.C-a: Soil Compaction Hazard**). These acres are soils located in transitional areas at the toe of slopes near floodplains. Floodplains will be eliminated from timber harvest during sale layout. Stand layout and performing management practices during either dry soil moisture periods or dry seasonal periods will usually reduce the potential for soil compaction. A good indicator of soil compaction is rutting from equipment tires or tracks. Monitoring of timber sales on the NFs in Alabama, including the Oakmulgee Ranger District (1988-2007) found soil compaction to be minimal off roads and primary skid trails. Compaction was determined by the percentage of tire rutting. Tire ruts observed averaged less than 3 inches and were over short distances of less than 30 feet. Tire rutting was over short distances as a result enforcement of sale contract standard and guidelines. Soil compaction can be reduced by operating equipment during dry ground conditions. Soil compaction has been found to be the most detrimental on roads and skid trails (primary and secondary trails). Thinning involves fewer passes with equipment, usually less than two, compared to even-age and uneven-age harvests. Implementation of mitigating measures such as ripping/disking, fertilizing and revegetating, can reduce the effects of soil compaction (improve soil bulk density).

Figure 3.E.2.C-a: Soil Compaction Hazard



Less than half of the acreage to be thinned and clear-cut has a moderate/severe to severe rating for soil erosion. The soil map units containing Maubila, Smithdale, and Boykin soils as a complex are rated as severe. Slope steepness (>15%) and the sandy surfaces of Smithdale and Boykin soils are the reasons for the severe erosion potential. There are no soil map units exceeding 40 % slope but isolated small areas exist. Slopes exceeding 40% are excluded from harvest if using conventional logging methods. Soils susceptible to erosion are those soils exposed to the elements of nature, primarily water from rainfall and landform position where increases in slope steepness increases the erosion hazard. Research observations and many studies (Hewlett, Lull, Reinhart, et al.) on experimental watersheds have shown that soil erosion is a product more by fire and/or mechanical disturbance than the actual harvest of trees. Monitoring of stands that had been clear cut (1988, 1993, 1994, 2004, 2005, 2006, 2007) have found soil exposure to occur primarily on temporary roads and skid trails with minor soil exposure off roads and skid trails usually resulting from equipment tire slippage and dragging of tree stems. Soil erosion on these areas has been found to occur over short distances with soil being trapped by surface debris. Revegetation has been found to occur over a two-year period returning the site back to non-erosive conditions. Soil erosion from thinning and restoration

operations will be low, occurring on less than 3% of the acreage for thinning and 10% of the acreage from restoration (**Figure 3.E.2.C-b.: Soil Erosion Hazard**).



D. Temporary Roads constructed for access to proposed treatment stands and associated skid trails for thinning and restoration treatments are known to affect the soil resource primarily through nutrient removal, soil compaction, and soil erosion. The proposed action constructs an estimated 1.75 miles or 3 acres of temporary roads. The primary source of soil erosion is temporary roads and primary skid trails for the duration they are in use. Nutrient loss is greatest on temporary roads since the surface organic layer and surface soil is removed in the process of construction. Skid trails under a thinning operation usually does not remove organic or soil surface layers leaving nutrients in place. Restoration operations will involve more traffic. Primary skid trails can be expected to remove organic layers and have exposed soils as high as 50%. Secondary skid trails can be expected to have loss of organic surface and soil exposure as high as 25%. Temporary roads and primary skid trails will be compacted from multiple traffic use. Proper road locations on a landscape, soil interpretations, and design level followed by placement of

standards and guidelines for erosion, water control, and revegetation will result in acceptable soil erosion rates and will assist with restoration of site productivity.

- E. Midstory Treatment** was proposed on approximately 2324 acres. Treatment proposed is cut and leave. Harvest of material will not take place. The effects are taken into account along with the thinning effects on the soil resource. In addition, post treatments using herbicide and/or mechanical mulching for mid story maintenance discuss effects under the herbicide and mechanical mulching sections.
- F. Herbicides** such as Glyphosate, Imazapyr, and Triclopyr, are proposed for use on approximately 2785 acres under the proposed action alternative. These herbicides have no known effect on soil physical and chemical properties. Herbicides may affect soil productivity through biotic impacts, soil erosion, and nutrient leaching (Veg. Mgmt. FEIS volume 1, pIV-90). Resulting changes in soil organisms are due more to physical than chemical effects (Mayack and others 1982). Where adverse effects have been observed, herbicide concentrations exceeded those measured under actual operational conditions (Fletcher and Friedman 1986). There is, however, a general consensus that herbicide usage at normal forestry rates does not reduce the activity of soil micro-organisms. There is no evidence that the herbicides currently in forest management in the South produce any adverse effects on site and soil productivity. There is evidence that herbicide usage as a silvicultural tool can increase site productivity. Herbicides do not disturb the soil surface, thus the soil erosion is limited to natural processes or to the method of application. Existing organic layer(s) are left intact after herbicide use, which mitigates rainfall impact and promotes water infiltration. Examining erosion from a variety of site preparation techniques in the South, it is evident that herbicides use results in sediment yields more similar to undisturbed watersheds than mechanically prepared ones. Neary and others (1986) found erosion rates of 170 kg/ha on herbicide treated plots compared to 67 kg/ha on control plots. Douglas and Van Lear (1983) found erosion rates of 44 kg/ha on burned plots versus 39 kg/ha on control plots. Both experiments were conducted on Piedmont soils with Neary and others having plots located on steeper terrain. In the upper coastal plain Beasley and others (1986), found erosion rates for shear and windrow to be 1,005 kg/ha compared to 205 kg/ha for herbicides. The control plot erosion rate was measured at 147 kg/ha. Nutrient leaching after herbicide use has been little studied. Based on nitrate losses found by Neary, Bush, and Douglass (1983), nitrogen losses are less than 10 lbs/acre due to suppression of vegetative uptake. Losses of other less mobile nutrients are negligible.

Of the three herbicides proposed for use in this project, Glyphosate and Triclopyr are not soil active, nor soil mobile. Triclopyr is not highly mobile in the soil and is absorbed primarily by plant leaves and moves readily throughout the plant. It is rapidly broken down by soil organisms and ultraviolet light, persists an average of 30 – 56 days depending on soils and weather.

Glyphosate is similar to Triclopyr in that is foliar active and not soil active and has a similar half-

life of 30 – 60 days. It is rapidly broken down by soil microbes. Sunlight causes little to no breakdown. Imazapyr is soil active with soil mobility being relatively low. Imazapyr is strongly absorbed by the soil, usually only found in the top few inches. Imazapyr has a half-life of 19 – 34 days. Studies in Alabama (Michael 1986) determined Imazapyr half-life in treated vegetation under field conditions ranged from 12 – 35 days and in soil from 19 – 34 days. Imazapyr can remain in the soil from 6 months to as long as 2 years. Exposure to sunlight assists with break down in soil as well as soil microorganisms.

G. Prescribe burn and site preparation burning on approximately 461 acres and prescribe burning approximately 2900 acres per year over a 3 year return interval has the potential to consume organic matter, change the surface physical properties of the soil, and kill soil biota through soil heating. Loss of organic matter results in loss of nutrients and increases the susceptibility of soil to erosion. Soil heating can affect soil biota and surface soil structure indirectly affecting the soils capacity to absorb water. The potential for negative affects increases with the severity of the burn. Burns that do not consume the entire surface organic layer provide the least potential for effects versus burns that consume the entire surface organic layer and are hot enough to crystallize the soil surface. Research has found that prescribed burning for 20 years in a mature southern pine stand resulted in a small increase in soil pH, organic matter, nitrogen, phosphorus, calcium, and magnesium in the surface 2-4 inches of mineral soil (Wells et al., 1971). Light burns have positive nitrogen budgets, moderate burns have neutral nitrogen budgets, and severe burns have negative nitrogen budgets. Less mobile nutrient losses are negligible (VM EIS IV-93). Stone (1971) has summarized the findings of others and reports that organic matter and nitrogen contents are not reduced by light annual burns; supplies of bases and mineral nutrients are little affected, porosity and infiltration of water are not affected and hydrological effects of burning appear minor on coastal plain soils. A high risk from soil erosion occurs on constructed fire lines where soil exposure is usually necessary to maintain control of the fire.

H. Mechanical Mulching is proposed on approximately 2785 acres. The mechanical method is referred to as Mastication or Mulching. This involves using machinery to break up large debris by running over the surface debris and breaking it up. The areas to be mulched are areas where mid story treatment is performed. This mechanical method usually does not disturb the surface soil as it runs over debris. However, areas with light debris can have surface soil disturbance as the mulch blade makes contact with the surface soil. This is expected to be over an area of 10% or less and scattered across the site(s) being mulched. The break-up of debris spreads mulch over the ground adding more surface cover, which will help reduce soil erosion. Compaction of the soil will occur where equipment runs over the ground rather than on top of debris. Under dry soil conditions, soil compaction will be slight equivalent to one pass discussed under soil compaction in this document.

- I. **Reforestation** by hand planting is proposed. Hand planting of trees has no potential for direct/indirect impacts to the soil resource.
- J. **Red-cockaded Woodpecker Management** has no potential for direct/indirect impacts to the soil resource.
- K. **Road Maintenance:** Road maintenance operations within the road corridor such as blading the road surface and pulling the ditches can lead to increases in soil erosion and increases in sediment production. During road maintenance activities, soil may be displaced and exposed. Soil movement would occur, however, mitigation measures designed to stabilize the road surface, such as adding aggregate surfacing by armoring the soil or limiting distance and amount of concentrated flow by installing water diversion devices (dips, reverse grades, out slopes, leadoff ditches, and culverts) would reduce adverse effects. The detachment and distance soil particles move would be reduced by limiting water concentration and movement on disturbed surfaces and/or fill materials.
- L. **Southern pine beetle (SPB) suppression** using either the cut and leave or cut and remove methods are planned under the Proposed Action Alternative. Cut and removal of infected trees involves ground-disturbing activities that can potentially affect the soil resource through nutrient removal, soil compaction, and soil erosion. The effects are similar to those discussed under soil resources, silvicultural practices, and restoration. Effects are on small acreages, less than five acres and scattered if the SPB site(s) are detected and addressed early. Under epidemic situations, the acreage can be greater than five acres resulting in increased potential for soil erosion and soil compaction. Cut and leaving infected trees has the least effects. Nutrient removal, soil compaction, and soil erosion would be less than cut and remove. Less ground disturbance can be expected from cut and leave since no extraction of trees off site occurs. Also, use of access roads (temporary and non-temporary) generally involves fewer passes (limited to getting equipment in and out). Leaving trees on site, less ground disturbance and reduced use of equipment on roads reduces the risk for direct and indirect effects compared to cut and leave. Construction/re-construction of temporary roads results in a reduction in soil productivity through loss of organic matter and surface soil.

3. Cumulative Effect of the No Action and Proposed Action Alternatives:

- A. **No Action Alternative:** The Action Alternative does not propose any new ground disturbance. Effects to soils generally occur because of ground disturbing activities. Cumulative effects from past and present activities generally result in a localized loss in soil productivity due to compaction, rutting, and/or soil displacement. However, soil erosion may also occur which may contribute to sedimentation. Activities on private lands would be site specific to those lands and no cumulative effects would occur to the soil resource from those actions. Cumulative effects from existing roads, implementation of the Longleaf Ecosystem Restoration Project EIS, The

Payne Lake Project EA, the Tornado Salvage Areas DMs (3 total) and implementing a 3 year return interval prescribe burn program, the effects from treating acres under the Payne Lake Project EA between 2009 and 2012 and the initial treatment of tornado salvage, control of non-native invasive species, past prescribe burn and other small scale land practices would continue to occur. Activities, on NF, that are reasonably foreseeable would be implemented under the standards for protecting soils listed in the Revised Land and Resource Management Plan for the National Forest in Alabama; therefore, cumulative effects from these actions are minimal. Activities on private lands would be site specific to soil on those lands and no cumulative effects would occur to the soil resource on public lands from those actions.

B. Action Alternative: Implementation of the Action Alternative considered together with past and reasonably foreseeable future activities is not expected to have a cumulative effect on the soil resource. Cumulative effects from soil compaction and erosion are generally expected to be short term, lasting one year for thinning, mid-story treatment, mechanical mulching, wildlife linear strip maintenance, road restoration, and SPB activities, three years for clear cut with ground disturbing site preparation and three years or less for prescribe burn. On sites where vegetation management and prescribed fire are scheduled within the same three-year period, recovery of site productivity may be as long as five years as a result of an expected longer time period for re-vegetation to occur. No long-term loss of soil productivity is expected. When compared to past harvesting intensity for the watershed, the proposed alternatives does not represent an increase in harvest activity or road use and their associated soil and water impacts. The potential cumulative effect on soil from the action alternatives over time is a loss in productivity.

Cumulative effects to the soil resource from implementation of the Action Alternative along with continuing to implement the remaining acres under the Longleaf Ecosystem Restoration Project EIS and implementing a 3-year return interval prescribe burn program, the effects from treating acres under the Longleaf Ecosystem Restoration Project EIS should peak between 2013 and 2017. As forest vegetation restoration is completed, the remaining foreseeable future activities of prescribe burning will continue. Implementing standards for protecting soils listed in the Revised Land and Resource Management Plan for the National Forest in Alabama and in Chapter 1 of this document were designed to minimize effects from these actions. Other past, present and foreseeable activities within the project area watershed that have the potential to interact cumulatively to affect soil are SPB suppression and control, NNIPS control and road maintenance.

F. Dispersed Recreation and Public Access:

1. Issues: The two objectives of this proposal are to “*Provide a spectrum of high quality, nature-based recreation settings and opportunities that reflect the unique or exceptional resources of the Forest and interests of the recreating public on an environmentally sound and financially sustainable basis*” (Forest Plan Goal 22) and to “*Provide a transportation system that supplies safe and efficient access for forest users while protecting forest resources*” (Forest Plan Goal 35). This section will address the predicted impacts of the Proposed Action and its alternative on dispersed recreation and public access in the Pipeline NW planning area.

Important dispersed recreation activities in the Pipeline NW planning area include hunting, driving for pleasure, and wildlife viewing (Kocis et. al., 2004). The level of vehicle access to Forest Service land is an important factor affecting these activities. While many members of the public value a high degree of road access to areas for hunting, wildlife viewing, and riding for pleasure, others seek areas with limited access because of decreased human presence.

Access indices including total road miles, road density, and distance from road were used to evaluate the effects of the Proposed Action and its alternative on public access within the planning area. Road miles and road density are directly related to the level of vehicle access to Forest Service land, with increasing values indicating increasing levels of vehicle access. Distance from road is an indicator of the accessibility of Forest Service land for non-motorized uses such as hunting, with areas with low distance from road values being most accessible. Conversely, areas with high distance from road values can be considered to offer increasing levels of solitude and decreasing human presence.

2. Infrastructure:

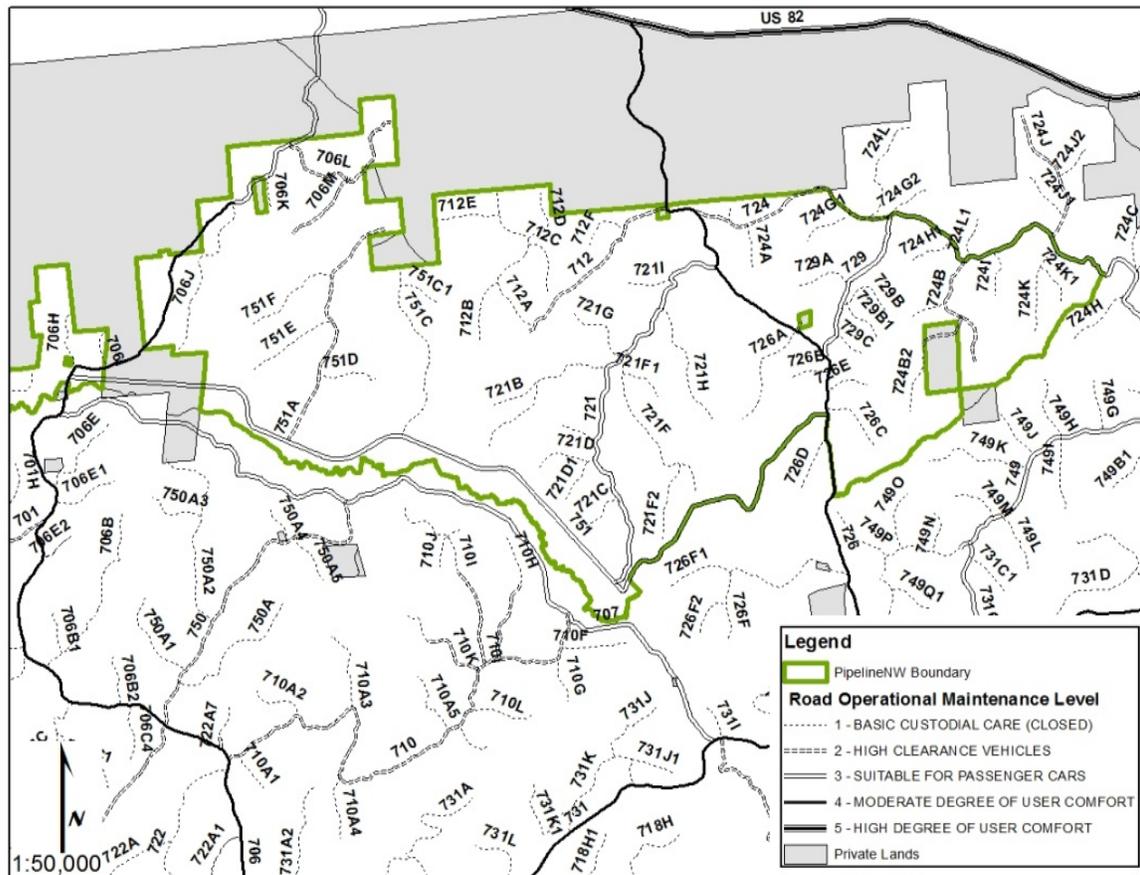
A. Roads: There are approximately 52 miles of Forest Service Roads (FSR) inventoried roads within or along the perimeter of the Pipeline NW project area. Of the 52 miles of FSR roads, 24 miles are closed to vehicle traffic and are classified as Forest Service administrative roads. Approximately 8 miles of roads are Level 2 – high clearance vehicle appropriate. There are approximately 15 miles of Level 3 – passenger car suitable roads and 5 miles classified as moderate user comfort roads (Level 4) (**Figure 3.F.2: Pipeline NW Project Area – Current Roads Maintenance Level & Costs**).

- **Road Maintenance Costs:** Current yearly costs for road maintenance are based on their operational level and the length. All roads under Level 1- Custodial care, which are closed to public, cost \$400 per mile to maintain. Level 2 – high clearance vehicles maintenance costs are \$1,100 per mile. Level 3 – suitable for passenger cars maintenance costs are \$2,950 per mile. Level 4 roads described as moderate user comfort have and

established cost of \$3,050 per mile. Current costs associated with the Pipeline project area for level 1 through level 4 roads is \$77,900 a year. Associated yearly costs are displayed in **Figure 3.F.2.A-a: Pipeline NW Project Area- Current Roads Maintenance Level & Annual Costs.**

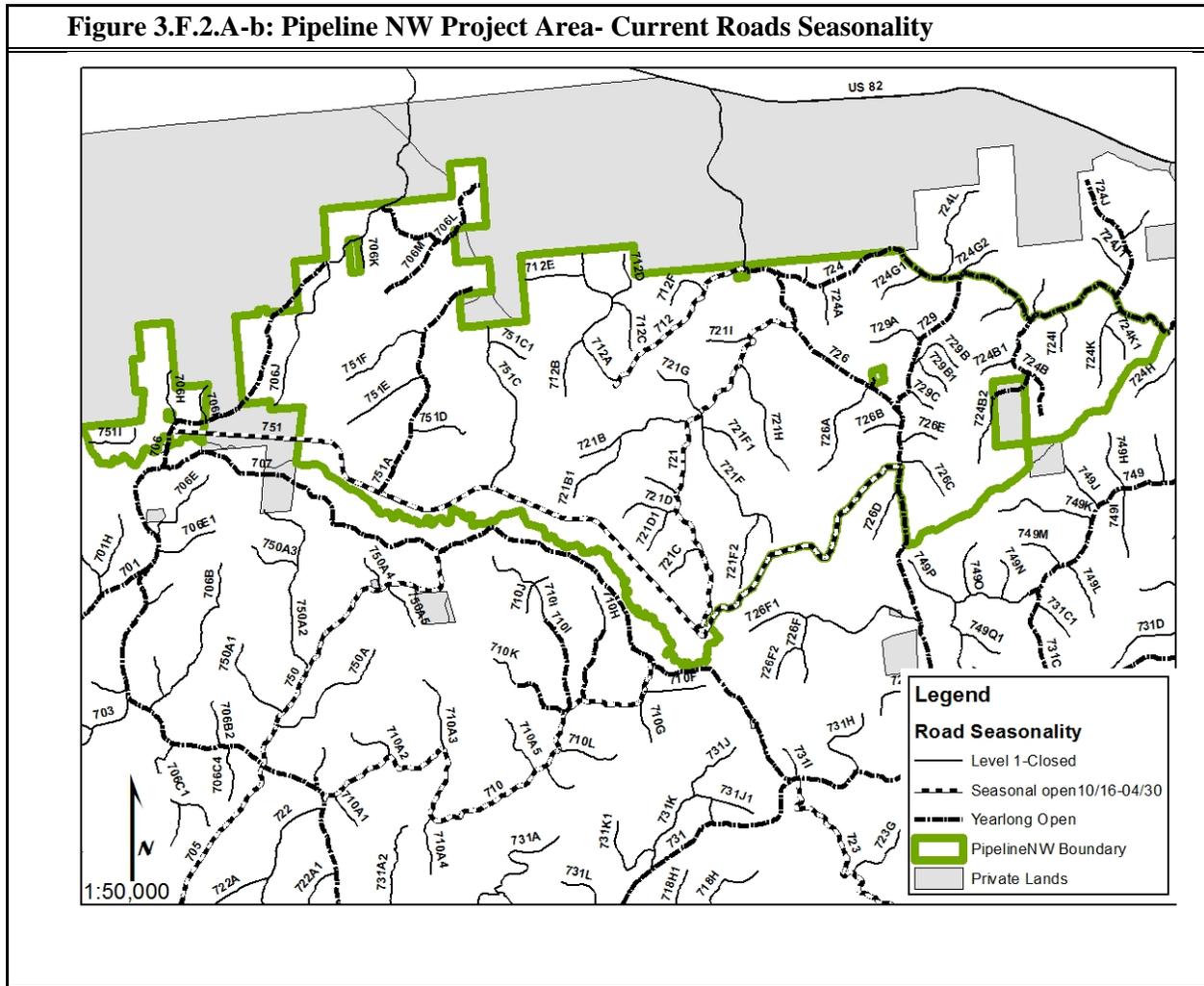
Note: Annual road maintenance costs are based on engineering estimates for the investments needed to maintain roads to agency safety standards, based on their operational level. Annual road maintenance costs listed in this document are not the amounts currently expended by the Forest Service on the roads within the Pipeline NW project area. The costs listed in this document are for the purposes of comparison.

Figure 3.F.2.A-a: Pipeline NW Project Area- Current Roads Maintenance Level & Annual Costs



Current Road Maintenance Level	Miles	Annual Cost/Mile	Total
1-Basic Custodial Care	24	\$400	\$9,600
2-High Clearance Vehicles			

- Road Seasonality:** Approximately 12 miles are currently classified as seasonal, open from October 16- April 30. There are 16 miles open year round. Based on the project unit square mileage of 13.72, the public accessible roads during the closed season are 1.2 miles/square mile. Density of public accessible roads during the open season is 2 miles/square mile. **Figure 3.F.2.A-b: Pipeline NW Project Area- Current Roads Seasonality**

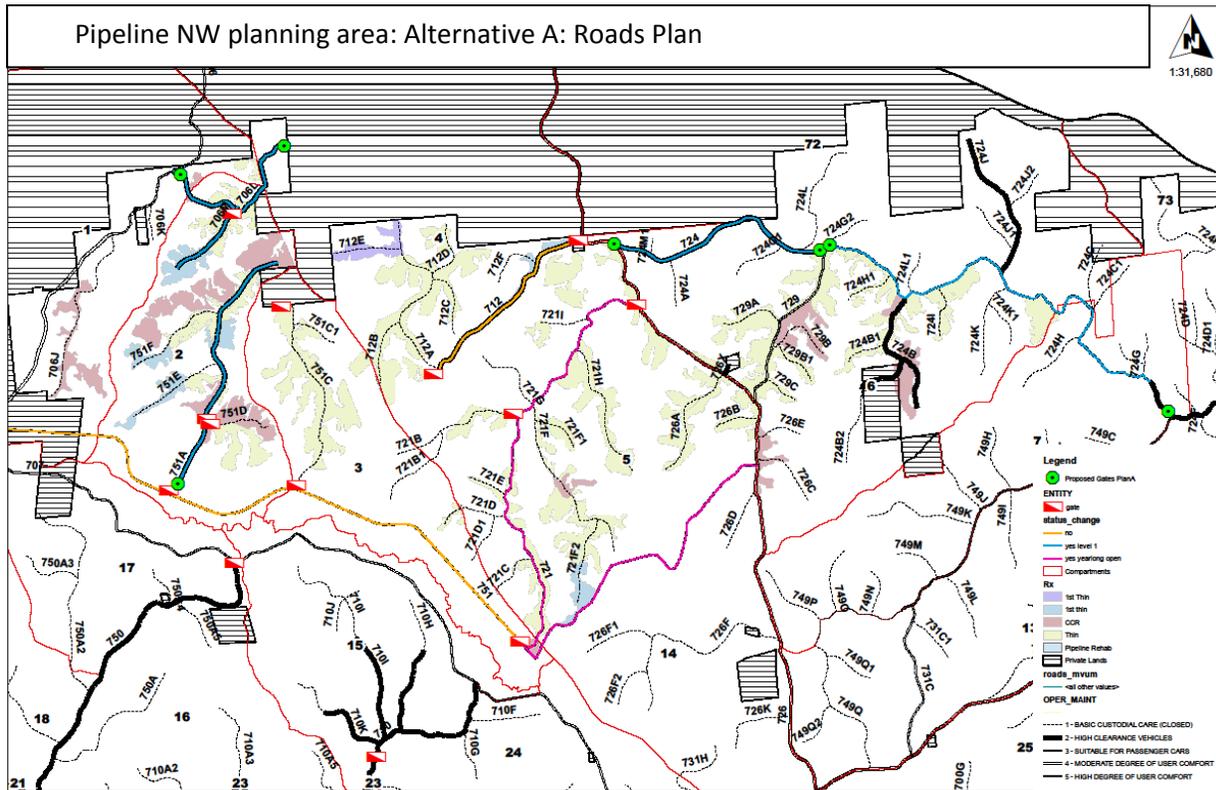


- Land Access:** During the open road season, 64% (5,627 acres) of the project area is within 0.25 miles of an open road, and 90% (7,967 acres) of the project area is within 0.5 miles of an open road. Ninety nine percent of the project area (8,741 acres) is within 0.75 miles of an open road. During the closed road season, 37% (3,307 acres) of the project area is within 0.25 miles of and open road and 57% (5,042 acres) of the project area is within 0.5 mile of an open road. Sixty nine percent (6,125 acres) of the project area is within 0.75 miles of an open road during the seasonal closures. All FSR roads within and adjacent to the project area are open to foot and non-motorized vehicle traffic. Roads

open to vehicle traffic are open to equestrian and mountain bike use. No closed or seasonally closed roads have been designated for equestrian traffic or mountain bikes.

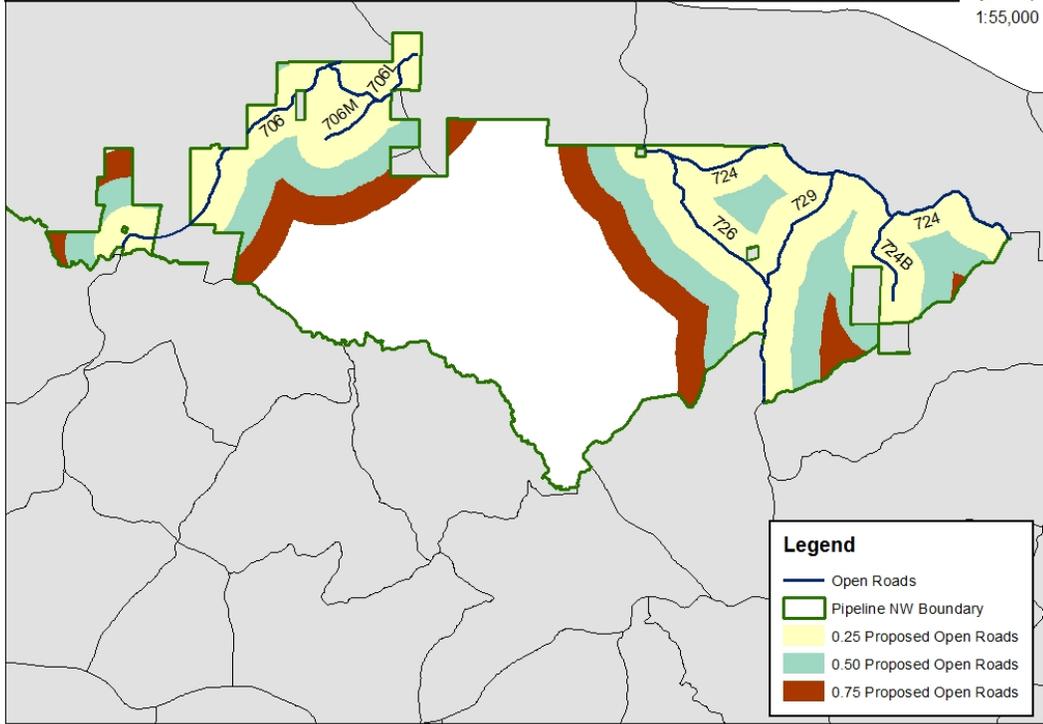
- Alternative A – No Action:** There are approximately 52 miles of FSR maintained roads within or along the perimeter of the Pipeline NW planning area. Of the 52 miles of FSR roads, 24 miles are closed to vehicle traffic; 8 miles of roads are Level 2 – high clearance vehicle appropriate. There are approximately 15 miles of Level 3 – passenger car suitable roads and 5 miles classified as moderate user comfort roads, Level 4. Throughout the year, regardless of road closure season, 99% or more of the planning area is within 0.75 miles of an open road. During the open road season (October 1 – April 30) 31% is within 0.25 mile of an open road and 47% is within 0.50 mile of an open road. During the closed road season (May 1 – September 30) 58% is within 0.75 mile, 42% is within 0.25 mile of an open road 91% within 0.50 mile of an open road.

Pipeline NW Proposed Road Plan A:		
Road Number	Status Current	Access Current
724	3	Yearlong
724	2	Yearlong
751	3	Seasonal
712	2	Seasonal
706M	2	Yearlong
721	3	Seasonal
706L	2	Yearlong
751A	2	Yearlong



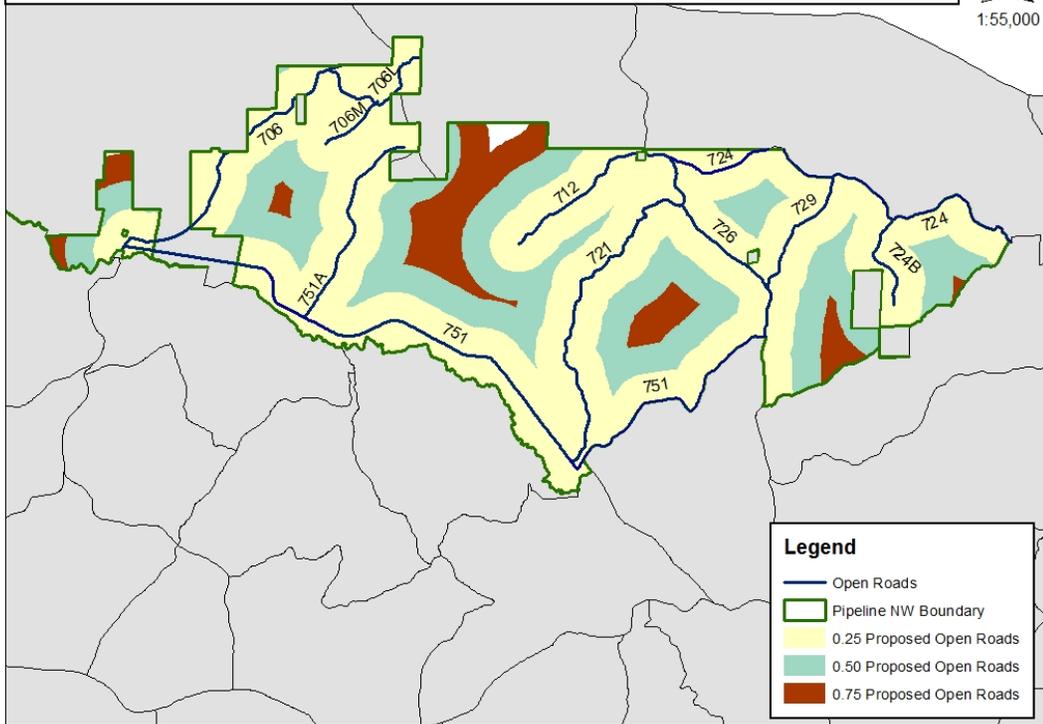
Alternative A: Access May – September

1:55,000



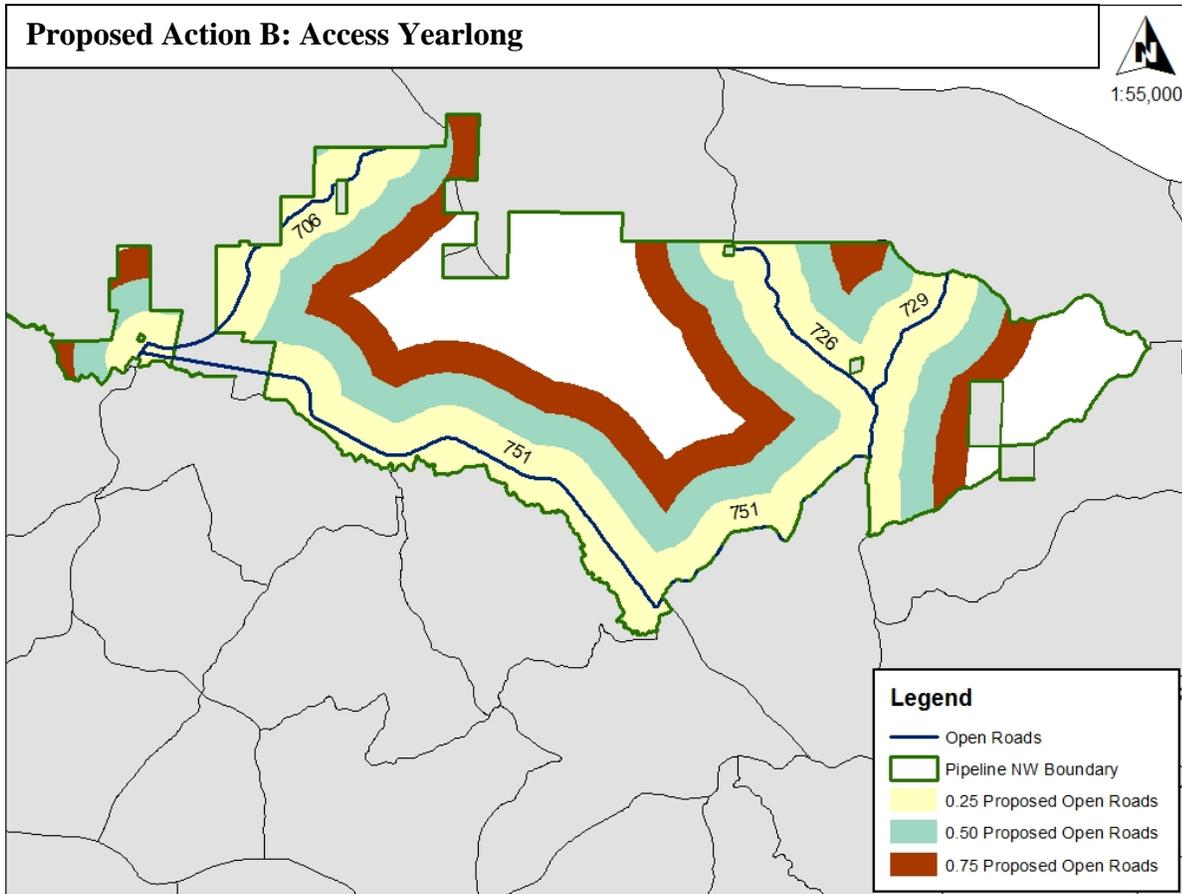
Alternative A: Access October – April

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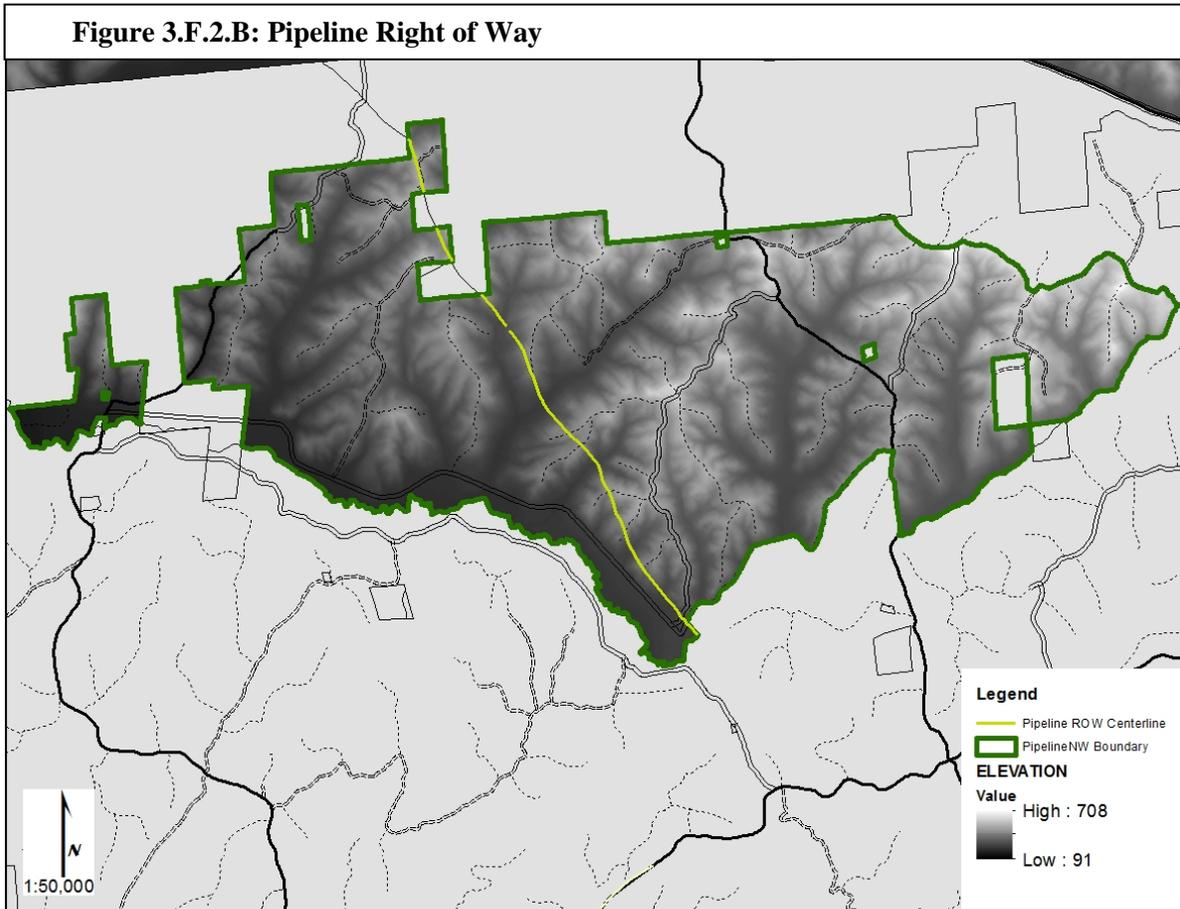


- Alternative B – Change Road Status:** Throughout the year, regardless of road closure season, 76% or more of the planning area is within 0.75 miles of an open road. Alternative B would open roads from May – September (closed road season) so that 18% more of the planning area is within 0.75 miles as compared to Alternative A. Alternative B further changes roads so that 42% is within 0.25 mile of an open road and 58% is within 0.50 mile of an open road. Alternative B reduces road maintenance burden to tax payer by 27% of the annual road maintenance budget on the Oakmulgee District

Pipeline NW Proposed Road Plan B:				
Road Number	Status		Access	
	Current	Proposed	Current	Proposed
724	3	1	Yearlong	Closed
724	2	1	Yearlong	Closed
751	3	3	Seasonal	Seasonal
712	2	1	Seasonal	Closed
706M	2	1	Yearlong	Closed
721	3	3	Seasonal	Yearlong
706L	2	1	Yearlong	Closed
751A	2	1	Yearlong	Closed
751	3	3	Seasonal	Yearlong

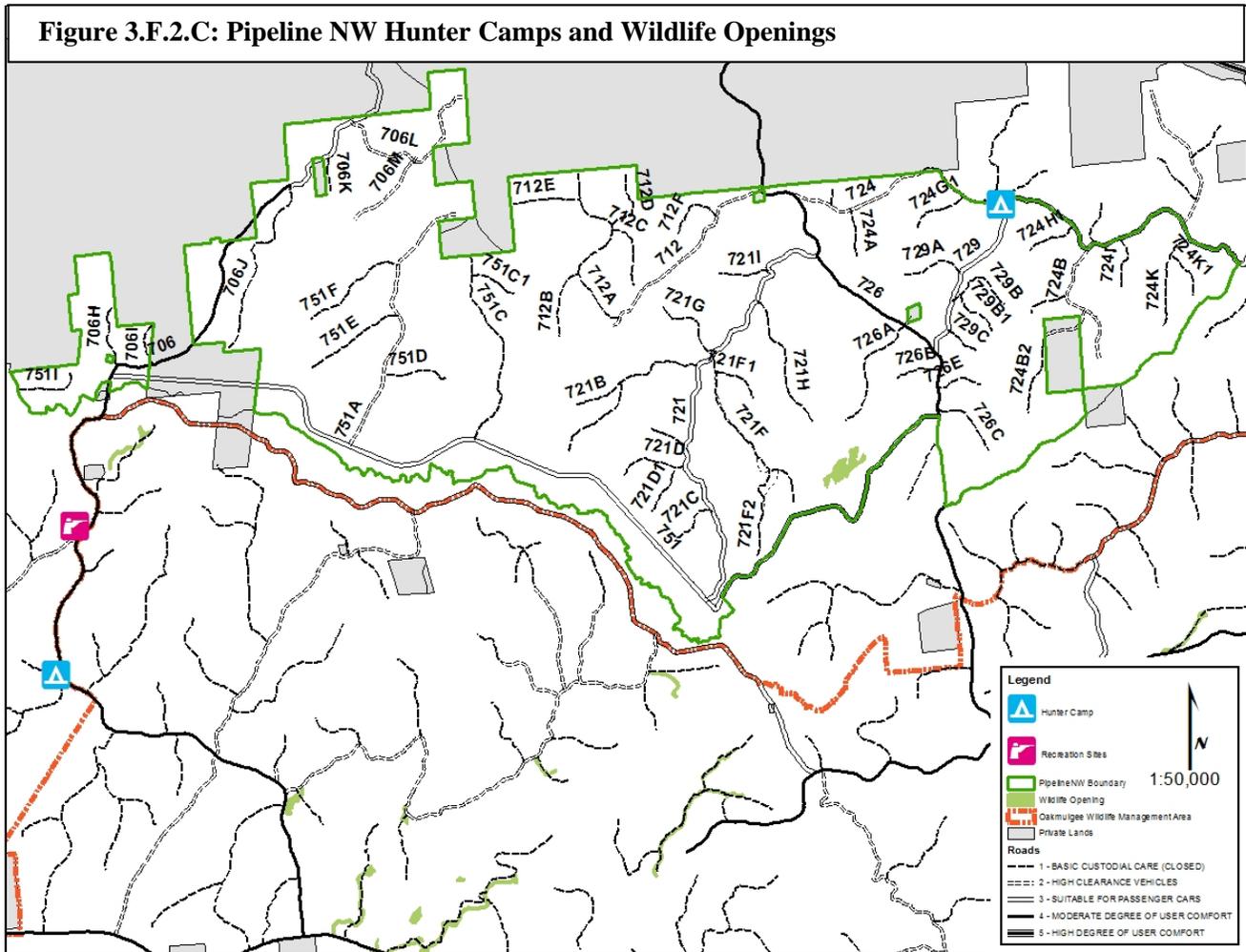


B. Pipeline: The abandoned Montgomery-Columbus Gas pipeline was permitted to Southern Natural Gas Company in October of 1945 for a 30-foot right of way. The pipeline was abandoned in the fall of 2004. The proposal to abandon included 1) de-pressuring the Montgomery Columbus line between mile post 29.084 and mile post 51.150; 2) flushing the pipeline with cleaning agent followed by a water rinse to be collected and removed for proper disposal; 3) removing the above ground facilities; and 4) filling the abandoned section with water and capping each end. To date, the pipe infrastructure has not been removed. In addition, the right of way has been utilized for non-sanctioned recreation activities such as off road vehicle use accessed from both Forest Service and private roads. The total length within the project area is approximately 3.5 miles and 13 total acres of the right of way opening. The full pipeline corridor right of way cuts a 22 mile diagonal path from the northwest to the southeast on the western portion of the Oakmulgee District (**Figure 3.F.2.B: Pipeline Right of Way**).



C. Hunter Camp and Wildlife Openings: Within the Pipeline NW project area there are two features established in support of hunting recreation opportunities. The Shiloh Hunter Camp is located on the southwest corner of the FSR 729 and the FSR 724 road intersection. The camp is a cleared area approximately less than 1 acre in size. One, 20 acre wildlife opening exists within the project unit. A portion of the unit (4 acres) was planted with native warm season grasses and is managed by fire and mowing as needed. It is located southwest of the FSR 726 and FSR 751 intersection **Figure 3.F.2.C: Pipeline NW Hunter Camps and Wildlife Openings.**

Figure 3.F.2.C: Pipeline NW Hunter Camps and Wildlife Openings



D. Effects of Road System Changes: The proposed action would reduce miles of Forest Service roads and road density within the Pipeline NW planning area, indicating decreased vehicle access to Forest Service land. This will result in decreased runoff from road surfaces and further protect the pipeline from unauthorized use; while still allowing visitors access to National Forest lands. The status change of the roads will align them to the actual need and maintenance level needed for future management of the area. The proposed action will not result in a net change in the miles of roads; it will change the status of the road to meet the need for the roads.

Based on estimates reported in the 2011 Oakmulgee Ranger District Travel Analysis Report, the annual road maintenance budget for the Oakmulgee District is 57% of the estimated annual maintenance need. Road system recommendations generated through the travel analysis process were aimed in part at balancing road system needs with road maintenance funding. The proposed action would reduce needed road maintenance funding within the Pipeline NW project

area by 26%. While the Pipeline NW planning area represents a small portion of the entire District, proposed changes correspond with recommendations from the Travel Analysis Report and will provide a safe, efficient, and affordable road system in the area.

The Project Area is generally accessible by roads, but some roads may be managed through year round motor vehicle closure. The proposed road status change will provide a transportation system that supplies safe and efficient access for forest users while protecting forest resources and improve the condition of forest roads that are adversely affecting surrounding resource values and conditions. The basic custodial care roads will offer opportunities to equine and mountain bike users.

The road status change will provide a spectrum of high quality, nature-based recreation settings, and opportunities that reflect the unique or exceptional resources of the forest and interests of the recreating public on an environmentally sound and financially sustainable basis and manage areas to provide for “backcountry” recreation experiences. The removal of the seasonally opened roads will allow for hunting opportunities away from an opened road.

G. Forest Composition and Structure – Wildlife:

1. Issues: Two objectives of the proposed action are to “*Manage forest and woodland ecosystems to restore and/or maintain native communities to provide the desired composition, structure, and function*” (Forest Plan Goal 1) and to “*Provide habitats to support desirable levels of selected species (e.g. species with special habitat needs such as large, continuous forested landscapes, species commonly hunted/trapped, or species of special interest)*” (Forest Plan Goal 16). This section will address the predicted impacts of the Proposed Action and its alternative on habitat relationships for species of high interest to conservation organizations, managers, and forest users. Wildlife resource considerations and analyses relative to federally listed species and Regional Forester’s sensitive species are reported in the Biological Evaluation (BE). Because the RCW is the species of viability concern most likely to experience meaningfully changed habitat conditions with implementation of the Proposed Action, it is analyzed in greater detail in section 3.K. Proposed, Endangered, Threatened, and Candidate Species.

The *Revised Land and Resource Management Plan (2005)* for the National Forests in Alabama identifies 12 Management Indicator Species (MIS) (Table 2-10). MIS were selected because their population changes are believed to indicate the effects of management activities (36 CFR 219.19(a) (2)) and as a focus for monitoring (36 CFR 219.19(a) (6)). Figure 3.G.1 shows MIS whose habitats are potentially affected by the Proposed Action and the no action alternative. The remaining MIS listed in the Revised Forest Plan utilize habitats that are not expected to be affected by the Proposed Action and the no action alternative. The species in Figure 3.G.1 were chosen because they provide meaningful comparisons of the potential effects of the Proposed Action and the no action alternative. They are expected to be sensitive to the changes proposed, they rely heavily on the communities proposed for treatment, and they are expected to serve as indicators of management success. **Figure 3.G.1: Management Indicator Species** also lists the reason each MIS was selected and relates them to management objectives in the Revised Forest Plan.

Figure 3.G.1: Management Indicator Species		
Common Name	Reason for Selection	Related Forest Plan Objectives
Wood thrush	To help indicate management effects on wildlife species dependent upon mature forest interior conditions	16.2, 16.4, 16.5, 16.6
White-tailed deer	To help indicate management effects on meeting hunting demand for this species	1.1, 1.2, 1.3, 16.3
Eastern wild turkey	To help indicate management effects on meeting hunting demand for this species	1.1, 1.2, 1.3, 16.3
Northern bobwhite quail	To help indicate management effects on meeting hunting demand for this species	1.1, 1.2, 1.3, 1.4, 1.5, 16.1, 18.1
Prairie warbler	To help indicate management effects on creating and maintaining early successional forest (low elevation) communities and other early successional habitats	1.1, 1.2, 1.3, 16.4

The wood thrush (*Hylocichla mustelina*) requires closed canopy forest for suitable habitat. While moist bottomland forest types offer prime habitat, deciduous forest, mixed deciduous-pine forest, and pine forests with deciduous understory can provide suitable habitats with canopy closure (Natureserve 2013).

White-tailed deer (*Odocoileus virginianus*) are habitat generalists that occupy a wide range of forested and non-forested habitats. In the southeast, deciduous and mixed pine-deciduous forest with hard and soft-mast producing species provide foraging opportunities in the late fall and early winter. Early successional habitats including managed openings, clearcuts, and mature forests with open canopies provide browse throughout the year. Open canopied forest managed with prescribed fire to suppress shade-tolerant hardwood species in the midstory and promote herbaceous vegetation in the understory provide quality habitat.

Eastern wild turkey (*Meleagris gallopavo*) occupies a wide range of habitats with diversified habitats providing optimum habitat conditions (Schroeder 1985). This includes mature mast-producing stands during fall and winter, shrub-dominated stands for nesting, and herb-dominated communities including agricultural clearings for brood rearing. Habitat conditions for wild turkey can be enhanced by management activities such as prescribed burning, thinning (Hurst 1978; Pack et al., 1988), and the development of herbaceous openings (Nenno and Lindzey 1979, Healy and Nenno, 1983).

The northern bobwhite quail (*Colinus virginianus*) inhabits a wide variety of vegetation types, particularly early successional stages. It occurs in croplands, grasslands, pastures, fallow fields, grass-brush rangelands, open pinelands, and open mixed pine-hardwood forests. Open canopy (<50%) pinelands and mixed pine-hardwood forests that have diverse groundcover vegetation provide ideal habitat in the south (Brennan 1999, DeVos and Mueller 1993).

The prairie warbler (*Dendroica discolor*) prefers upland scrub-shrub habitats. Optimal breeding habitats are usually associated with brushy communities, fallow fields with scattered trees, pine plantations, clear-cuts, and power line rights-of-way. Large openings surrounding or containing clumps of shrubs are typical components of breeding habitat. Populations typically use sites only for short periods because preferred breeding habitat (early seral) coincides with rapid structural change in plant structure and composition.

2. Affected Environment: The Pipeline NW planning area consists of 8,783 acres of NFS lands located in the west central portion of the TNF, Oakmulgee District in Bibb, Hale, and Tuscaloosa Counties, Ala. The area is inventoried as Oakmulgee Compartments 1, 2, 3, 4, 5 and 6. See Chapter 1.A for a detailed description of the planning area.

The Pipeline NW planning area is located within the East Gulf Coastal Plain Physiographic Area as identified by the Partners in Flight (PIF) Bird Conservation Plan (BCP). The specific habitat proposed for treatment in the Proposed Action is identified as one of seven priority species habitat suites in the BCP. This habitat suite is listed as longleaf pine-slash pine and the BCP establishes an objective to increase longleaf pine forest acreage by over 4 million acres by 2025. This objective was established in order to recover habitat not only for red-cockaded woodpecker, but also for Bachman's sparrow, brown-headed nuthatch, prairie warbler, northern bobwhite quail, and southeastern American kestrel, all of which are considered of high conservation concern by PIF. It is important to note that longleaf pine themselves are not critical to the survival of these species, rather it is open, park-like stands that exist in a woodland condition that is the critical niche shared by these species.

Stands proposed for timber harvest and/or midstory control treatments include over mature and declining off-site loblolly pine and loblolly pine-hardwood stands occurring on longleaf pine sites, mature (>40 years old) longleaf pine stands that are overstocked, and young (<40 years old) longleaf pine stands that are overstocked.

3. Environmental Effects:

▪ **Alternative A – No Action:** Current forest conditions in the Pipeline NW planning area are described in **Chapter 3.A. – Forest Composition and Structure**. Forest composition and structure will continue to change under the No Action Alternative as a result of prior decisions. Early seral stage habitat will be created through restoration of longleaf pine on native longleaf sites by regeneration harvest methods.

Thinning of overstocked longleaf over 40 years old in conjunction with midstory treatments will speed establishment of an herbaceous understory. This treatment will result in a rapid change in

stand structure coupled with a more gradual and long-term change in stand function as application of prescribed fire is utilized to promote and maintain an herbaceous understory.

The current road system in the Pipeline NW Planning Area is described in section 3.F. Dispersed Recreation and Public Access. Existing access restrictions including seasonal and year-round road closures will continue to provide wildlife protection from disturbance from spring through early fall.

Continued maintenance of permanent openings in the area by mowing and/or planting will continue to provide limited early seral stage habitats and foraging opportunities for wildlife.

▪ **Alternative B – Proposed Action:** Proposed actions will build upon previous decisions and will add methods to improve efficiency in achieving goals relating to forest composition, structure, and function. Proposed actions are designed to provide resiliency and sustainability by restoring species composition, structure, and function through a series of actions designed to favor native species on native sites (i.e. longleaf on longleaf sites, hardwood on hardwood sites, etc.). These actions will also increase adaptive capacity of resources to potential effects of climate change, natural wind events, etc. by aligning species to their respective native sites.

- **Restore longleaf on native longleaf sites and delineate hardwood inclusions and riparian areas:** The primary objective of restoration is to establish native longleaf community types with long-term sustainability as upland woodland communities for RCW, northern bobwhite quail, and other woodland associate wildlife species. In the long-term, restoring longleaf pine on longleaf, soils will provide sustainable woodland habitats because this species is long lived, fire adapted, and well suited to RCW utilization. Regeneration harvest employed to accomplish restoration will create early seral habitat conditions favorable to prairie warbler, eastern wild turkey, and northern bobwhite quail. With application of herbicides to control competing hardwoods and prescribed fire to promote herbaceous understory development, the utility of these stands to these species can be extended to 10 years post planting.
- **Thin overstocked native longleaf, over 40 years old, and treat midstory to achieve open park-like conditions:** The primary objective of this treatment is to restore the desired structure and function of these stands. Thinning in conjunction with midstory treatments will decrease canopy closure, allowing establishment of an herbaceous understory. This treatment will result in a rapid change in stand structure coupled with a more gradual and long-term change in stand function as application of prescribed fire is utilized to promote and maintain an herbaceous understory. Ultimately, establishment and maintenance of the herbaceous understory will increase availability of early successional habitat across the landscape. While this treatment will not benefit wood thrush, remaining MIS will be benefitted.

- **Thin mixed pine, less than 40 years old, and treat midstory to achieve open park-like conditions:** The primary objective of this treatment is to restore the desired structure and function of these stands. Thinning in conjunction with midstory treatments will decrease canopy closure, allowing establishment of an herbaceous understory. This treatment will result in a rapid change in stand structure coupled with a more gradual and long-term change in stand function as application of prescribed fire is utilized to promote and maintain an herbaceous understory. Ultimately, establishment and maintenance of the herbaceous understory will increase availability of early successional habitat across the landscape. While this treatment will not benefit wood thrush, remaining MIS will be benefitted.
 - **Provide safe and efficient access while providing nature-based recreation:** Actions relating to the road system in the Pipeline NW planning area are discussed in section 3.F. Changing status of 7.2 miles of seasonally closed road to year-round open will increase disturbance to wildlife from spring through early fall. This disturbance will be mitigated by the fact that a series of beaver created wetlands are adjacent to the road, limiting foot access. Changing the status of 1.5 miles of seasonally open roads to yearlong closed and changing the status of 12.7 miles of road from yearlong open to yearlong closed for a total of 14.2 miles will provide additional mitigation to those disturbance effects. Maintaining roads with selective herbicide will decrease encroachment of road edges by woody vegetation and promote herbaceous growth along road edges. This treatment will add early successional habitat within the planning area, benefitting MIS species except wood thrush.
- 4. Indirect Effects on Management Indicator Species (MIS):** This section discusses expected population trends of MIS by alternative. Population trends are based on expected trends in habitat quantity and quality in the Pipeline NW planning area and are summarized in **Table 3.G.4**.

Wood thrush: Wood thrush habitat exists within the Pipeline NW planning area. Preferred habitat occurs in riparian areas and closed-canopy hardwood dominated drainage bottoms, and suitable but non-preferred habitats occur in closed-canopy pine and mixed pine stands with hardwood midstory. Alternative A would not affect preferred habitats, but would result in a short-term reduction in availability of non-preferred habitats as a result of commercial harvest in upland pine stands. Limited hardwood midstory treatments will likely result in development of hardwood midstory in commercially harvested stands resulting in long-term development of non-preferred habitats. Alternative B also would not affect preferred habitats, but would result in additional short-term reductions in availability of non-preferred habitats. Commercial harvest, hardwood midstory treatments, and prescribed burning in the planning area will decrease canopy closure and promote herbaceous understory conditions. While canopy closure will increase over time, actions will result in an overall long-term decrease in wood thrush habitat within the planning area.

While both alternatives will result in reductions in wood thrush habitat within the planning area, reductions will occur in non-preferred habitat. Availability of preferred and non-preferred habitat within and adjacent to the planning area will moderate reductions and actions are not likely to cause major decreases in wood thrush population levels on the Oakmulgee District.

White-tailed deer: A variety of white-tailed deer habitats exist in the Pipeline NW planning area. Hard and soft-mast producing species provide foraging opportunities for white-tailed deer in the late fall and early winter. Early successional habitats including managed openings, clear-cuts, and mature forests with open canopies provide browse throughout the year.

Both Alternative A and B will result in short term increases in early successional habitat within the planning area. While some loss of mast-producing hardwood species will occur through commercial harvest treatments on upland sites, mast-producing species in riparian areas and hardwood dominated drainage bottoms will not be affected. Additionally, lost forage potential will be positively offset through creation of early successional habitat with year-round foraging opportunities.

As clear cuts are replanted and mature into stands with closed canopies, some short-term gains in early successional habitat will be lost over the long term. Alternative A will likely result in little long-term change in white-tailed deer population levels while Alternative B will likely result in long term increases as a result of creation and development of open canopied stands with woodland conditions through application of hardwood midstory control treatments and prescribed fire.

Eastern wild turkey: A variety of eastern wild turkey habitats exist in the Pipeline NW planning area. Hard and soft-mast producing species provide foraging opportunities in the late fall and early winter and early successional habitats including managed openings, clear-cuts, and mature forests with open canopies provide nesting and brood rearing habitat.

Both Alternative A and B will result in short term increases in early successional habitat within the planning area. While some loss of mast-producing hardwood species will occur through commercial harvest treatments on upland sites, mast-producing species in riparian areas and hardwood dominated drainage bottoms will not be affected. Additionally, lost forage potential will be positively offset through creation of early successional habitat with year-round habitat value.

As clear-cuts are replanted and mature into stands with closed canopies, some short-term gains in early successional habitat will be lost over the long term. Alternative A will likely result in little long-term change in eastern wild turkey population levels while Alternative B will likely result in long term increases as a result of creation and development of open canopied stands with

woodland conditions through application of hardwood midstory control treatments and prescribed fire.

Northern bobwhite quail: Northern bobwhite quail habitat exists within the Pipeline NW planning area, but population density is low. Alternative A would create additional early successional habitat, but gains would be short lived as clear cuts transition into planted pine stands with closed canopies. Short-term trends would likely remain static while long-term trends would decrease as canopy closure increases and development of hardwood midstory in upland pine stands continues.

Alternative B would create higher quantities of early successional habitat, which would likely result in slight increases in habitat availability and population levels in the short term.

Alternative B will likely result in long-term increases in northern bobwhite quail habitat availability and population trends as a result of creation and development of open canopied stands with woodland conditions through application of hardwood midstory control treatments and prescribed fire.

Prairie Warbler: Limited prairie warbler habitat exists within the Pipeline NW planning area because the area is predominately forested. Existing habitat consists of managed openings.

Both Alternatives A and B would result in increases in early successional habitat through commercial harvest activities. This will likely result in short term increases in prairie warbler breeding habitat and population levels within the area. Long-term prairie warbler habitat availability and population trends will likely remain stable because short term gains in breeding habitat would be short lived as clear-cuts transition into planted pine stands with closed canopies.

Figure 3.G.4: Expected population trends¹ of wildlife resources by alternative. Population trends are based on expected trends in habitat quantity and quality.		
	A	B
Wood thrush		
Short-term	-	-
Long-term	=	-
White-tailed deer		
Short-term	+	+
Long-term	=	+
Eastern wild turkey		
Short-term	+	+
Long-term	=	+
Northern bobwhite quail		
Short-term	=	+
Long-term	-	+
Prairie warbler		
Short-term	+	+
Long-term	=	=

¹ - Population trend expressed as change from current levels: "++" = relatively large increase, "+" = increase, "=" = little to no change, "-" = decrease, "--" = relative large decrease

H: Non-Native Invasive Plant Species (NNIPS):

1. Issues: One objective of the proposed action is to “*Manage forest and woodland ecosystems to restore and/or maintain native communities to provide the desired composition, structure, and function*” (Forest Plan Goal 1). This section will address the predicted impacts of the Proposed Action and its alternative on the control, spread, and potential for introduction of non-native invasive plant species (NNIPS) in the Pipeline NW planning Area.

NNIPS have been identified as a threat to National Forest lands nationwide and the agency has made responding to NNIPS a priority. The National Forests in Alabama (NFinAL) has developed a NNIPS strategy that involves 1) Prevention of introduction of NNIPS species; 2) Early detection and rapid response to NNIPS infestations; 3) Control and management of known NNIPS infestations; and 4) Rehabilitation and restoration of native species (USDA Forest Service, 2008). The NFinAL NNIPS strategy also recommends application of a risk assessment tool (adopted from FS General Technical Report SRS-62, James H. Miller) for new projects (Figure 3.H.1).

Figure 3.H.1: NON-NATIVE INVASIVE PLANT SPECIES RISK ASSESSMENT TOOL

**FACTOR 1: Likelihood of Undesirable Plant Species,
Including Noxious Weeds Species, Spreading to Planning Area:**

Ranking	Value	Definitions
NONE	0	Undesirable plants, including non-native invasive plant species not located within or immediately adjacent to the planning area. Project activity is not likely to result in the establishment of undesirable weed species on the planning area.
LOW	1	Undesirable plant species present in areas adjacent to, but not within, planning area. Project activities can be implemented and prevent the spread of undesirable plants into the planning area.
MODERATE	5	Undesirable plant species located immediately adjacent to or within area. Project activities are likely to result in some areas becoming infested with undesirable plant species even when preventative management actions are followed. Control measures may be essential to prevent the spread of undesirable plants or noxious weeds within the planning area.
HIGH	10	Heavy infestations of undesirable plants are located within or immediately adjacent to the planning area. Project activities, even with preventative management actions, are likely to result in the establishment and spread of undesirable plants on disturbed sites throughout much of the planning area.

FACTOR 2: Consequence of Undesirable Plant Establishment in Planning Area

Ranking	Value	Definitions
LOW	1	None. No cumulative effects expected.
MODERATE	5	Possible adverse effects on site and possible expansion of infestation within planning area. Cumulative effects on native plant community are likely, but limited.
HIGH	10	Obvious adverse effects within the planning area and probable expansion of undesirable plants, including noxious weed infestations to areas outside the planning area. Adverse cumulative effects on native plant community are probable. Likelihood that NNIPS may enter an area where treatment options may be severely limited or logistically difficult.

RISK RATING PROCEDURE

Step 1. Identify level of likelihood and consequence of adverse effects (Factors 1 and 2) and assign values.

Step 2. Multiply level of likelihood times consequences (Factor 1 x Factor 2).

Step 3. Use the value resulting in step 2 to determine Risk Rating and action as follows:

Ranking	Value	Definitions
NONE	0	Proceed as planned.
LOW	1-10	Proceed as planned. Initiate control treatments on undesirable plant populations that are established in the area.
MODERATE	25	Develop preventative management measures for the proposed project to reduce the risk of introduction or spread of undesirable plants into the area. Monitor the area for at least 3 consecutive years and provide for control of new infestations.
HIGH	50-100	Modify project design and implement preventative management measures for the proposed project to reduce the risk of introduction or spread of undesirable plants into the area. Monitor the area for at least 5 consecutive years and provide for control of new infestations. Consider moving or dropping project to avoid impacts.

2. Affected Environment: The Pipeline NW planning area consists of 8,783 acres of NFS lands located in the northwest portion of the TNF, Oakmulgee District in Tuscaloosa, Hale, and Bibb Counties, Ala. The area is inventoried as Oakmulgee Compartments 1, 2,3,4,5 and 6. The planning area lies 12 miles south of Tuscaloosa, Ala., and 21 miles northeast of Greensboro, Al. It extends from Forest Service Road (FSR) 706 on the west, to Forest Service Road 726 and Wiggins Creek Drainage on the east, and Forest Service Road 724 and the Talladega National Forest proclamation boundary to the north. For a detailed description of the planning area, see Chapter 1.A.

3. Environmental Effects:

A. Alternative A – No Action: In 2015, there were 19 documented NNIPS infestations within the Pipeline Northwest planning area (**Table 3.H.3: Known non-native invasive plant species within the Pipeline NW planning area**). Over the past five years there have been ongoing control efforts and currently the twenty known infestations have been greatly reduced. Currently, NNIPS species include cogongrass, kudzu, mimosa, tall fescue, and shrub lespedeza. Of these sites, one active cogongrass site, 2 active kudzu sites exist in the project area. Inventory methods to date have concentrated along roadways and those areas are under a treatment regime. The stand level inventory for this planning area documented several cogongrass patches in interior areas not easily accessed by roads. There is a definite pattern of inadvertent introduction and spread of NNIPS through transport on vehicles, equipment, and through road maintenance activities. There is also reason to believe that some of these NNIPS have been introduced into non-roaded areas. These infestations are likely suppressed and not readily identifiable due to dense canopy cover and lack of prescribed fire.

Common Name	Scientific Name	Priority	Location	Size	Current Status
Cogongrass	<i>Imperata cylindrica</i>	High	T23N, R6E, Sec. 34	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 2	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 2	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 3	< 1 ac	Active
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 14	< 1 ac	Controlled*
Cogongrass	<i>Imperata cylindrica</i>	High	T22N, R6E, Sec. 14	< 1 ac	Controlled*
Kudzu	<i>Pueraria montana</i>	High	T22N, R6E, Sec. 2	2.3 ac	Active
Kudzu	<i>Pueraria montana</i>	High	T22N, R6E, Sec. 11	0.6 ac	Active
Mimosa / Silktree	<i>Albizia julibrissin</i>	Low	T24N, R7E, Sec. 32	< 1 ac	Controlled*
Mimosa / Silktree	<i>Albizia julibrissin</i>	Low	T24N, R6E, Sec. 23	< 1 ac	Controlled*
Mimosa / Silktree	<i>Albizia julibrissin</i>	Low	T24N, R6E, Sec. 27	< 1 ac	Controlled*
Bicolor	<i>Lespedeza bicolor</i>	Low	T23N, R7E, Sec. 4	< 1 ac	Controlled*
Bicolor	<i>Lespedeza bicolor</i>	Low	T23N, R7E, Sec. 5	1.8 ac	Controlled*

* Not present on site, but potentially present in soil

Implementation of the no action alternative will involve risk of NNIPS introduction and spread through commercial harvest activities, mechanical mid-story treatments, and road maintenance activities.

Application of the Risk Assessment Tool (**Figure 3.H.2**), adopted from FS General Technical Report SRS-62, James H. Miller, results in moderate likelihood of NNIPS spreading into the area (Factor 1) because undesirable plant species are located within the planning area and project activities may result in some areas becoming infested with undesirable plant species. Factor 1 is not rated high because heavy infestations do not exist within the planning area and project activities are not likely to cause establishment and spread of undesirable plant species throughout much of the planning area due to the limited number and size of active infestations.

Consequences of NNIPS establishment in the planning area (Factor 2) are rated as moderate in the Risk Assessment Tool because expansion of infestations and resulting adverse effects are possible within the planning area and cumulative effects on the native plant community are likely, but limited due to the limited number and size of active infestations. Factor 2 is not rated high because expansion of infestations outside the planning area is not probable, adverse cumulative effects on the native plant community are not likely, and there are no areas where treatment options may be severely limited or logistically difficult. A summary of Risk Assessment Tool application is given in **Table 3.H.3**.

B. Alternative B – Proposed Action: Implementation of the proposed action will also involve risk of NNIPS introduction and spread in the Pipeline NW planning area. While risk of NNIPS introduction and spread through commercial timber harvest and midstory treatments will be higher than the no action alternative due to larger treatment acreages, risk of introduction and spread through road maintenance activities will be lower because of the addition of selective herbicide application to roadside vegetation management options. Risk of NNIPS introduction and spread may also be increased due to decreasing canopy closure with implementation of project activities. Despite higher risk associated with the proposed action relative to the no action alternative, application of the Risk Assessment Tool (**Figure 3.H.2**) to Alternative B results in moderate likelihood of NNIPS spreading into the area (Factor 1) because undesirable plant species are located within the planning area and project activities may result in some areas becoming infested with undesirable plant species. Factor 1 is not rated high because heavy infestations do not exist within the planning area and project activities are not likely to cause establishment and spread of undesirable plant species throughout much of the planning area due to the limited number and size of active infestations.

Consequences of NNIPS establishment in the planning area (Factor 2) are rated as moderate in the Risk Assessment Tool because expansion of infestations and resulting adverse effects are possible within the planning area and cumulative effects on the native plant community are likely, but limited due to the limited number and size of active infestations. Factor 2 is not rated high because expansion of infestations outside the planning area is not probable, adverse cumulative effects on the native plant community are not likely, and there are no areas where treatment options may be severely limited or logistically difficult. A summary of Risk Assessment Tool application is given in **Table 3.H.3.B**.

Figure 3.H.3.B: Risk Assessment Tool application results by alternative		
Risk Assessment Criteria	Alternative A - No Action	Alternative B – Proposed Action
Factor 1 - Likelihood of Spread	5 - Moderate	5 - Moderate
Factor 2 - Consequences of Establishment	5 - Moderate	5 - Moderate
Risk Rating - Factor 1 X Factor 2	25 - Moderate	25 - Moderate
Recommended Actions	1. Develop preventative measures to reduce risk of introduction or spread. 2. Monitor area for at least 3 consecutive years. 3. Provide for control of new infestations.	

4. NNIPS Mitigation: Both the proposed action and no action alternative resulted in a moderate risk rating when the NNIPS Risk Rating Tool was applied. Recommended actions for this risk rating are to 1) develop preventative management measures for the proposed project to reduce the risk of introduction or spread of undesirable plants into the area; 2) monitor the area for at least 3 consecutive years; and 3) provide for control of new infestations. Mitigation measures for proposed actions within the Pipeline NW planning area will include the following:

1. Develop preventative management measures for the proposed project to reduce the risk of introduction or spread of undesirable plants into the area
 - a. Restrict operations within and adjacent to infestations.
 - i. Operation of off-road equipment will be restricted within and immediately adjacent to infestations. Infestation locations where equipment operation will be restricted will be shown on Contract Area Maps and/or by designation on the ground.
 - b. Treat known infestations within the planning area.
 - i. Known infestations within the Pipeline NW planning area will be treated annually with selective herbicides until control of the infestation is achieved. Application rate, method, and timing will be according to herbicide label instructions.
 - c. Require cleaning of equipment.
 - i. Areas, known by Forest Service prior to contract advertisement, that are infested with invasive species of concern will be shown on Contract Area Maps.
 - ii. Contractor shall not move any Off-Road Equipment, which last operated in an area that is infested with one or more invasive species of concern onto Contract Areas without having first taken reasonable measures to make each such piece of equipment free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Contractor shall identify the location of the equipment’s most recent operations. If the prior location of the off-road equipment cannot be identified, Forest Service will assume that it is infested with seeds of invasive species of concern. In addition, prior to moving off-road equipment from an area in the planning area that is shown on Contract Area Maps to be infested with invasive species of concern to any other area that is indicated on Contract

- Area Maps as being free of invasive species of concern, Contractor shall again take reasonable measures to make each such piece of equipment free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds.
- iii. Contractor must advise Forest Service of measures taken to clean off-road equipment and arrange for Forest Service inspection prior to such equipment being placed in service or moved from areas infested with invasive species of concern to areas to areas that are free of such invasive species. Equipment shall be considered free of soil, seeds, and other such debris when a visual inspection does not disclose such material.
 - iv. “Off-Road Equipment” includes all logging and construction machinery, except for log trucks, chip vans, service vehicles, water trucks, pickup trucks, cars, and similar vehicles.
 - v. If Contractor desires to clean Off-Road equipment on National Forest land, such as at the end of a project or prior to moving to a new area that is free of invasive species of concern, Contractor and Forest Service shall agree on locations for the cleaning and control of off-site impacts, if any.
 - vi. New infestations of invasive species of concern to Forest Service, identified by either Contractor or Forest Service on Contract Area, shall be promptly reported to the other party and operations shall be delayed or interrupted at that location until Contractor and Forest Service agree on treatment methods.
2. Monitor the area for at least three consecutive years.
 - a. Monitor known infestations.
 - i. Known infestations (active and controlled) within the Pipeline NW planning area will be monitored annually to determine status of the infestation. Monitoring will consist of a visual inspection of the infestation to determine if active growth of the invasive species of concern is occurring.
 - ii. An infestation will be considered controlled when monitoring reveals no active growth of the invasive species of concern.
 - iii. An infestation will be considered active when monitoring reveals active growth of the invasive species of concern. Active infestations will be treated annually until control is achieved.
 - iv. Monitoring will continue for at least three consecutive years after control is achieved.
 - b. Survey the planning area.
 - i. Surveys for NNIPS will occur within the Pipeline NW planning area throughout project implementation and for three consecutive years following project completion.
 - ii. Informal surveys will be conducted through the course of normal field operations by Oakmulgee District personnel.
 - iii. Formal surveys will be conducted in areas of higher likelihood of new infestations being established (e.g. areas adjacent to known infestations, roadsides, areas where Off-Road Equipment has been used).
 3. Provide for control of new infestations.
 - a. Treat new infestations within the planning area.

- i. Known infestations within the Pipeline NW planning area will be treated annually with selective herbicides until control of the infestation is achieved. Application rate, method, and timing will be according to herbicide label instructions.

In addition to specific mitigation measures discussed above, the Forest Plan provides “Forest-wide Standards” that define the rules for implementation of management actions. Standards are the specific technical resource management directions and often preclude or impose limitations on management activities on resource uses, generally for environmental protection, public safety, or to resolve an issue. Standards applicable to the Pipeline NW planning area and specific standards relative to management actions relating to NNIPS in the Proposed Action and the No Action alternative are discussed in Chapter 2 of this document (**Reference Chapter 2, Management Standards Common to Both Alternatives**).

I. Climate Change:

- 1. Affected Environment:** Climate change can affect the resources in the Pipeline Northwest planning area and the proposed project can affect climate change through altering the carbon cycle. Climate models are continuing to be developed and refined, but the two principal models found to best simulate future climate changed conditions for the various regions across the country are the Hadley Centre model and the Canadian Climate Centre model (Climate Change Impacts on the United States 2001). Both models indicate warming in the southern region. However, the models differ in that one predicts little change in precipitation until 2030 followed by much drier conditions over the next 70 years. The other predicts a slight decrease in precipitation during the next 30 years followed by increased precipitation. These changes could affect forest productivity, forest pest activity, vegetation types, major weather disturbances (droughts, hurricanes), and stream flow. These effects would likely be seen across the forest.

Recent scientific literature confirms a general pattern of changes in net ecosystem productivity (NEP)¹ and carbon stocks over the period of forest stand development. Most mature and old stands remain a net sink of carbon. Pregitzer and Euskirchen (2004) synthesized results from 120 separate studies of carbon stocks and carbon fluxes for boreal, temperate, and tropical biomes. They found that in temperate forests NEP is lowest, and most variable, in young stands (0-30 years), highest in stands 31 – 70 years, and declines thereafter as stands age. These studies also reveal a general pattern of total carbon stocks declining after disturbance and then increasing, rapidly during intermediate years and then at a declining rate, over time until another disturbance (timber harvest or tree mortality resulting from drought, fire, insects, disease or other causes) kills large numbers of trees and again converts the stands to a carbon source where carbon emissions from decay of dead biomass exceeds that amount of carbon removed from the atmosphere by photosynthesis within the stand.

Timber harvesting and burning may change the amount of carbon sequestered in forests. Timber harvests result in lower amounts of carbon left in forests as living biomass is removed, especially when more of the basal area is removed and in clear-cuts (Li, Chen et al. 2007; Depro, Murray et al., 2008; Nunery and Keeton, 2010), although carbon may continue to be stored in manufactured wood products (Nunery and Keeton 2010). At the same time, timber harvesting of forest products, as proposed for this environmental assessment, may reduce CO₂ emissions by forests,

¹ Net ecosystem productivity, or NEP, is defined as gross primary productivity (GPP) minus ecosystem respiration (ER) (Chapin et al. 2006). It reflects the balance between (1) absorbing CO₂ from the atmosphere through photosynthesis (GPP) and (2) the release of carbon into the atmosphere through respiration by live plants, decomposition of dead organic matter, and burning of biomass (ER). When NEP is positive, carbon accumulates in biomass. Ecosystems with a positive NEP are referred to as a carbon sink. When NEP is negative, ecosystems emit more carbon than they absorb. Ecosystem with a negative NEP is referred to as a carbon source.

increasing CO₂ uptake due to enhancement of net primary productivity and net ecosystem productivity (Birdsey, Pregitzer et al., 2006; Boerner, Huang et al., 2008). Forest harvesting may result in immediate reductions of forest carbon (Depro, Murray et al. 2008; Nunery and Keeton 2010), but this has been shown to be balanced by increased carbon sequestration in subsequent years (Boerner, Huang et al. 2008).

Carbon dioxide and water vapor generally make up over 90% of the total emissions from wildland fire (Hardy, Ottmar et al., 2001), releasing approximately 3,000 pounds of CO₂ per ton of fuel consumed. Since wildfires usually consume more fuel than prescribed fires, they release more carbon dioxide into the atmosphere. Prescribed burning is used to reduce the fuel load and the risk of severe wildfire, thereby limiting the release of CO₂ into the atmosphere. Carbon stored in forests may be severely impacted by forest fires, with resulting exacerbation of global climate change. Intensely and extensively burned forest areas no longer sequester carbon at the same rate as they did pre-fire. Unlike large-scale wildfires, prescribed burns are low intensity and cover only small areas at a time. This results in differences between wildfires and prescribed fires in their effect on the forest carbon cycle. During a fire, carbon stocks are released into soils through the death of living vegetation, temporarily increasing the overall carbon content of the soil in some cases; in other circumstances resulting in overall soil carbon loss. Studies have shown that prescribed fires and wildfires both can increase *or* decrease carbon content in soils (Johnson and Curtis 2001; Cason, Grebner et al., 2006). Low-intensity controlled burns generally do not result in major long-term losses of soil carbon or coarse woody debris on the forest floor (Johnson and Curtis 2001; Hubbard, Vose et al., 2004; Boerner, Huang et al., 2008), and they result in less soil carbon loss than high-intensity fires (Cason, Grebner et al., 2006). A short-term loss of biomass resulting from a prescribed fire may be offset by the burned area's increased ability to produce herbaceous biomass (McCarty 2002). According to a regional study, the largest carbon pool in forests is in living trees (Li, Chen et al. 2007). Regular, periodic prescribed burning results in a risk reduction of catastrophic, stand replacing wildfire occurrence (Fernandes and Botelho 2003). Carbon stocks that had been stored within the trees are released into the atmosphere as a result of wildfires (Hubbard, Vose et al., 2004; Birdsey, Pregitzer et al. 2006); prescribed fires generally do not result in large-scale tree death and therefore do not release carbon to the same extent as a wildfire. In fire-mediated ecosystems, carbon sequestration generally equals or exceeds sequestration in unburned systems (Liechty, Luckow et al. 2005).

Soil carbon levels (both organic and inorganic) can also change with forest harvesting, although there is some evidence that timber removal does not change soil carbon levels, as long as the area remains forested (Ponder 2007; Depro, Murray et al. 2008). Two primary changes to soil organic carbon may occur: carbon is released when decaying root systems are consumed and respired by soil microbes; and carbon stored in soil biomass increases with increased forest floor herbaceous vegetation. Changes to soil organic carbon levels resulting from plant turnover may

increase energy available to soil microbes, ultimately resulting in decreased inorganic carbon levels deep in the soil. This deep soil carbon is one of the largest carbon pools, and its release and reduction over time may have climatic consequences (Fontaine, Barot et al. 2007).

- 2. Direct, Indirect Effects of Alternative A:** Under the No Action Alternative, the impacts of the action alternative on global carbon sequestration and atmospheric concentrations of CO₂ are miniscule. Forested stands treated through prior decisions documents will become more resilient to possible climate change, while the ones left untreated are expected to be less resilient to possible climate change impacts such as changes in productivity or insect and disease compared to the action alternative. Untreated off site pine species will continue to die off at a rapid rate (3 – 5 years).

- 3. Direct, Indirect Effects of Alternative B:** The impacts of the action alternative on global carbon sequestration and atmospheric concentrations of CO₂ are miniscule. However, the forests of the United States reduce atmospheric concentrations of CO₂ resulting from fossil fuel emissions. The forest and wood products of the United States currently sequester approximately 200 teragrams² of carbon per year (Heath and Smith, 2004). This rate of carbon sequestration offsets approximately 10% of CO₂ emissions from burning fossil fuels (Birdsey et al., 2006). U.S. forests currently contain 66,600 teragrams of carbon. The short-term reduction in carbon stocks and sequestration rates resulting from the proposed project are imperceptibly small on global and national scales, as are the potential long-term benefits in terms of carbon storage.

The currently large carbon sink in U.S. forests is a result of past land use changes, including the re-growth of forests on large areas of the eastern U.S. harvested in the 19th century, and 20th century fire suppression in the western U.S. (Birdsey et al., 2006). The continuation of this large carbon sink is uncertain because some of the processes promoting the current sink are likely to decline and projected increases in disturbance rates such as fire and large-scale insect mortality may release a fraction of existing carbon stocks (Pacala et al. 2008). Management actions - such as those proposed – that improve the resilience of forests to climate-induced increases in frequency and intensity of disturbances such as fire, and utilize harvested trees for long-lived forest products and renewable energy sources may help sustain the current strength of the carbon sink in U.S. forests (Birdsey et al., 2007).

It is not expected that the action alternative will substantially alter the effects of climate change in the project area. The regeneration and thinning in the areas to be harvested and other vegetation management will provide more structural diversity to the area, and establish young, vigorous stands of timber and maintain health that may be more resilient to the changes in

² 200 teragrams, or Tg, equals 196,841,306 US tons.

climate. The proposed fuels treatment in the action Alternative may contribute towards moving the burned area towards a community closer to its historic fire regime that may be more resilient to changes in climate. There will be a direct, short-term (length of time the prescribed fire is actively burning live and dead vegetation) increase in carbon emissions during the prescribed burn and a short-term increase due to an increase in dead vegetation following the burn. However the short term loss of biomass (the length of time for the prescribed burn area to re-vegetate; typically anywhere from three to six months depending on rainfall and climatic conditions) resulting from a fire may be offset by the burned area's increased ability to produce herbaceous biomass. There is a direct beneficial effect on climate change of decreased greenhouse gas emissions from the acres to be burned because the risk of acres being burned by uncharacteristically severe wildfires would be reduced. There is also an indirect beneficial effect by treating these acres because live stands of trees will retain higher capacity to sequester carbon dioxide compared to stands killed by uncharacteristically severe wildfires, especially if not immediately reforested.

Overall forestry practices (including timber harvesting) have been shown to act as a net carbon sink (EPA 2001). Regeneration harvests will reduce existing carbon stocks at the harvest sites. The harvest of live trees, combined with the likely increase in down, dead wood will temporarily convert stands from a carbon sink that removes more carbon from the atmosphere than it emits, to a carbon source that emits more carbon through respiration than it absorbs. These stands will remain a source of carbon to the atmosphere until carbon uptake by new trees and other vegetation exceeds the emissions from decomposing dead organic material. The stands will likely remain a carbon source for several years, and perhaps for more than a decade, depending on the amount of dead biomass left on site, the length of time before new trees become reestablished, and their rate of growth once reestablished. As the stands continue to develop, the strength of the carbon sink will increase until peaking at an intermediate age and then gradually decline but remain positive. Similarly, once new trees are established, carbon stocks will accumulate rapidly for several decades. The rate of accumulation will slow as the stands age. Carbon stocks will continue to accumulate, although at a declining rate, until impacted by future disturbances. Thinning stands is considered a short-term reduction in carbon stocks with rapid increases in carbon stocks as thinned stands become more vigorous.

- 4. Cumulative Effects of Alternatives A and B:** There is confidence that temperatures are changing at a global scale and it is difficult to predict the effect of climate change at local and regional scales because the relationship between climate change and the proposed project areas are at a minute scale. The contribution of the proposed actions and past and future projects to the carbon cycle is extremely small. Collectively, the risk and rate of additional carbon release through regeneration, harvest and prescribed burning is minimal for the reasonably foreseeable future. Management actions such as those proposed will aid the forest in improving resiliency to changes in climate.

J. Economics and Operational Capacity:

The monetary cost of restoring upland longleaf pine woodlands can be high, especially when the area to be restored is outside the historic 3 – 5 year return interval for prescribed fire. Revenue from the sale of timber from restoration treatments can be applied to the restoration costs and will reduce the funds needed from other sources. **Figure 3.J.: Summary of Economic Considerations by Alternative** provides a tabulation of estimated volumes, values, and costs for the woodland restoration treatments. It does not include the cost of NNIPS treatments or SPB suppression, as those are difficult to predict and treatment often spans multiple years.

The calculations listed in **Figure 3.J.** indicate that reforestation cost should be covered by the value of the stumpage from harvesting. The woodland understory/midstory treatments will need to be adjusted between the herbicide, cut & leave, and mulching treatments (as addressed in the Upland Longleaf Pine Restoration Adaptive Management Protocols), or additional funds will need to be garnered.

This alternative proposes approximately 1483 acres of thinning, approximately 460 acres of clear cutting, approximately 841 acres of mid-story treatment (cut and leave), approximately 2,785 acres of herbicide application, approximately 2,785 acres of mechanical mulching, and 1.75 miles of temporary roads. Also proposed is road status change, SPB treatments as they occur and associated treatments with vegetation management, i.e. use of herbicides. The proposed treatments are listed as duplicate treatments for many areas. The actual treatments will be less than the acres proposed when the Adaptive Management Protocols are applied.

Figure 3.J.: Summary of Economic Considerations	
Proposed Action	
Estimated Volume (CCF)	
First Thinning (10 CCF/AC)	3,413 acres
Intermediate Thinning (12 CCF/AC)	11,417 acres
Clear Cut with Reserves (20 CCF/AC)	4,609 acres
	19,439 acres
Estimated Value ~\$50/CCF	
	\$971,950.00
Reforestation Costs	
Site Prep Herbicide (\$235/acre)	\$108,312
Site Prep Burning (\$38/acre)	\$212,429
Site Prep Mulching (\$350/acre)	\$161,315
Planting (\$208/acre)	\$95,867
Release herbicide (\$235/acre)	\$108,312
	\$686,234.01
Woodland Treatments	
Midstory Cut/Leave (\$151/acre)	\$223,933
Midstory Mulch (\$350/acre)	\$974,835
Midstory Herbicide (\$216/acre)	\$601,612
	\$1,800,380.16
RCW Artificial Cavities	
Insert Installation (\$120/ea.)	\$10,500.00
TOTAL ALL TREATMENTS	\$2,497,114.17

Both Alternatives provide a short-term relief in cost to the government for the restoration actions. The local community should benefit from both alternatives due to the creation of some local jobs. Infusion of timber raw material into local processing facilities will have a short-term economic benefit for the local economy as jobs are generated to produce the timber to local mills, which in turn process it into products used for construction, furniture manufacture, paper products, and many other products sold to wholesale and retail distributors. Given that there is some additive value to Alternative B, it will provide a greater short-term economic benefit when compared to Alternative A.

There will be substantial long-term benefits both economically and ecologically. Economic benefits include a restored landscape of higher value longleaf trees replacing declining loblolly pine trees. This in turn will create woodlands stocked with healthy longleaf pine that are less susceptible to stress from natural events such as winds, insects, and disease. Healthy sustainable woodlands generally require less mediation from natural disturbances. Healthy sustainable woodlands also have an aesthetic value often increasing visitor use with an indirect benefit to the local community through tourism. Alternative B allows for additional restoration treatments thus providing increased long-term benefits resulting from healthy sustainable forests and woodlands.

K. Proposed, Endangered, Threatened, and Candidate Species (PETC):

1. **Proposed Management Actions:** The goals of the Pipeline NW planning area are designed to provide resiliency and sustainability by restoring species composition, structure, and function through a series of actions designed to favor native species on native sites (i.e. longleaf on longleaf sites, hardwood on hardwood sites, etc.) and to enhance the recreational opportunity spectrum. The goals were developed within the guidance of the Revised Land and Resource Management Plan (Forest Plan) for the National Forests in Alabama. The Forest Plan provides broad program-level direction for management with the intent that future projects, such as the *Pipeline NW Restoration Plan*, will carry out the direction as well as develop site-specific mitigations and coordination measures.

To achieve the goals listed in Section B. (Goals and Objectives) of the EA, the following actions are proposed within the Pipeline NW planning area. The proposed actions are described as the maximum treatment considered for the area.

2. **Species Considered and Evaluated:** All Forest PETC species relative to the project were considered. Reference **Table 1: PETC Species Considered and Included/Excluded from Analysis – Pipeline NW Project Area, FY 2015, Talladega National Forest, Oakmulgee Ranger District** for species considered and included/excluded from analysis for this project, based on whether or not they occur, or potentially occur, within the area of analysis.

Table 1: Proposed, Endangered, Threatened and Candidate Species Considered and Included/Excluded from Analysis – Pipeline NW Project Area, FY 2015, Talladega National Forest, Oakmulgee Ranger District. (List derived from Longleaf Ecosystem Restoration Project EIS, and the Revised Land and Resource Management Plan for the National Forests in Alabama, Jan. 2004, and USFWS listing of Species by County from the Daphne Ecological Services Field Office website, 2015.)

Summary: PETC species	Habitat	Occurrence on Talladega NF, Oakmulgee RD	Considered but Excluded from Analysis	Considered in BE
Endangered: Red-cockaded woodpecker (<i>Picoides borealis</i>)	Open pine forests with large, old trees.	Many active cluster sites.		✓
Wood stork (<i>Mycteria Americana</i>)	Shallow freshwater and estuarine wetlands.	Infrequent sightings.	✓ ₂	
Alabama canebrake pitcher plant (<i>Sarracenia rubra var al</i>)	Acidic, highly saturated deep, peaty sands or clay.	One known occurrence on private land within proclamation boundary of Oakmulgee.	✓ ₂	
Tennessee yellow-eyed grass (<i>Xyris tennesseensis</i>)	Thinly wooded. Moist to wet soils year round along streams.	Just below fall line in Bibb County. No known occurrences.	✓ _{1,2}	
Mitchell's satyr (<i>Neonympha mitchellii</i>)	Shrub-sedge marshes, forest swamps, and beaver ponds.	All known occurrences are on the western portion of the Oakmulgee.		✓
Cahaba shiner (<i>Notropis cahabae</i>)	Main channel of the Cahaba River. Current is slow to moderate over clean sand or sand-gravel substrates.	Historic and relatively recent records found this spp. within the proclamation boundary of Oakmulgee.	✓ _{1,2}	
Alabama sturgeon (<i>Scaphirhynchus suttkusi</i>)	Endemic to Mobile River Basin. Free-flowing rivers over stable gravel and sand substrates.	Recent report captured on the lower Cahaba River in July 2000.	✓ _{1,2}	
Ovate clubshell mussel (<i>Pleurobema perovatum</i>)	Endemic to Mobile River Basin. Medium to large streams in sand and gravel substrates.	Extant population thought to occur within the proclamation boundary of Oakmulgee.	✓ _{1,2}	
Southern clubshell (<i>Pleurobema decisum</i>)	Historically occurred in the Mobile River Basin. Sand and substrate in shoals of river to small streams.	Possibly extirpated within the Cahaba River.	✓ _{1,2}	
Rayed kidneyshell (<i>Ptychobranchus foremanianus</i>)	Endemic to Alabama, Cahaba, Coosa and Cahaba River systems of the Mobile River Basin. Found in medium to large rivers in swift current with sand and gravel substrates	Not found within National Forests in Alabama boundaries but is know from the Cahaba River near Oakmulgee.	✓ _{1,2}	
Flat pebbesnail (<i>Lepyrium showalteri</i>)	Endemic to Mobile River Basin. Prefers clean, smooth stones in rapid current of small to large rivers.	The only known extant populations are found at one site above the fall line of the Cahaba River.	✓ _{1,2}	

Cylindrical Lioplax snail (<i>Lioplax cyclostomaformis</i>)	Endemic to Mobile River Basin. Shoals of rivers and streams in mud substrate under large rocks in rapid current.	The only known extant population occurs approximately 15 miles on the Cahaba above the fall line.	✓ _{1,2}	
Threatened: Northern long-eared bat (<i>Myotis septentrionalis</i>)	Hibernates in caves and mines. Roosts and forages in upland forests during late spring and summer.	No known occurrences	✓ ₂	
Fine-lined pocketbook (<i>Hamiota altilis</i>)	Endemic to the eastern reaches of the Mobile River Basin including the Cahaba River systems.	Extant populations occur on the Oakmulgee.	✓ _{1,2}	
Round rocksnail (<i>Leptoxis ampla</i>)	Endemic to the Mobile River Basin. Substrate consisting of gravel, cobble, and boulders.	Currently found in the shoals of the Cahaba River upstream from the proclamation boundary of Oakmulgee.	✓ _{1,2}	
Inflated heelsplitter (<i>Potamilus inflatus</i>)	Black Warrior River, Big Sandy Creek and Elliotts Creek, are tributaries which is occupied by the Inflated heelsplitter. Clean gravel riffles with some current.	No known occurrences.	✓ _{1,2}	
Alabama moccasinshell (<i>Medionidus acutissimus</i>)	Mobile River Basin except in the Tallapoosa River above the fall line; swift gravel bottomed shoals or riffles	Occurs in the Mobile River Basin, not known from Oakmulgee District.	✓ _{1,2}	
Blue shiner (<i>Cyprinella caerulea</i>)	Tributary streams in NE Ala. Clear, small to medium streams with sand, gravel, or rubble substrates.	Documented as extirpated and outside the influence of any Oakmulgee. Management actions.	✓ _{1,2}	
Goldline darter (<i>Percina aurolineata</i>)	Endemic to the Mobile River Basin. In Alabama it is restricted to the middle of the section of the Cahaba River.	Historic and relatively recent records found this spp. within the proclamation boundary of Oakmulgee.	✓ _{1,2}	
Mohr's Barbara's buttons (<i>Marshallia mohrii</i>)	Shale-bedded streams in a grass sedge community.	No known occurrences.	✓ ₂	
Candidate: Georgia rockcress (<i>Arabis Georgiana</i>)	Rocky bluffs and slopes along water courses.	A few occurrences on the northern part of the Oakmulgee.	✓ ₂	
White-fringeless orchid (<i>Platanthera integrilabia</i>)	Wetland areas.	No known occurrences.	✓ ₂	
Critical Habitat: Alabama sturgeon (<i>Scaphirhynchus suttkusi</i>)		Portions of the Cahaba River, that runs through the proclamation boundary of Oakmulgee.	✓ ₂	
Notes: ¹ Project areas are not within the species' range of Alabama. ² Project areas, or their access routes, are not appropriate, nor potentially appropriate habitat for the species, or surveys have indicated the species is not present.				

3. Survey and Consultation History: Various surveys and inventories targeting the endangered red-cockaded woodpecker and Mitchell's satyr have been conducted within the Pipeline NW planning area and known breeding populations for both species exist within the project area boundary.

Multiple surveys have been conducted within the project area within the last decade for other rare plants and animals. All stands associated with the 2005 Oakmulgee Longleaf Restoration EIS (including Cmpt. 1/Stands 6, 23, 24, 25, 27, Cmpt. 2/Stands 5, 6, 14, 17, 24, 28 and 30, Cmpt. 3/Stands 9, 10 and 15, Cmpt. 4/Stands 2, 3, 5, 10, 12, 15, 18, 24, 28, 29, 30, 31, 36, 38, 39, 41, 42, 44, and 46, Cmpt. 5/Stands 8, Cmpt. 6/Stands 2, 3, 5, 6, 7, 19, and 25, within the Pipeline NW planning area) were surveyed for rare plants by various botanists. No federally listed or candidate plant or animal species (besides RCW's and Mitchell's satyrs) were found during any of the above surveys.

I queried the District GIS rare species/rare community database for existing PETC, Plant Element of Occurrence Records, and found no listed or candidate species in the vicinity of the proposed project area. Based on this information, I have eliminated all species in Table I, except Red-cockaded woodpecker and Mitchell's satyr.

John Moran, NFsAL Fisheries Biologist, was consulted (3/23/2015) to confirm that there were no new locations (based on any recent surveys) for aquatic species and critical habitats within the project area.

4. Effects of Proposed Actions on Species Evaluated:

A. Red-cockaded Woodpecker (Endangered): The red-cockaded woodpecker (RCW), *Picoides borealis*, has declined considerably from historic levels, ranging from 1-1.6 million groups to a present day population estimate of approximately 5,600 family groups. The reasons for the decline of the RCW are many, but primarily including the expansive loss of the longleaf pine ecosystem.

The RCW is a territorial, non-migratory species with a social system much more complex than most birds. It is the only North American woodpecker that excavates its roost and nest cavities in living pine trees. The RCW is very specific in regards to its habitat, requiring large tracts of old, and open pine woodlands. The dependence of the RCW upon living pine trees for cavities is probably a response to living in a fire-dependent ecosystem, where snags are often a limiting factor.

In general, pine trees 30 years or older are needed for foraging habitat and pine trees 70 years or older are needed for nesting (i.e., cavity construction) habitat. Additionally, suitable habitat should have a low basal area of mature pine with few canopy-sized hardwoods, lack a dense midstory layer, and have a diverse and abundant herbaceous layer.

The Oakmulgee currently has approximately 107 active RCW clusters, with almost all of them occurring on the western half of the District. There are five active RCW clusters (family units) within the Pipeline NW planning area. Monitoring conducted during the 2015

nesting season documented that each of the five clusters has a Potential Breeding Pair. Currently, none of the stands containing active cluster trees meet the definition of Good Quality Foraging habitat (GQFH) as defined by the RCW Recovery Plan. Timber thinning and midstory treatment are proposed for the stands containing all five of the existing active RCW cluster and adjacent stands to open the canopy and bring the pine overstory and hardwood and pine midstory down to GQFH levels and to promote an abundant herbaceous understory.

Efforts to expand RCW populations into areas with acceptable habitat conditions include spatial analysis of relative distances to existing clusters and analysis of available forage habitat. The resulting analysis of the Pipeline NW planning area reveals 12 candidate sites for placement of recruitment clusters to attract offspring from nearby active clusters, recruiting these offspring to form new Potential Breeding Groups (PBG).

Direct Effects: Direct effects of the proposed actions are expected to be negligible. Timber harvest (thinning) operations within the clusters would be consistent with the guidelines and restrictions provided in the RLRMP and RCW Recovery Plan, with regards to timing of harvest and other mechanical treatments (avoiding the breeding season, April-July). Proposed RCW insert maintenance/installation/ and –or replacement in existing and recruitment clusters would follow Recovery Plan guidelines and would have only beneficial effects.

Any treatments of future SPB infestations would be analyzed on a case-by-case basis and risks to RCWs would be analyzed prior to treatment. If direct effects are determined in the analysis, a new biological evaluation (BE) (and concurrence from FWS) would be required.

No other proposed activity (including site prep., planting, herbicide application, yearlong open and road closure, abandoned pipeline removal, wildlife opening maintenance) should have any measurable direct effects on RCWs.

Indirect Effects: Indirect effects of the proposed actions as a whole are expected to be beneficial in the long term. Thinning of the clusters and adjacent stands (within the .25 and 0.5 mile partitions) will increase the acreage moving towards GQFH and is expected to increase fitness in all five PBG's over the next few years. Herbaceous understory response is also expected to be higher and therefore more consistent with GQFH requirements, with the reductions of the current biological assessment (BA) of the existing longleaf stands.

Approximately 461 acres of clear-cut with reserve treatments are proposed within the project area, however these stands would be consistent with the guidelines provided in the RCW Recovery Plan, with regards to size and distance to active or recruitment clusters. Any potential negative short-term effects would be negligible. I surveyed all of these stands and none is currently quality foraging habitat. These types of off-site stands have been demonstrated to be unsustainable as long-term RCW foraging habitat on longleaf soils of the Oakmulgee.

Midstory treatments are expected to have short and long term beneficial effects for RCWs as they will enhance the habitat structure and understory abundance. Herbicide treatments (cut-stump, foliar, roadside) are not expected to have any measurable indirect impacts on the species.

SPB infestations would be analyzed on a case-by-case basis and risks to RCWs would be analyzed prior to treatment. If indirect effects are determined in the analysis, a new BE (and concurrence from FWS) would be required.

Cumulative Effects: Non-federal activities that may occur in the vicinity of this project include maintenance of existing wildlife openings maintained by the state and general public use (hunting, hiking, etc.). No other non-Federal activities are known at this time that may impact the RCW.

Determination: Based on the above analysis, it is my determination that the proposed project is “not likely to adversely affect” the RCW.

- B. Mitchell’s satyr (Endangered):** The Mitchell’s satyr (*Neonympha mitchellii*) has been referred to as one of the most restricted and endangered butterflies in North America. Habitat is believed to consist of wet meadows dominated by herbaceous ground covers including sedges, rushes, and grasses. These habitats are sometimes created as a result of beaver activity.

In 2000, a single male Mitchell’s Satyr was photographed on the Oakmulgee District of the Talladega National Forest, Bibb County, Alabama. On June 4, 2001, the first colony for Alabama was located and documented by a series of photographs. Since 2001, a number of surveys have been performed on the Oakmulgee District to document new sightings and localities, gather information for genetic analysis and subsequent taxonomic evaluation, and to describe and characterize the habitats supporting Mitchell’s satyr. Since then, genetic studies have found that the District’s species is most probably a subspecies of the Mitchell’s satyr. Much is still unknown as to the prevalence of the species, due to the fact that beaver impoundments are not scarce, but rather abundant on the district and throughout the state, and that seems to be the desired habitat for the Mitchell’s satyr. Beaver impoundments that later succeeded into wet herbaceous ecosystems, and herbaceous wetlands occurring in woodland and savannah complexes maintained by fire, were most likely the historic native habitat of satyrs. However, to date the butterfly has been given an endangered status and will be managed as one. A Forest Supervisor’s Closure Order on the collection of butterflies, especially for Mitchell’s satyrs was enacted on the Oakmulgee District. Enforcement of this Order aims to protect satyrs from local extirpation due to collection.

One population was located in 2002 in a small, moderately open forested patch that is situated within a mature hardwood bottomland along FRD 751 that transects the southern portion of the Pipeline NW project area.

Direct Effects: Satyrs are present within the project area. However, no timber harvest, midstory treatments, planting, or herbicide use is proposed in drains or wet areas (satyr

habitat) within the project area. Therefore, it is unlikely the proposed actions would directly affect a cocooned, larval, or adult satyr.

SPB infestations would be analyzed on a case-by-case basis and risks to Mitchell’s satyr would be analyzed prior to treatment. In the unlikely case that direct effects are determined in the analysis, a new BE (and concurrence from FWS) would be required.

Indirect Effects: Indirect effects are expected to be minor. Timber harvest and silvicultural operations are proposed for upland stands and Forest Plan standards would protect satyr habitats from disturbance. Regarding roadside maintenance, mowing may disturb a very small amount of vegetation in the short-term near stream crossings, etc. but would help to maintain early succession at these locations (similar to the effects of fire). Roadside vegetation management using triclopyr applications will be consistent with label restrictions and therefore will not typically affect satyr habitat.

SPB infestations would be analyzed on a case-by case basis and risks to Mitchell’s satyr would be analyzed prior to treatment. In the unlikely case that indirect effects are determined in the analysis, a new BE (and concurrence from FWS) would be required.

Cumulative Effects: Non-federal activities that may occur in the vicinity of this project include maintenance of existing wildlife openings maintained by the state and general public use (hunting, hiking, etc.). No other non-Federal activities are known at this time that may impact Mitchell’s satyr.

Determination: Based on the above analysis, the proposed project is “**not likely to adversely affect**” Mitchell’s satyr populations.

- C. Northern Long-eared Bat (Threatened):** On May 4, 2015, the northern long-eared bat (NLEB) was listed as a threatened species and an interim 4(d) rule was published in the Federal Register. The USDA Forest Service Southern Region is currently formally consulting, at a regional scale, with the US Fish and Wildlife Service on NLEB. After the issuance of the final Biological Opinion, including any reasonable and prudent measures, terms and conditions, or any authorized incidental take, this project-level Biological Assessment will be amended if needed and the appropriate project-level consultation will be completed.

5. Summary of Determination for Species considered in BE

Summary: PETC species	No Effect	Not likely to adversely affect	Likely to adversely affect
Endangered:			
• Red-cockaded woodpecker		X	
• Mitchell’s satyr		X	

L. Regional Forester's Sensitive Species

The BE summarizes and documents the process and makes determinations regarding the effects on the Regional Forester's Sensitive Species (RFSS) of the Oakmulgee Ranger District for management activities as proposed within the Pipeline NW project area. The affected areas are within Compartment 1 through 6 and are shown on the maps in Section II and III of this BE, and the Pipeline NW Environmental Analysis document. The proposed project will restore and maintain resiliency in native ecosystems within the Pipeline NW project area of the Oakmulgee Ranger District on the Talladega National Forest.

1. Survey and Consultation History: Multiple surveys have been conducted within the project area within the last decade for other rare plants and animals. All stands associated with the 2005 Oakmulgee Longleaf Restoration EIS (including Cmpt. 1/Stands 6, 23, 24, 25, 27, Cmpt. 2/Stands 5, 6, 14, 17, 24, 28 and 30, Cmpt. 3/Stands 9, 10 and 15, Cmpt. 4/Stands 2, 3, 5, 10, 12, 15, 18, 24, 28, 29, 30, 31, 36, 38, 39, 41, 42, 44, and 46, Cmpt. 5/Stands 8, Cmpt. 6/Stands 2, 3, 5, 6, 7, 19, and 25, within the Pipeline NW project area) were surveyed for rare plants by various botanists. No RFSS species were found during any of the above surveys within the project area.

The District GIS rare species/rare community database was queried for existing plant, Element of Occurrence Records, and found no RFSS within proposed project.

2. Species Considered and Evaluated: Sensitive Species known to occur on or near the Oakmulgee Ranger District are included in this discussion. Other sensitive species from the National Forests in Alabama list occur on other field units (other Districts or Forests), require different habitats, are associated with specific communities or are tied to other physiographic regions in Alabama. As such, they are not known to occur in the vicinity and do not have a high probability of occurrence near the project or treatment area. Sensitive plants and animals are combined into habitat preferences, either aquatic/riparian/mesic woods or upland, to reduce the descriptions and discussion in this section. Some of these sensitive species will inhabit both upland and aquatic/riparian/mesic slope habitats and are included on both lists respectively.

Table 1. Category A: Sensitive species associated with aquatic, riparian, and mesic slope habitats known to occur or potentially occurring on the Oakmulgee Ranger District of the TNF.

Scientific Name	Common Name	Status
<i>Procambarus marthae</i>	Crayfish	G3
<i>Alosa alabamae</i>	Alabama shad	G3
<i>Crystallaria asprella</i>	Crystal darter	G3
<i>Etheostoma parvapis</i>	Goldstripe darter	G1
<i>Etheostoma ramseyi</i>	Alabama darter	G2
<i>Etheostoma zonifer</i>	Blackwater darter	G3
<i>Notropis uranoscopus</i>	Skygazer shiner	G2
<i>Noturus munitus</i>	Frecklebelly madtom	G3
<i>Percina brevicauda</i>	Coal darter	G2
<i>Percina lenticula</i>	Freckled darter	G2
<i>Cheumatopsyche bibbensis</i>	Caddisfly	G1
<i>Gomphus hybridus</i>	Cocoa clubtail	G3
<i>Hydropsyche hageni</i>	Caddisfly	G2
<i>Hydroptila paralatosa</i>	Caddisfly	G2
<i>Oecetis morsei</i>	Caddisfly	G2
<i>Somatochlora provocans</i>	Treetop emerald dragonfly	G3
<i>Stylurus laurae</i>	Laura's clubtail	G3
<i>Anodontoides radiatus</i>	Rayed creekshell	G3
<i>Lasmigona complanta alabamensis</i>	Alabama heelsplitter	G5T2
<i>Obovaria jacksoniana</i>	Southern hickorynut	G2G3
<i>Quadrula rumphiana</i>	Ridged mapleleaf	G3
<i>Aesculus parviflora</i>	Small-flowered buckeye	G2G3
<i>Arabis georgiana</i>	Georgia rockcress	G2
<i>Baptisia megacarpa</i>	Apalachicola wild indigo	G2
<i>Carex decomposita</i>	Cypress-knee sedge	G3
<i>Carex impressinervia</i>	Ravine sedge	G1G2
<i>Castilleja sp. nov. "kraliana"</i>	Kral's indian paintbrush	G2
<i>Collinsonia verticillata</i>	Whorled horse-balm	G3G4
<i>Croton alabamensis</i>	Alabama croton	G3
<i>Cypripedium kentuckiense</i>	Southern lady's slipper	G3
<i>Fothergilla major</i>	Large witchalder	G3
<i>Helianthus longifolius</i>	Longleaf sunflower	G3
<i>Hexastylis Shuttleworthii</i> var. <i>harperi</i>	Harper's wild ginger	G4
<i>Hexastylis speciosa</i>	Harper's heartleaf	G2
<i>Hymenocallis caroliniana</i> (= <i>H. coronaria</i>)	Carolina spider lily	G2Q

<i>Jamesianthus alabamensis</i>	Alabama jamesianthus	G3
<i>Neviusia alabamensis</i>	Alabama snow-wreath	G2
<i>Onosmodium sp. nov. "decipiens"</i>	False gromwell	G1G2
<i>Platanthera intgrilabia</i>	White fringeless orchid	G2G3
<i>Rhynchospora thornei</i>	Thorne's beaksedge	G1G2
<i>Rudbeckia auriculata</i>	Eared coneflower	G1
<i>Schisandra glabra</i>	Bay starvine	G3
<i>Silene regia</i>	Royal catchfly	G3
<i>Silphium sp. nov. "glutinosum"</i>	Rosinweed	G2
<i>Trillium lancifolium</i>	Lanceleaf trillium	G3

The above listed Sensitive species (Category A) are known to occur, have the potential to occur, or occur near the Oakmulgee Division in aquatic/riparian areas and mesic slopes. Some are associated with springs and/or small to large perennial streams with moderate to fast moving currents with boulders, rubble, gravel and sand substrates. Others may be associated with low areas, including ditches, marshes, swamps, seeps, and rich, mesic, wooded slopes. Many of the above plant species require moist or wet sites or bluffs or mesic wooded slopes and are very specific in habitat requirements.

A. Direct Effects: No (Category A) Sensitive plant or animal species or rare communities are known from the project areas. I queried the Oakmulgee GIS rare plant/rare community database and no documented Sensitive Element of Occurrence Records (EORs) inside the project area. It is possible that one or more of the above species do occur within the Pipeline NW project area in riparian or aquatic habitats; however the proposed activities will focus on upland areas. Considering the trends for rare species occurrences within the Pipeline NW project area suggested by the various past surveys, and the habitats they occupy, I do not expect any measurable direct impacts to any of these species from the proposed activities.

SPB infestations would be analyzed on a case-by-case basis and risks to (Category A) RFSS would be analyzed prior to treatment.

B. Indirect Effects: Drains and riparian areas are typically excluded from the timber, midstory, and herbicide site-prep and release operations, therefore indirect effects to the habitats of Category A species would be minimal. Past surveys have not indicated Sensitive plants present along the proposed roadsides. Although it is possible that unknown individual Sensitive plant species do exist in these areas (roadsides) no major direct or indirect impacts to overall populations are expected from roadside maintenance using herbicides (triclopyr). No indirect effects are expected for Sensitive animals from roadside herbicide applications. Midstory operations would also be focused on uplands and therefore would not impact Category A Sensitive species.

C. Cumulative Effects: Non-federal activities that may occur in the vicinity of this project include maintenance of existing wildlife openings maintained by the state and general public use

(hunting, hiking, etc.). No other non-Federal activities are known at this time that may impact Category A Sensitive species.

3. Determination for Sensitive Species Associated with Aquatic, Riparian, and Mesic Slope Habitats: Overall, the proposed salvage “**may impact individuals, but is not likely to cause a trend towards federal listing or loss of viability**” on these species within the habitat types described above.

Table 2. Category B: Sensitive species associated with upland habitats known to occur or potentially occurring on the Oakmulgee Division of the National Forests in Alabama.		
Scientific Name	Common Name	Status
<i>Corynorhinus rafinesquii</i>	Rafinesque’s big-eared bat	G3G4
<i>Aimophila aestivalis</i>	Bachman’s sparrow	G3
<i>Helianthus longifolius</i>	Longleaf sunflower	G3
<i>Neviusia alabamensis</i>	Alabama snow-wreath	G2
<i>Quercus arkansana</i>	Arkansas oak	G3
<i>Arabis georgiana</i>	Georgia rockcress	G1
<i>Silene regia</i>	Royal catchfly	G3
<i>Castilleja sp. Nov. “kraliana”</i>	Kral’s Indian paintbrush	G2
<i>Fothergilla major</i>	Large witchalder	G3

The above listed sensitive species are known to occur, have the potential to occur, or occur near the Oakmulgee Division in upland habitats. Upland habitats include ridge tops, woodlands, glades, and prairie areas, which includes roadsides.

A. Direct Effects: No (Category B) Sensitive plant or animal species or rare communities are known from the project areas. Sensitive species are known from the project areas based on the surveys in Section IV, although Arkansas oak is known from other locations on the district. I queried the Oakmulgee GIS rare plant/rare community database and no documented Sensitive Element of Occurrence Records (EORs) inside the project area. It is possible that one or more of the above species do occur within the Pipeline NW planning area in upland pine habitats, however considering the trends for rare species occurrences within the Pipeline NW planning area based on the various past surveys, I do not expect any measurable direct impacts to any of these species from the proposed activities.

SPB infestations would be analyzed on a case-by-case basis and risks to (Category B) RFSS would be analyzed prior to treatment.

Although they have not been detected in the planning area, there may be some use of the project area by Bachman’s sparrow since there is appropriate habitat in the vicinity. Direct effects to sensitive upland animals (Bachman’s sparrow or Rafinesque’s big-eared bat) are expected to be minor as they are mobile will be able to move away from disturbances. There

may be isolated sparrow nests that may potentially be disrupted or destroyed, but as is the case with periodic fire, the habitat improvements from the reduction in basal area and enhancement of the herbaceous understory via the proposed herbicide treatments will more than offset any incidental losses to individuals in the long term. Direct impacts for all Category B Sensitive species are expected to be discountable.

- B. Indirect Effects:** The proposed activities will help to restore the structure and functionality of upland pine habitats, and will be beneficial to Category B sensitive species in the long term. Thinning and hardwood midstory reduction will benefit upland associates via providing more sunlight to the ground and promoting a functioning pyrophitic ecosystem. The herbicide site prep areas surveyed indicated no evidence of or ideal habitat for RFSS. Roadsides to be maintained with herbicide were also surveyed and no rare communities were documented. Based on these and other past surveys, no measurable negative indirect effects to Category B sensitive species are expected.
- C. Cumulative Effects:** Non-federal activities that may occur in the vicinity of this project include maintenance of existing wildlife openings maintained by the state and general public use (hunting, hiking, etc.). No other non-federal activities are known at this time that may impact Category B Sensitive species.
- D. Determination for Sensitive Species Associated with Upland Habitats:** Overall, the proposed project “**may impact individuals, but is not likely to cause a trend towards federal listing or loss of viability**” for the above listed species or their habitats.

M. Cultural Resources

Heritage resources inventory of the Pipeline NW planning area has been completed. Cultural Resource sites were identified and those needing protection during No Action/Prior Decision (Alternative A) and the Proposed Action (Alternative B) treatments have been documented and the appropriate mitigation measures selected for use in potential contracts and/or other method of accomplishment. No ground disturbing activities will be conducted within the established boundaries of these sites. If any additional cultural resources are discovered during stand treatments within the project areas, the District or Forest Archeologist would be notified and activity at that location would be suspended until an evaluation of the resource has been made in consultation with SHPO.

The relevant federal statutes and responsibilities include Section 106 of the National Historic Preservation Act of 1966, as amended; and Executive Order 11593, the Advisory Council's "Protection of Historic Sites" (36 CFR Part 800), effective June 17, 1999.

N. Other Environmental Effects Relative to FONSI Significant Factors –

- **Environmental Justice:** Though low-income and minority populations exist adjacent to the planning area, the proposed action is not expected to have disproportionately high and adverse human health or environmental effects on these communities. The proposed action treatment were selected for ecological importance and not based on proximity to low-income and minority populations.
- **Degree to which it the effects on the quality of the human environment are likely to be highly controversial:** Vegetation management, including the use of commercial harvest, herbicide, mechanical mulching, etc. are common practices in west Alabama. Comments received from scoping included specific support for treatments. Others, not commenting formally, have expressed concern for the amount of harvesting on the Oakmulgee District. Concurrently, those expressing concern about the short-term effects of harvesting are equally supportive of the effects to the harvested areas once fire is applied. The effects of the proposed action on the human environment are expected to be minor and short in duration. Beyond implementation activities, the resulting conditions will provide improved forest health and ecosystem resiliency.
- **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks:** The impacts from the proposed action to the landscape can be predicted and the Forest Service has a long history of implementing these types of treatments. Adaptive management protocols are in place as well as a site specific monitoring program.
- **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration:** Activities proposed in this project are specific to this project.
- **The degree the proposed action might affect public health and safety:** The Proposed Action contains two elements with the potential to affect public health and safety.
 - **Herbicide application:** In the restoration and maintenance of longleaf pine ecosystems, herbicides provide an efficient method to correct and change vegetative species composition. Public health and safety mitigation measures and standards are listed in Chapter 2, Mitigation Standards Common to Both Alternatives. The herbicides considered for use in the Pipeline NW planning area are highly to moderately selective of the plant species that will be controlled. The current array (Triclopyr, Imazapyr and Glyphosate) of herbicides offer the prescriptionist/applicator choices of timing (season of use), rates (amount per acre used) and method of application to optimize the control of undesirable plant species while minimizing risks to human and wildlife health and the environment. Herbicide applications will consist of primarily hand spraying using backpack sprayers set up to apply herbicide to target vegetation only. Mechanical broadcast applications where forestry tractors, ATVs, dozers, or other suitable off-road machines are expected to deliver herbicide solutions to target and limited non-target species may be used for longleaf pine site preparation and midstory

foliar applications. Hand applied cut surface and bark injections, where herbicide is directly injected or placed in contact with the cambium of target tree species are planned to deaden or eliminate re-sprouting in the case of stump treatments.

Human Health and Ecological Risk assessments performed for each of the herbicides included in Pipeline NW Project from Syracuse Environmental Research Associates, Inc. (SERA), were used to assess risk to humans and the environment. SERA Assessments evaluate several methods of application and associated rates in regard to risks to humans, wildlife, fish and the environment. Due to the thoroughness and length of the assessment documents, they are incorporated by reference into this EA, and are made available on request, at the Oakmulgee Ranger District Office.

- **Concerns for forest user safety involve the increased traffic resulting from commercial timber harvest:** The impacts to the road bed will be mitigated through the timber sale contract and appropriate cooperators road maintenance requirements. Also within the timber contract are the requirements for the contractor to comply with the Manual on Uniform Traffic Control Devices.
- **Fire and Smoke Management:** A third element related to human health and safety is not related to the proposed action, rather the consequences of wildfire in the planning area. Based on existing air quality information from within the analysis area, regional air quality modeling projects, smoke dispersion modeling and best available science, no long-term adverse impacts to air quality standards are expected.

Short-term effects would be mitigated by the application of full wildfire suppression tactics. To mitigate smoke concerns, signs will be posted along major travel corridors alerting motorists of smoke ahead. Additional coordination measures include alerting Alabama Department of Transportation and Alabama Department of Public Safety if conditions merit, as well as local authorities. The Pipeline NW planning area has within one and a half miles from its parameter the incorporated communities of Duncanville and Hagler, Shiloh Church and Cemetery, Alabama Power infrastructure as well as U.S. Highway 82, all which qualify the area as WUI (Wildland Urban Interface).

The planning area currently has a range of three to five tons/acre of fine fuel loading. A wildfire in certain conditions could increase smoke and smoke management issues involving public health. Implementation of the proposed action would result in a decrease in the fine fuel loading to an estimated 1.5 to three tons/acre.

- **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts:** The Pipeline NW planning area Proposed Action is designed so that site-specific adverse cumulative effects to resources would be unlikely. The project is designed for long-term effects to be positive as native woodland conditions are restored and the natural function of the upland longleaf pine ecosystem continues to

improve. The cumulative effects from past, present and reasonably foreseeable future forest actions on vegetation, fuel hazards, watershed conditions, and other forest resources have been considered in this document. Based on the resource work completed during the planning process, and project design including the standards listed, resources in the project area are expected to be protected during implementation and improved and sustained in the long-term.

Chapter IV: Consultation and Coordination

The following is a listing of the individuals and agencies that participated or was consulted during the environmental analysis for this proposal. Also listed in this section are the references used throughout the analysis.

Forest Service Preparers: Interdisciplinary Team

Contributor	Education/Experience
Mike Caylor NEPA Planner Oakmulgee Ranger District	B.S. Forestry, AL Registered Forester, USDA Forest Service Certified Pesticide Applicator
Doug Gantt Fire Management Officer Oakmulgee Ranger District	M.S. in Geography, B.S. Outdoor Recreation and Parks Management, 15 years of Fire Management
Jake Thelen Assn. Fire Management Officer Oakmulgee Ranger District	A.A. Natural Resource Management, 13+ years' experience in Fire Management
Phillip Taggart Timber Sale Administrator/ Forest Service Representative (trainee) Oakmulgee Ranger District	B.S. of Science in Agriculture (Forestry Major), R9 Certified Check Cruiser, R8 and R9 Advanced Cruiser, R8 and R9 Harvest Inspector, Forest Protection Officer
Lovoyd Fountain Engineering Technician Oakmulgee Ranger District	B.S. Construction Science and Management, FS certified Road Construction, Contracting Officer, 25+ years in region 8
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Chrystal Tindell Wildlife Technician Oakmulgee Ranger District	B.S. Wildlife Science, 20+ years of experience on Oakmulgee Ranger District, FS Certified Pesticide Applicator
Ryan Shurette Forest Botanist and Ecologist Forest Supervisor's Office	B.S. Wildlife, M.S. Ornithology, Certified Wildlife Biologist, member of AL Native Plant Society, Invasive Plant Council, and Environmental Education Association
Art Goddard Soil Scientist Forest Supervisor's Office	M.S. Soil Scientist, 36 years' experience with Forest Service in Watershed Management

Other Contributors:

The Forest Dynamics Laboratory from the University of Alabama also offered contribution to the document through GIS support and editing. Members involved were Jacob Richards M.S. Geography, Amanda Keasberry M.S. Geography, and Brett Russell.

State and Federal Government Agencies:

Alabama Historic Preservation Office, Montgomery, AL
University of Alabama, Office of Archaeological Research, Moundville, AL
U.S. Fish and Wildlife Service, Ecological Services, Daphne, AL
Alabama Wildlife & Freshwater Fisheries Division, Northport, AL

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APPENDIX A: ALTERNATIVE B - PROPOSED ACTION TREATMENTS

							CONCURRENT AND CONTEMPORANEOUS ACTIONS									
COMP	STD	GIS ACRES	FOREST TYPE	AGE YEAR	MGMT TYPE	AOC	COMMERCIAL HARVEST	SITE PREP HERBICIDE	SITE PREP BURN	SITE PREP MULCH	PLANT LONGLEAF	RELEASE HERBICIDE	RELEASE CUT & LEAVE	MIDSTORY HERBICIDE	MIDSTORY CUT & LEAVE	MIDSTORY MULCH
1	25	46.36	31	1970	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
2	1	2.30	53	1916	53	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
2	5	41.48	31	1973	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
2	9	48.34	31	1934	13	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
2	13	16.79	31	1934	13	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
2	24	15.79	31	1969	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
2	25	41.21	31	1969	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
3	14	11.76	31	1939	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
3	23	9.30	21	1992	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
4	2	14.44	31	1977	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
4	5	7.44	31	1977	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
4	23	13.55	31	1970	46	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
4	23	24.68	31	1970	46	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
5	3	8.67	21	1925	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
5	14	19.95	31	1973	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
5	26	23.47	31	1933	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
5	26	3.74	31	1933	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
5	34	17.20	31	1974	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
5	43	12.13	31	1974	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
6	36	7.01	31	1966	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
6	39	36.57	31	1970	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
6	51	38.68	21	1919	21	1	CCR	YES	YES	YES	YES	YES	YES	NO	NO	NO
460.86																
AOC 1 Treatment = 461 acres																
1	36	9.00	21	1932	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	2	7.84	13	1916	13	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	3	42.89	21	1930	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	7	48.33	21	1923	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	23	17.29	21	1935	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	26	37.91	21	1918	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES

APPENDIX A: ALTERNATIVE B - PROPOSED ACTION TREATMENTS

							CONCURRENT AND CONTEMPORANEOUS ACTIONS									
COMP	STD	GIS ACRES	FOREST TYPE	AGE YEAR	MGMT TYPE	AOC	COMMERCIAL HARVEST	SITE PREP HERBICIDE	SITE PREP BURN	SITE PREP MULCH	PLANT LONGLEAF	RELEASE HERBICIDE	RELEASE CUT & LEAVE	MIDSTORY HERBICIDE	MIDSTORY CUT & LEAVE	MIDSTORY MULCH
2	34	6.00	21	1930	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
3	2	42.97	21	1916	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
3	3	53.01	21	1916	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
3	12	6.92	21	1925	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	14	153.24	21	1935	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	21	18.62	21	1923	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	26	10.24	21	1925	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	40	25.37	21	1955	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	45	11.69	21	1925	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	50	5.42	21	1925	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	52	8.56	21	1985	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	1	5.57	21	1920	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	6	22.45	21	1994	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	7	27.57	21	1920	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	19	24.39	21	1926	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	19	2.88	21	1926	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	21	26.07	21	1926	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	30	3.02	53	1925	53	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	30	3.13	53	1925	53	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	31	61.53	21	1925	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	35	32.88	31	1974	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	3	105.80	31	1968	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	6	56.94	21	1968	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	10	28.13	21	1922	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	15	6.77	21	1917	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	16	26.18	21	1922	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	18	22.84	21	1917	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	35	35.41	21	1922	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	37	13.79	21	1928	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	38	23.92	31	1970	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES

APPENDIX A: ALTERNATIVE B - PROPOSED ACTION TREATMENTS

							CONCURRENT AND CONTEMPORANEOUS ACTIONS									
COMP	STD	GIS ACRES	FOREST TYPE	AGE YEAR	MGMT TYPE	AOC	COMMERCIAL HARVEST	SITE PREP HERBICIDE	SITE PREP BURN	SITE PREP MULCH	PLANT LONGLEAF	RELEASE HERBICIDE	RELEASE CUT & LEAVE	MIDSTORY HERBICIDE	MIDSTORY CUT & LEAVE	MIDSTORY MULCH
6	42	50.35	21	1921	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	47	30.07	21	1927	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	53	11.52	21	1919	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	58	12.26	21	1919	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	59	2.94	21	1919	21	4	THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
1141.71																
AOC 4 Treatment = 1142 acres																
COMP	STD	GIS ACRES	FOREST TYPE	AGE YEAR	MGMT TYPE	AOC	COMMERCIAL HARVEST	SITE PREP HERBICIDE	SITE PREP BURN	SITE PREP MULCH	PLANT LONGLEAF	RELEASE HERBICIDE	RELEASE CUT & LEAVE	MIDSTORY HERBICIDE	MIDSTORY CUT & LEAVE	MIDSTORY MULCH
2	10	35.20	21	1995	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	15	16.85	21	1994	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	19	18.76	21	1993	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	21	23.79	21	1994	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
3	2	9.03	21	1916	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
3	2	17.97	21	1916	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
3	3	22.36	21	1916	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	7	33.14	21	1992	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	9	15.81	21	1992	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	20	4.31	21	1992	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	33	6.56	21	1992	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	33	2.06	21	1992	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	52	9.31	21	1985	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	53	6.21	21	1935	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	54	5.55	21	1970	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	6	5.88	21	1994	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	23	16.18	21	1994	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	24	22.90	21	1994	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	39	25.75	21	1994	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	40	43.65	21	1994	21	5	1 ST THIN	NO	NO	NO	NO	NO	NO	YES	YES	YES
341.28																
AOC 5 Treatment = 341 acres																

APPENDIX A: ALTERNATIVE B - PROPOSED ACTION TREATMENTS

							CONCURRENT AND CONTEMPORANEOUS ACTIONS									
COMP	STD	GIS ACRES	FOREST TYPE	AGE YEAR	MGMT TYPE	AOC	COMMERCIAL HARVEST	SITE PREP HERBICIDE	SITE PREP BURN	SITE PREP MULCH	PLANT LONGLEAF	RELEASE HERBICIDE	RELEASE CUT & LEAVE	MIDSTORY HERBICIDE	MIDSTORY CUT & LEAVE	MIDSTORY MULCH
2	26	2.91	21	1918	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	26	2.26	21	1918	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	29	7.22	13	1939	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
2	38	9.68	13	1939	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	39	56.56	21	1965	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	42	12.20	21	1965	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	47	31.42	21	1925	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	48	10.64	21	1925	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	50	21.76	21	1925	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	60	8.71	31	1965	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	61	3.20	21	1965	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	63	1.78	21	1965	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	72	26.66	21	1930	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	96	54.40	21	1965	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	97	11.75	31	1978	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	98	29.39	21	1970	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	99	13.06	31	1976	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	100	21.89	21	1965	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	101	6.54	21	1970	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
4	102	16.24	31	1976	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	3	44.42	21	1925	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	14	61.92	31	1973	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	18	62.10	31	1974	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	41	19.38	31	1933	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
5	80	1.42	21	1920	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	2	7.67	21	1919	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	3	28.60	31	1968	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	4	36.57	31	1967	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	10	48.30	21	1922	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	10	28.90	21	1922	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES

APPENDIX A: ALTERNATIVE B - PROPOSED ACTION TREATMENTS

							CONCURRENT AND CONTEMPORANEOUS ACTIONS									
COMP	STD	GIS ACRES	FOREST TYPE	AGE YEAR	MGMT TYPE	AOC	COMMERCIAL HARVEST	SITE PREP HERBICIDE	SITE PREP BURN	SITE PREP MULCH	PLANT LONGLEAF	RELEASE HERBICIDE	RELEASE CUT & LEAVE	MIDSTORY HERBICIDE	MIDSTORY CUT & LEAVE	MIDSTORY MULCH
6	10	7.21	21	1922	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	13	15.49	21	1922	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	25	29.60	31	1932	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	27	46.57	21	1921	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	28	13.01	31	1980	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	44	101.94	21	1906	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	45	12.09	31	1980	31		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	51	5.14	21	1919	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	54	2.47	21	1919	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	59	22.05	21	1919	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
6	60	9.26	21	1919	21		NO	NO	NO	NO	NO	NO	NO	YES	YES	YES
952.39																
MSR_HERB Treatments = 952 acres																
Total = 2896 acres																

Upland Longleaf Pine Woodland Restoration – Areas of Concern Adaptive Management Protocols

Adaptive Management is a concept for dealing with uncertainty in environmental management. Projects are designed with built-in continuous assessment (monitoring – “if X happens”) and process for improvement (then action “y” will be taken”). It allows managers the latitude to treat successive portions of the project based on local conditions, and to assess and monitor these activities while staying within the range of anticipated impacts described in this document. Adaptive management is used where managers are uncertain of any outcome but fairly certain of the direction they would pursue if a change were necessary.

To guide upland longleaf pine woodland community restoration a characterization system is utilized. This system was developed for the Longleaf Ecosystem Restoration Project EIS and continues to be an adaptive process as restoration projects are evaluated and modified. The characterization system references “Areas of Concern” as a mechanism to describe current conditions of stands that have upland longleaf pine as the PNV. Each Area of Concern has associated prescriptive practices to guide restoration decisions and resource allocations through a 10-20 year restoration period.

Prior to defining Upland Longleaf Pine Woodland Restoration Adaptive Management Protocols for the Pipeline NW planning area, it first must be determined the potential for achieving the desired woodland conditions. An essential element in upland longleaf pine woodland restoration is the successful application of prescribed fire on preferably a three-year burning rotation but no greater than a five year rotation. As disclosed in Chapter 1, Section A. of the Pipeline NW planning area has not achieved a prescribed fire return interval of three years. It is often the frequency of prescribed fire that determines the level of successful restoration within the upland longleaf pine ecosystem. The frequency of fire also determines the extent of certain silviculture treatments needed to achieve restoration objectives. To compensate for the lack of fire, treatments such as herbicide, cut and leave midstory and/or mulching are often applied. These treatments carry with them a higher cost than prescribed fire, thus when presented with limited funds it must first be determined if restoration is feasible and if so, at what cost?

To answer the question if longleaf restoration in this area is achievable, the following ranking index was developed and applied to the Pipeline NW planning area. The index takes into consideration the physical and social constraints to prescribed fire and the relative importance of applying limited Forest Service resources to achieve restoration objectives. It is the first step in developing realistic restoration goals.

The index as completed for the Pipeline NW planning area indicates an overall suitable ranking of “Moderately High”, which challenges the historic prescribed burning frequency for the area. While the matrix indicates suitability for prescribed fire, embedded within the ranking criteria is a “need” for prescribed fire based on Oakmulgee District management responsibilities. The ranking of Moderately High also serves as an index to guide prioritization of restoration resources when compared to other areas of the District.

**PIPELINE NW PLANNING AREA RESTORATION SUITABILITY INDEX
TO DETERMINE POTENTIAL FOR LONGLEAF RESTORATION**

Criteria 1: Acceptable Wind Direction for Prescribed Burn

<i>Wind direction scenario most suited to Planning Unit</i>	North Wind Only North winds are infrequent across the Oakmulgee District, greatly limiting the number of burn days.	Two Winds Suitable to burn with 2 or more wind directions	Three Winds Suitable to burn with 3 or more wind directions	All Winds Suitable to but with winds from any direction
Suitability Ranking	1- Low x	2- Moderately Low	3-Moderately High	4-High

Criteria 2: Prescribed Burn Application Cost

<i>Application cost most aligned to Planning Unit</i>	Very High Cost Greater than 10 miles of fireline to be plowed and parameter of burn to hold with additional staffing needs. No potential for Wyden Agreements	High Cost 5-10 miles of fireline to be plowed and parameter of burn to hold with additional staffing needs. Limited potential for Wyden Agreements	Moderate Cost 2-5 miles of fireline to be plowed and parameter of burn to hold with moderate additional staffing needs. Potential for Wyden Agreement	Low Cost 0-2 miles of lines to be plowed and parameter of burn to hold requiring no additional staffing needs.
Suitability Ranking	1- Low	2-Moderately Low x	3-Moderately High	4-High

Criteria 3: Potential Native Vegetation (PNV) Fire Dependent Community

<i>PNV most suited for the Planning Area</i>	Little to No Longleaf Less than 20% of area with longleaf as PNV. RCW habitat capability less than 2 clusters	Low Longleaf Greater than 20% of area with longleaf as PNV. RCW habitat capability greater than 2 clusters.	Moderate Longleaf Greater than 40% of area with longleaf as PNV. RCW habitat capability greater than 4 clusters	Predominately Longleaf Greater than 60% of area with longleaf as PNV. RCW habitat capability greater than 5 clusters.
Suitability Ranking	1- Low	2-Moderately Low	3-Moderately High	4-High x

Criteria 4: Recreation Influence

<i>Recreation Influence within the Planning Area</i>	Little to No Influence No Concentrated Use Areas (primitive hunter camps), outside WMA, Limited Accessible Roads	Low Influence No Concentrated Use Areas (primitive hunter camps), outside WMA, Accessible Roads	Moderate Influence Concentrated Use Areas (primitive hunter camps), outside WMA	High Influence Contains Developed Recreation Sites, inside WMA
Suitability Ranking	1- Low	2-Moderately Low	3-Moderately High	4-High x

Criteria 5: Wildland Urban Interface (WUI) Needs for Prescribed Fire

<i>WUI Concerns most suited for the Planning Area</i>	Little to No Concern No wildfire history – No WUI.	Low Concern No WUI and limited fire history	Moderate Concern High value timberland (operable & marketable stumpage). No Structures. History of wildfire within past 5 years	High Concern Structures & high value timberland. History of wildfire w/in past 5 years.
Suitability Ranking	1- Low	2-Moderately Low	3-Moderately High x	4-High

AREA OF CONCERN – 1

AOC 1 stands are older (> 40 years) predominately loblolly stands generally with existing mortality and encroachment by light seeded hardwoods. They are located on upland sites with longleaf as the PNV. In some cases they have scattered mature longleaf, rarely greater than 20 ft²/ac BA. Most AOC 1 stands were established through restoration activities associated with the purchase of properties in the 1930s and 1940s during the establishment of the Talladega National Forest, Oakmulgee Division. In many occasions they were planted to loblolly and shortleaf seedlings in an effort to control erosion and the subsequent stands were allowed to establish during a period of fire suppression. Prior management of these areas included farming and pastures. Gullies are often evident. Due to the heavy mortality and hardwood competition, fire is often not effective and the understory is brush and shrubs. Under the AOC characterization process, an AOC 1 designation would include a series of conditions from pre-restoration to restoration treatments that carry the effort to restore species composition through age 20.

Stands in an AOC 1 condition have both species composition and structure altered. Restoration involves removal of the “off-site” species and re-establishment of longleaf pine. Site delineation is often the first step in accessing the restoration potential of the site. Challenges to restoration are exacerbated by loblolly in adjacent stands, as soils or site characteristics were not considerations of stand establishment. Concurrent to evaluation of the potential for loblolly to continue to naturally seed the restoration area, is the suitability for prescribed burning. If the prescribed fire suitability ranking is “moderately high” or “high”, then the potential exists to successfully restore upland longleaf pine and the following adaptive management protocols may be applied.

IF	THEN
Heavy cone producing loblolly exist in areas adjacent to the delineated restoration area,	Consideration should be given to including those adjacent loblollies for the purposes of removal of undesirable seed sources, but not for inclusion in the restoration area. <i>(All standard practices apply relative to use of mechanical equipment in protected areas. Once loblollies are removed from adjacent areas, they should be designated as hardwood or hardwood pine stands and managed accordingly.</i>
The area designated for restoration has not been successfully prescribed burned on a 3-5 year rotation and there is heavy build-up of undesirable species.	Consideration should be given to short duration sale contracts to allow the return of prescribed fire after harvest in the shortest time period possible to control undesirables.
Post-harvest assessment indicates longleaf of cone producing age are present in restoration areas at stocking densities greater than 30 BA	Longleaf should be retained and consideration should be given to allowing those areas to re-establish through natural regeneration.
Post-harvest assessment indicates microsites not evident prior to treatment.	Delineate non suitable acres for exclusion from certain site preparation actions
Prior burn history for area is greater than 3 year return interval, and sale contract greater than 3 years in length.	Consideration should be given to coordination of all planting units within the same planting season, even if some units are held through a planting season waiting on the remaining units to complete harvesting. Site preparation by foliar, and bark treatment of herbicide followed by prescribed burn in fall prior to planting.

Hardwood coppice regrowth and natural seeded loblolly averages 5ft in height or greater over 50% or more of the stand.	Site preparation by mechanical mulching on suitable slopes, with foliar and bark treatment of herbicide in areas with equipment limitations. Mulching and herbicide treatment in late summer prior to winter planting. Withhold fire for 3-5 years. <i>(Note: Most applicable for areas with low prescribed fire suitability ranking)</i>
Adjacent loblollies were not removed during harvesting operations	Include cut and leave, or herbicide injection in site preparation treatments to remove those loblollies from seed production and natural regeneration of the targeted longleaf area.
Residual longleaf are insufficient for natural regeneration,	Plant containerized longleaf seedlings at a minimum of 726 seedlings per acre, and reintroduce dormant season prescribed fire within 2 years of seedling establishment. <i>(Note: Planting density purposefully calculated to compensate for loss during prescribed fire and still achieve 3 year objective of 400 seedlings per acre.)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and foliage from native grasses and herbaceous vegetation cover 20% or greater of the area, and hardwood competition less than 300 stems per acre, no loblolly encroachment.	No release treatment is needed. <i>(Note this is an indication the prescribed fire is successful in the area and maintaining the current prescribed fire interval will allow the increase of grasses and herbaceous ground while suppressing hardwoods)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and foliage from native grasses and herbaceous vegetation cover 20% or greater of the area and hardwood competition is greater than 300 stems per acre with stems less than 5 feet in height, no loblolly encroachment.	Treat hardwoods by foliar herbicide application of Triclopyr. <i>(Note: Triclopyr does not kill grass, but will address the hardwoods, allowing the native ground cover to increase)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and hardwood competition is at 1,000 stems/ acre or greater with stems less than 5 feet in height, and understory native grasses and herbaceous vegetation cover is less than 20%.	Treat hardwoods by foliar herbicide application of Imazapyr applied near end of growing season. <i>(Note: Imazapyr kills native grasses. Given the amount of hardwood competition grasses are unlikely and hardwoods will need to be controlled before any grasses or herbaceous ground cover can be established.)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and loblolly encroachment is greater 400 stems per acre or greater and over 5 feet tall.	Treat loblolly stems by mechanical cut and leave. <i>(Note this is an indicator that the prescribed burning program has been ineffective. Consider re-evaluating the prescribed burning suitability ranking to determine if longleaf restoration in this area can be achieved.)</i> Continue burning on 3-5 year interval, with post burn monitoring of representative sites to determine understory response and longleaf component.
If longleaf stocking drops below 50% of stand composition and longleaf DBH is less than half that of adjacent loblolly...	Consider intermediate mechanical treatment such as pre-commercial thinning, and/or a stand altering growing season burn, or reclassifying stand as mixed loblolly/longleaf and discontinuing restoration efforts.

AREA OF CONCERN – 2

AOC 2 stands are younger (< 40 years) predominately loblolly stands generally with existing mortality and history of pine beetle infestation. They are located on upland sites with longleaf as the PNV. In some cases they have scattered mature longleaf, rarely greater than 20 ft²/ac BA. Most AOC 2 stands were established through reforestation activities from the 1950s to the time in where containerized longleaf became a reliable means to reestablish longleaf. In many occasions they were planted to at very high densities, exceeding 1,000 stems per acre. Mortality or salvage operations due to beetle infestations have resulted in under-stocked “spots” within the stand. In some case the stand integrity has been compromised. Under the AOC characterization process, an AOC 2 designation would include a series of conditions from pre-restoration to restoration treatments that carry the effort to restore species composition through age 20.

Stands in an AOC 2 condition have both species composition and structure altered. Restoration involves removal of the “off-site” species and re-establishment of longleaf pine. Site delineation is often the first step in accessing the restoration potential of the site. Challenges to restoration are not as severe as AOC 1 stands in that stand establishment generally considered soils or site characteristics in delineation of the planted area. Concurrent to evaluation of the potential for loblolly to continue to naturally seed the restoration area, is the suitability for prescribed burning. If the prescribed fire suitability ranking is “*moderately high*” or “*high*”, then the potential exists to successfully restore upland longleaf pine and the following adaptive management protocols may be applied.

IF	THEN
Heavy cone producing loblolly exist in areas adjacent to the delineated restoration area,	Consideration should be given to including those adjacent loblollies for the purposes of removal of undesirable seed sources, but not for inclusion in the restoration area. <i>(All standard practices apply relative to use of mechanical equipment in protected areas. Once loblollies are removed from adjacent areas, they should be designated as hardwood or hardwood pine stands and managed accordingly.</i>
The area designated for restoration has not been successfully prescribed burned on a 3-5 year rotation and there is heavy build-up of undesirable species.	Consideration should be given to short duration sale contracts to allow the return of prescribed fire after harvest in the shortest time period possible to control undesirables.
Post-harvest assessment indicates longleaf of cone producing age are present in restoration areas at stocking densities greater than 30 BA	Longleaf should be retained and consideration should be given to allowing those areas to re-establish through natural regeneration.
Post-harvest assessment indicates microsites not evident prior to treatment.	Delineate non suitable acres for exclusion from certain site preparation actions
Prior burn history for area is greater than 3 year return interval, and sale contract greater than 3 years in length.	Consideration should be given to coordination of all planting units within the same planting season, even if some units are held through a planting season waiting on the remaining units to complete harvesting. Site preparation by foliar, and bark treatment of herbicide followed by prescribed burn in fall prior to planting.
Hardwood coppice regrowth and natural seeded loblolly averages 5ft in	Site preparation by mechanical mulching on suitable slopes, with foliar

height or greater over 50% or more of the stand.	and bark treatment of herbicide in areas with equipment limitations. Mulching and herbicide treatment in late summer prior to winter planting. Withhold fire for 3-5 years. <i>(Note: Most applicable for areas with low prescribed fire suitability ranking)</i>
Adjacent loblollies were not removed during harvesting operations	Include cut and leave, or herbicide injection in site preparation treatments to remove those loblollies from seed production and natural regeneration of the targeted longleaf area.
Residual longleaf are insufficient for natural regeneration, or not mature enough for cone production.	Plant containerized longleaf seedlings at a minimum of 726 seedlings per acre, and reintroduce dormant season prescribed fire within 2 years of seedling establishment. <i>(Note: Planting density purposefully calculated to compensate for loss during prescribed fire and still achieve 3 year objective of 400 seedlings per acre.)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and foliage from native grasses and herbaceous vegetation cover 20% or greater of the area, and hardwood competition less than 300 stems per acre, no loblolly encroachment.	No release treatment is needed. <i>(Note this is an indication the prescribed fire is successful in the area and maintaining the current prescribed fire interval will allow the increase of grasses and herbaceous ground while suppressing hardwoods)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and foliage from native grasses and herbaceous vegetation cover 20% or greater of the area and hardwood competition is greater than 300 stems per acre with stems less than 5 feet in height, no loblolly encroachment.	Treat hardwoods by foliar herbicide application of Triclopyr. <i>(Note: Triclopyr does not kill grass, but will address the hardwoods, allowing the native ground cover to increase)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and hardwood competition is at 1,000 stems/ acre or greater with stems less than 5 feet in height, and understory native grasses and herbaceous vegetation cover is less than 20%.	Treat hardwoods by foliar herbicide application of Imazapyr applied near end of growing season. <i>(Note: Imazapyr kills native grasses. Given the amount of hardwood competition grasses are unlikely and hardwoods will need to be controlled before any grasses or herbaceous ground cover can be established.)</i>
Third year stocking survey indicates area meets objective of 400 longleaf trees/ac and loblolly encroachment is greater 400 stems per acre or greater and over 5 feet tall.	Treat loblolly stems by mechanical cut and leave. <i>(Note this is an indicator that the prescribed burning program has been ineffective. Consider re-evaluating the prescribed burning suitability ranking to determine if longleaf restoration in this area can be achieved.)</i> Continue burning on 3-5 year interval, with post burn monitoring of representative sites to determine understory response and longleaf component.
If longleaf stocking drops below 50% of stand composition and longleaf DBH is less than half that of adjacent loblolly...	Consider intermediate mechanical treatment such as pre-commercial thinning, and/or a stand altering growing season burn, or reclassifying stand as mixed loblolly/longleaf and discontinuing restoration efforts.

AREA OF CONCERN – 3

AOC 3 stands are younger (< 40 years) predominately loblolly stands generally without a history of pine beetle infestation. They are located on upland sites with longleaf as the PNV. In some cases they have scattered mature longleaf, rarely greater than 20 ft²/ac BA. Most AOC 3 stands were established through reforestation activities from the 1950s to the time in where containerized longleaf became a reliable means to reestablish longleaf. In many occasions they were planted to at very high densities, exceeding 1,000 stems per acre. They are often very dense stands with loblolly BAs exceeding 100 ft²/ac BA. Under certain conditions where there have been periods of fire suppression, these stands may contain xeric oak inclusions.

Stands in an AOC 3 condition have both species composition and structure altered. Restoration involves removal about half the existing loblolly and hardwoods, favoring retention of longleaf, to create a woodland condition. The objective is to allow these stands to continue growth, in an open park like condition providing a surrogate for a longleaf stand, and prepare the stand for future conversion to longleaf. These trees are generally mature enough to produce cones, thus the area must be suitable for prescribed burning. If the prescribed fire suitability ranking is “*moderately high*” or “*high*”, then the potential exists to successfully restore upland longleaf pine and the following adaptive management protocols may be applied.

IF	THEN
The total pine BA is greater than 100 ft ² /acre.	Designate for commercial thinning with marking instructions to retain longleaf and removing loblolly and hardwoods. Residual BA should be 40-60 ft ² /ac striving for as much of a residual longleaf component as possible. Residual hardwood component should be no greater than 10% of total BA.
The area designated for restoration has not been successfully prescribed burned on a 3-5 year rotation and there is heavy build-up of undesirable species.	Consideration should be given to short duration sale contracts to allow the return of prescribed fire after harvest in the shortest time period possible to control undesirables.
Assessment indicates little to hardwood midstory and natural seeded loblolly averages less than 5 ft. in height or greater over no more than 20% or more of the stand. Stand is within 0.5 mile of an active RCW nest site	No chemical or mechanical treatment needed. Apply fire within 3 years, otherwise apply fire within 5 years
Assessment indicates moderate hardwood midstory averages 5ft in height or greater over 20% or more of the stand.	Treat hardwoods by foliar herbicide application of Triclopyr. (<i>Note: Triclopyr does not kill grass, but will address the hardwoods, allowing the native ground cover to increase</i>)
Stand is within 0.5 mile of an active RCW nest site	Apply fire within 3 years, otherwise apply fire within 5 years
Assessment indicates significant hardwood component averages 5 ft. in height or greater over 50% or more of the stand.	Treat midstory by mechanical mulching on suitable slopes, with foliar and bark treatment of herbicide in areas with equipment limitations.
Stand is within 0.5 mile of an active RCW nest site	Apply fire within 3 years, otherwise apply fire within 5 years

AREA OF CONCERN – 4

AOC 4 stands are older (> 40 years) predominately longleaf stands. They are located on upland sites with longleaf as the PNV. Generally they result from areas harvested by the early lumber companies (Kaul and J.A. Jackson) prior to Forest Service acquisition, and are naturally regenerated from native stock. These areas often contain older relict trees and support habitat for RCW. Many AOC 4 stands have received multiple treatments over the years including thinning and midstory control. In optimum woodland conditions they range from 40 – 60 ft²/ac BA with groundcovers of native grasses and fire-tolerant/fire dependent herbaceous vegetation. No hardwood midstory exists over 7 feet in height. Canopy hardwoods are absent or less than 10% of the total canopy.

AOC 4 stands in need of restoration generally have an altered structure with B.A.s over 100 ft²/ac and significant hardwood midstory. Under certain conditions where there have been periods of fire suppression, these stands may contain xeric oak inclusions. Also in situations where fire was excluded they have a loblolly component close to or slightly exceeding 30% of the stand composition. Restoration involves removal about half the stems targeting loblolly for removal, favoring retention of longleaf, removal and control of midstory (pine and hardwood), and prescribed fire return intervals not to exceed 5 years to insure desired understory composition. In some cases, undesirable hardwoods such as sweetgum have become established in these stands to the point that the underground root system requires repeated treatments with herbicide to significantly reduce continued encroachment.

The objective is to allow these stands to continue growth, in an open park like condition. Long-term management options would include intermediate treatments to allow for two aged or multi-aged stands. If the prescribed fire suitability ranking is “*moderately high*” or “*high*”, then the potential exists to successfully restore upland longleaf pine and the following adaptive management protocols may be applied.

IF	THEN
The combined BA of all pine is greater than 100 ft ² /ac,	Designate for commercial thinning with marking instructions to select loblolly for removal and retain longleaf favoring the older, larger and potentially relict trees. Residual BA should be 40-60 ft ² /ac with longleaf making up no less than 70% of the stand composition.
The area designated for restoration has not been successfully prescribed burned on a 3-5 year rotation and there is heavy build-up of undesirable species.	Consideration should be given to short duration sale contracts to allow the return of prescribed fire after harvest in the shortest time period possible to control undesirables.
Assessment indicates little to no hardwood midstory and natural seeded pine averages less than 5ft. in height or greater over no more than 20% of the stand.	No chemical or mechanical treatment needed. Apply fire within 3-5 years Address midstory adjacent to nest trees and potential nest trees by cut and

The stand contains active RCW or is designated for RCW recruitment	leave treatment. Apply fire within 3 years; otherwise apply fire within 5 years.
<p>Assessment indicates moderate hardwood midstory averages 5 ft. in height or greater over 20% or more of the stand.</p> <p>Xeric hardwoods exist within the stand and stand is within 0.5 mile of an active RCW nest site.</p> <p>The stand contains active RCW or is designated for RCW recruitment</p>	<p>Treat hardwoods by foliar herbicide application of Triclopyr. (<i>Note: Triclopyr does not kill grass, but will address the hardwoods, allowing the native ground cover to increase</i>)</p> <p>Address xeric hardwoods by foliar herbicide application of Triclopyr.</p> <p>Address midstory adjacent to nest trees and potential nest trees by cut and leave treatment, followed by herbicide stump treatment. Apply fire within 3 years; otherwise apply fire within 5 years.</p>
<p>Assessment indicates significant hardwood component averages 5 ft. in height or greater over 50% or more of the stand</p> <p>The stand contains active RCW or is designated for RCW recruitment</p>	<p>Treat midstory by mechanical mulching on suitable slopes, with foliar and bark treatment of herbicide in areas with equipment limitations.</p> <p>Address midstory adjacent to nest trees and potential nest trees by cut and leave treatment, followed by herbicide stump treatment. Apply fire within 3 years; otherwise apply fire within 5 years.</p>

AREA OF CONCERN – 5

AOC 5 stands are older (< 40 years) predominately longleaf stands; however in some situations, generally due to the absence of fire, they have become mixed pine and pine hardwood stands. They are located on upland sites with longleaf as the PNV. Generally they result from prior restoration of AOC 1 stands, and were established by the Forest Service sometime after the mid-1980s when containerized longleaf seedlings became a reliable means to restore longleaf species composition. In a few cases these stands may be a result of natural regeneration and may contain older relict trees that were once habitat for RCW. Due to encroachment of the longleaf saplings into the midstory, the RCW generally abandon these areas, unless extensive work has been performed to suppress the midstory. The objective is for AOC 5 stands to lose their “plantation” characteristics and become similar to a naturalized AOC 4 stand.

AOC 5 stands in need of restoration generally have an altered structure with B.A.s over 120 ft²/ac. In many cases they have a loblolly and hardwood component, sometimes greater than 50% of the stand composition. Under certain conditions where there have been extended periods without fire, these stands may contain xeric oak inclusions. Restoration involves removal about half the stems targeting loblolly for removal, favoring retention of longleaf, removal and control of midstory (pine and hardwood), and prescribed fire return intervals not to exceed 5 years to insure desired understory composition. In some cases, undesirable hardwoods such as sweetgum have become established in these stands to the point that the underground root system requires repeated treatments with herbicide to significantly reduce continued encroachment.

The objective is to allow these stands to continue growth, in an open park like condition. Long-term management options would include intermediate treatments to allow for two aged or multi-aged stands. If the prescribed fire suitability ranking is “*moderately high*” or “*high*”, then the potential exists to successfully restore upland longleaf pine and the following adaptive management protocols may be applied.

IF	THEN
The combined BA of all pine is greater than 100 ft ² /ac,	Designate for commercial thinning with marking instructions to select loblolly for removal and retain longleaf favoring the older, larger and potentially relict trees. Residual BA should be 40-60 ft ² /ac with longleaf making up no less than 70% of the stand composition.
The area designated for restoration has not been successfully prescribed burned on a 3-5 year rotation and there is heavy build-up of undesirable species.	Consideration should be given to short duration sale contracts to allow the return of prescribed fire after harvest in the shortest time period possible to control undesirables.
Assessment indicates little to no hardwood midstory and natural seeded pine averages less than 5ft in height or greater over no more than 20% of the stand.	No chemical or mechanical treatment needed.
Stand is within 0.5 mile of an active RCW nest site	Apply fire within 3 years; otherwise apply fire within 5 years.

Assessment indicates moderate hardwood midstory averages 5 ft. in height or greater over 20% or more of the stand.	Treat hardwoods by foliar herbicide application of Triclopyr. (<i>Note: Triclopyr does not kill grass, but will address the hardwoods, allowing the native ground cover to increase</i>)
Xeric hardwoods exist within the stand and stand is within 0.5 mile of an active RCW nest site.	Address xeric hardwoods by foliar herbicide application of Triclopyr.
Stand is within 0.5 mile of an active RCW nest site	Apply fire within 3 years; otherwise apply fire within 5 years.
Assessment indicates significant hardwood component averages 5 ft. in height or greater over 50% or more of the stand	Treat midstory by mechanical mulching on suitable slopes, with foliar and bark treatment of herbicide in areas with equipment limitations.
Stand is within 0.5 mile of an active RCW nest site	Apply fire within 3 years; otherwise apply fire within 5 years.