United States
Department
of
Agriculture

Forest
Service

June 2013

FINAL
ENVIRONMENTAL ASSESSMENT

Pine Flat
Integrated Resource Restoration Project

National Forests in Alabama
Talladega National Forest – Oakmulgee District

Bibb and Hale Counties, Alabama

Responsible Official:
Cynthia Ragland
District Ranger
9901 Alabama Hwy 5
Brent, AL 35034
Ph: 205-926-9765
Email: cragland@fs.fed.us

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the bases of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, or all or part of an individual's income is derived from any public assistance program, or protected genetic information in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases will apply to all programs and/or employment activities.)

To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (PDF) within 45 days of the date of the alleged discriminatory act, event, or in the case of a personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form (PDF), found online at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442 or email at program.intake@usda.gov.

Persons with Disabilities

Individuals who are deaf, hard of hearing or have speech disabilities and you wish to file either an EEO or program complaint please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

Persons with disabilities who wish to file a program complaint, please see information above on how to contact us by mail directly or by email. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.) please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Table of Contents

Introduction & Framework……4

Chapter I. Purpose and Need for Act……5

Background……...5
A. The Planning Area……6
B. Goals and Objectives……..27
C. Purpose and Proposed Action……28
D. Issues……..36
E. Decision to be Made……...38
F. Public Involvement……39

Chapter II. Comparison of Alternatives….……..40

Alternative A (No Action)…… ……40
Alternative B (Proposed Action)… ……41
Alternatives Considered but Elminated……...48

Chapter III. Environmental Consequences……..59

A. Forest Composition and Structure – Early Succession Conditions……59
B. Forest Composition and Structure – Forest Health……66
C. Forest Composition and Structure – RCW Expansion……...72
D. Watershed Health……74
E. Soil Productivity, Compaction, and Erosion……...81
F. Dispersed Recreation and Public Access……90
G. Forest Composition and Structure – Wildlife……98
H. Non-Native Invasive Plant Species……...105
I. Climate Change……111
J. Economics and Operational Capacity……115
K. Proposed, Endangered, Threatened and Candidate (PETC) Species……117
L. Regional Forester's Sensitive Species……...134
M. Cultural Resources ……146
N. Other Environmental Effects Relative to FONSI Significant Factors……...146

Chapter IV. Consultation and Coordination….……..150

Appendix A: Proposed Action Treatment Areas
Appendix B: Adaptive Management Protocols
Appendix C: Response to Comments

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 Pine Flat 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. These 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 planning 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 improve forest health conditions and increase adaptive capacity of resources to potential effects of climate change, natural wind events, etc. by aligning species to their respective native sites.

This Environmental Assessment (EA) builds on previous analysis relative to a condition known as loblolly decline. This condition is discussed in length in the *Longleaf Ecosystem Restoration Project Environmental Impact Statement (Longleaf EIS)* and stems from artificially (planting, fire suppression, grazing) establishing loblolly and shortleaf on sites that, under native conditions, would have been predominately longleaf. **(The official citation for the Longleaf EIS is, USDA Forest Service. 2005. Final environmental impact statement. Longleaf Ecosystem Restoration Project, National Forests in Alabama, Talladega National Forest, Oakmulgee District and is incorporated by reference into this EA.)** The symptoms of loblolly decline become most apparent as trees approach the 51-60 year age class. While there are some specific abiotic and biotic concerns with loblolly decline it is directly related to altered species composition and structure (i.e. over stocked off-site species).

This EA also incorporates an understanding and acceptance of the 2011 storm events as natural disturbance within a dynamic, yet greatly reduced ecosystem. The analysis will take into consideration the juxtaposition of the forest to an altered and human populated landscape. The natural progression of a similar storm event prior to European settlement would have likely been an integrated action involving insects, disease, and fire. In the case of fire, today's human society will no longer tolerate unmanaged fire and its resulting smoke. The altered sites with loblolly decline conditions are considered unhealthy and action needs to be taken that improves forest health conditions and reduces risk of insect and disease infestations on NFS lands as well as adjoining private lands.

The EA seeks to provide the analysis to support a decision to implement actions designed to improve forest health and vigor building a more resilient landscape capable of naturally absorbing natural events such as severe weather, fire, disease, and insect infestations. These actions would further enhance the ecological function of natural stands providing connective corridors for expansion of endangered species such as the red-cockaded woodpecker (RCW). Good Quality Foraging Habitat (GQFH) as defined by the RCW Recovery Plan and incorporated into the Revised Land and Resource Management Plan (Forest Plan) for the National Forests in Alabama serves as a guideline for restoring natural longleaf pine

conditions. GQFH contains large old pines, low densities of small and medium pines, sparse or no hardwood midstory and a grass and forb understory.

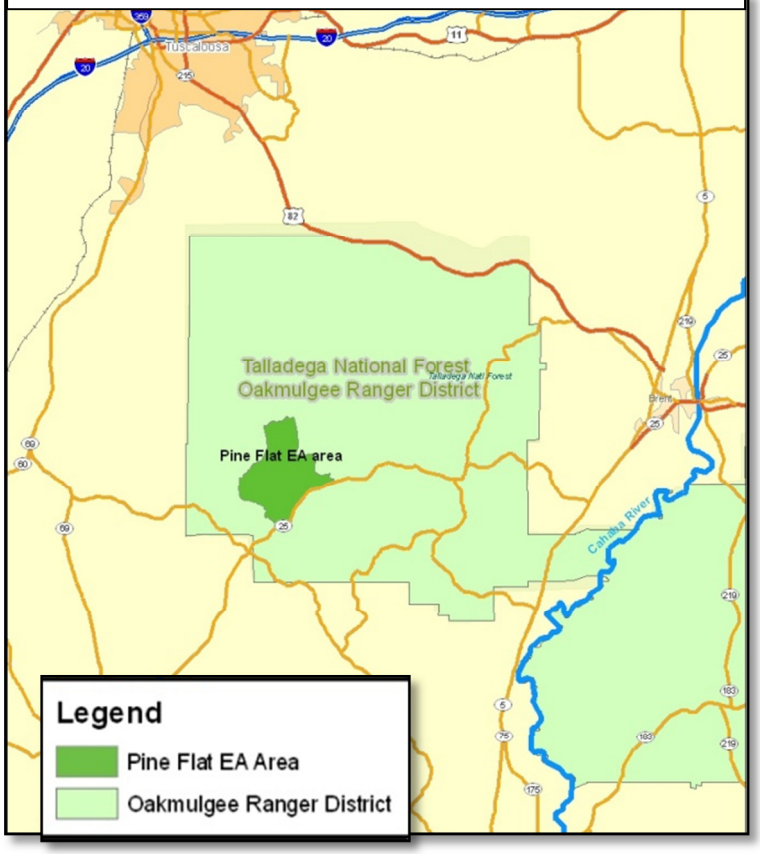
The EA will examine a series of integrated actions and their effects to fuel loads, fire severity, and smoke impacts. It also takes into consideration the public services, such as recreation, road use, and economic benefits, provided by NFS lands.

A. Plan Area Description

1. **General Information:** The *Pine Flat Integrated Resource Restoration Plan area* consists of 5,750 acres of NFS lands located in the west central portion of the TNF, Oakmulgee District in Bibb and Hale Counties, Ala. The area is inventoried as Oakmulgee Compartments 40, 41, 52, and 53.

The planning area lies 12 miles south of Tuscaloosa, Ala., and 14 miles northeast of Greensboro, Ala. It extends from Hale County Highway #53 (Clary Hill Road) on the west, to Hale County Highway #49 and Forest Service Road (FSR) 715 on the east, and Alabama Highway #25 on the south to FSR 704 and 708 on the north **(Reference Figure 1.A.1-1: Pine Flat Planning Area Vicinity Map).**

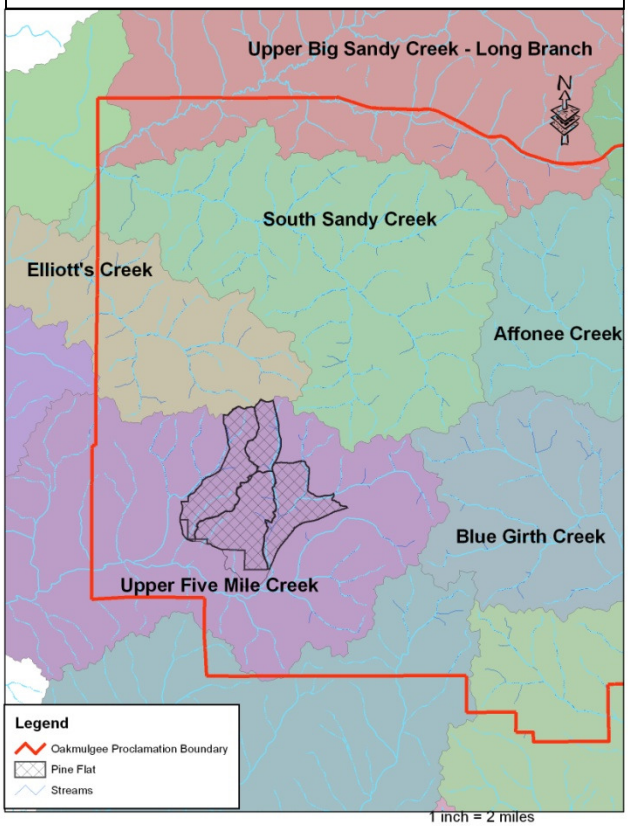
Figure 1.A.1-1: Pine Flat Planning Area Vicinity



a) **Legal Description:**
Township 22 North, Range 06 East, portions of Sections 1, 2, 3, 9, 10, 11, 12, 13, 14 and 15. Township 22 North, Range 07 East, portions of Section 7. Township 23 North, Range 06 East, portions of Sections 34 and 35.

b) **Watersheds:** The Pine Flat planning area lies completely within the Black Warrior River Basin (USGS Cataloging Unit: 03160113) and the Upper Five Mile Creek (12th level) sub-watershed. The Upper Five Mile Creek sub-watershed consists of 110 square miles as shown in **Figure 1.A.1-2: Upper Five Mile Creek Sub-Watershed.** U.S. Environmental Protection Agency (EPA) completed a watershed assessment in 2008, spanning from the Black Warrior River upstream to Payne Lake. EPA found no impairment or Total Maximum Daily Load issues to report 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 a watershed are related to both current use trends and expected use trends based on state water quality standards.

Figure 1.A.1-2: Upper Five Mile Creek Sub-Watershed



c) **Unique Geographic Characteristics:** The Pine Flat planning area does not contain any prime farmlands, ecologically critical areas, or wild and scenic rivers. The planning area does contain the Payne Lake Recreation Area which is currently being evaluated as a potential historic landscape through a Cultural Landscape Report (CLR). A CLR is the nationally approved format to evaluate rural historic landscapes to determine their level of significance. The Payne Lake CLR will provide documentation of the landscape characteristics for the viewshed immediately surrounding the lake.

d) **Cooperative Management Agreements and Easements:** The following management agreements are in place within or affecting the Pine Flat planning area.

1. The Pine Flat planning area lies within the cooperatively managed Alabama Department of Conservation and Natural Resources, Oakmulgee Wildlife Management Area (WMA), with the exception of the 1,019 acres within Payne

Lake Recreation Area. The Oakmulgee WMA is cooperatively managed by the FS and Alabama Wildlife and Freshwater Fisheries Division to restore and manage wildlife. This cooperative relationship is defined by a Cooperative agreement signed by the two agencies in 1962 (agreement #12-11-018-721).

2. There are two privately owned in-holdings within the Pine Flat planning area. They are Pisgah Cemetery and Pine Flat Church (approximately 1 and 3.5 acres, respectively). There are no FS acquired rights of way or easements across either of these properties.
3. Four special-use authorizations are active within the Pine Flat planning area **(Reference Figure 1.A.1-3: Special Use Permits with the Pine Flat Planning Area).**
   - The Alabama Highway Department holds authorizations for AL State Highway 25 and Hale County Road 49.
   - Moundville Telephone Company holds an authorization for an underground telephone line servicing a private in-holding to the north of the planning area.
   - Black Warrior Electric Membership Corporation holds an authorization for a power distribution line routed in part through Payne Lake Recreation Area and adjacent to AL State Highway 25 and Hale County Road 49.
4. The Oakmulgee District has entered into a Forest Road Agreement with the Hale County Highway Department. Under the terms of this agreement, the FS and the Hale County Highway Department have agreed to cooperatively maintain and/or improve roads that provide mutual benefit to both parties.

Figure 1.A.1-3: Special-Use Permits within the Pine Flat Planning Area

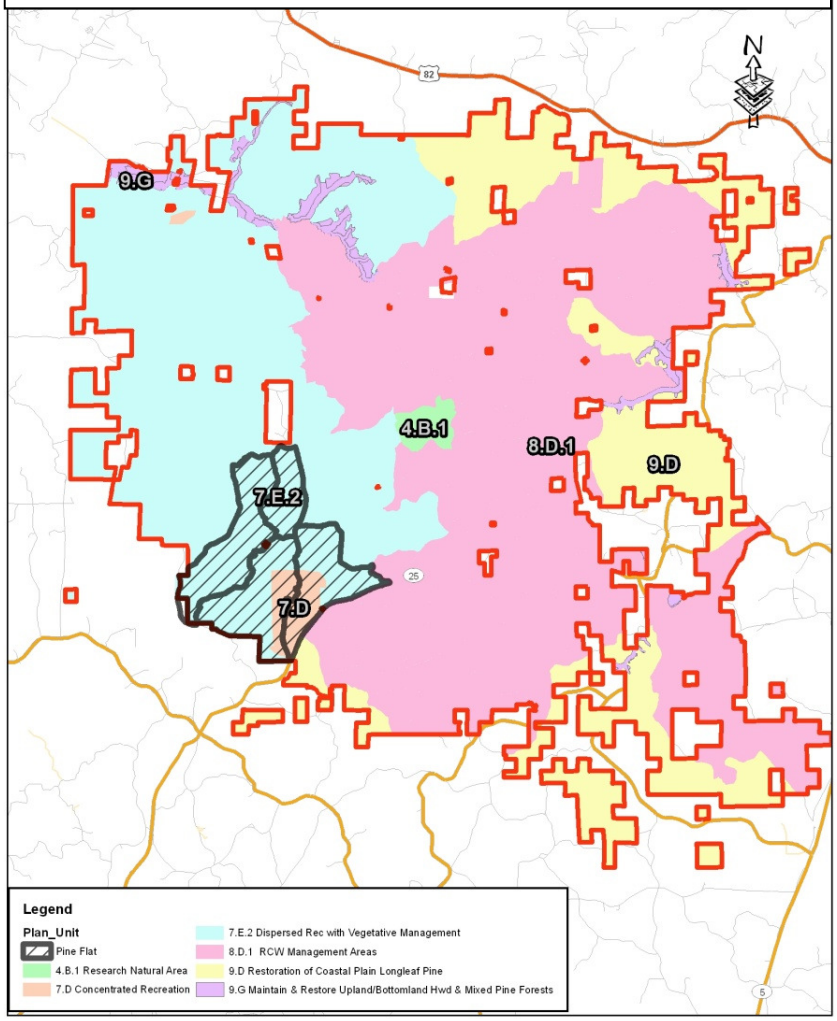
HOLDER	USE DESCRIPTION	EXPIRATION DATE
AL Hwy. Department	Highway, CR 49	N/A
AL Hwy. Department	Highway, SH 25	N/A
Moundville Telephone Co.	Underground Telephone Line	12/31/2021
Black Warrior EMC	Power Distribution Line	12/1/2032

2. **<u>Forest Plan Framework:</u>** The Forest Plan for the National Forests in Alabama designates the area within the Pine Flat planning area as a Recreation/Scenic Emphasis Area. The specific categories and sub-categories within this emphasis area are the Concentrated Recreation Zone and Dispersed Recreation Area – Dispersed Recreation Areas with Vegetation Management (**Reference Figure 1.A.2-1: Forest Plan Management Prescriptions**).
   a) **Concentrated Recreation Zones:** These are managed to provide the public with a variety of recreational opportunities in visually appealing and environmentally healthy settings. Developed recreation areas, concentrated use areas, and areas of high-density dispersed recreation activity are the components of Concentrated Recreation Zones. Facilities are provided to enhance the quality of the recreation experience and/or mitigate damage to the affected ecosystems. These areas also serve as the "gateways"

to the wide diversity of recreation opportunities throughout the forest. These areas are considered unsuitable for timber production; meaning that timber removal from these areas must have a primary objective to enhance the recreational opportunity. Payne Lake Recreation Area, a developed recreation area, is entirely located inside the Pine Flat planning area.

b) **Dispersed Recreation Areas with Vegetation Management:** The area immediately surrounding Payne Lake Recreation Area is managed with the emphasis 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. Timber harvesting and vegetative manipulation may be used to achieve recreational, forest health improvements, ecosystem restoration, and/or aesthetic values. On the Oakmulgee District the Dispersed Recreation Areas with Vegetation Management area is mapped at 30,929 acres, The Pine Flat Planning Area represents 5,740 acres (18.6 %) of the larger management area

Figure 1.A.2-1: Forest Plan Management Prescriptions



c) **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:** Nine project level decisions have been made for activities within the Pine Flat planning area in the past decade. Three of these decisions have been fully implemented, two are in various stages of implementation, and three programmatic decisions regarding the treatment of Non-Native Invasive Plant Species (NNIPS) are for multi-year treatments that will continue until the objective is met or new information is provided contrary to the current decision. A multi-year decision exists for ongoing operations and maintenance of permanent openings. The three decisions that have been implemented in full came as a result of the April 27, 2011 EF 3 tornado that transected the Pine Flat planning area. A summary of these decisions follows:

- **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. Total acreage affected is roughly 150 acres, of which 8.4 acres are within the Pine Flat planning area.

- **Longleaf Ecosystem Restoration Project Environmental Impact Statement (Longleaf EIS), Record of Decision (ROD) signed February 2, 2005:** This document placed into decision 1,081 acres of restoration treatments within the Pine Flat planning area. Initial restoration has begun on 22 acres through the Payne Lake #1 Timber Sale which was awarded in 2009 and closed in 2012. The associated restoration treatments such as site preparation and planting are scheduled for the winter of 2013/2014. Approximately 129 acres covered by this decision were damaged by the 2011 tornado. New decisions were made respective of the extent of damage. Additional restoration treatments include the implementation of a 3-5 year prescribed fire program across the planning area. A detailed discussion on the fire history of this area may be found in Section 3.d. of this chapter. Understory Conditions/Fire Condition Class. **Reference Figure 1.A.2-2: Summary of Prior Decision – Longleaf EIS and ROD** for specific acreages and status of implementation.

Figure 1.A.2-2: Status of Prior Decision - Longleaf EIS and ROD				
	Original Decision	**Treated in Payne Lake Timber Sale (Acres)**	**Damaged/Salvaged as result of 2011 Tornado (Acres)**	**Actions Remaining (Acres)**
Clear-cut w/ Reserves; Site Prep; Plant to Longleaf; and Release	672	22	60	**565**
Remap as hardwood and deduct from treatment areas **(The EIS estimated 20% of restoration to be remapped and retyped as hardwood or mixed pine hardwood)*	0	25	0	**0**
Thin Planted Loblolly	250	0	6	**244**
Thin Longleaf; Treat Midstory	159	0	60	**99**
	1,081	**47**	**126**	**908**
Prescribed fire on 2-5 year burning rotation				**5,750**

- **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: cogon grass, kudzu, Chinese wisteria, multiflora rose, Japanese climbing fern, Japanese, Chinese, and European privet, mimosa, Nepalese brown top, serecia lespedeza, and bicolor lespedeza.

- **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.

- **Payne Lake Project 2009 EA (Payne Lake EA), Decision Notice (DN) and Finding of No Significant Impact (FONSI) signed August 11, 2009:** This planning document placed into decision 848 acres of forest restoration treatments (**Reference Figure 1.A.2-3: Status of Prior Decision – Payne Lake EA, DN, and FONSI**), 110 acres of recreational fisheries re-establishment, and a variety of

recreation enhancements within the Payne Lake Recreation Area. Initial restoration has begun on 271 acres through the Payne Lake #1 Timber Sale which was awarded in 2009 and closed in 2012. The associated restoration treatments such as site preparation and planting are scheduled for the winter of 2013/2014. Twenty-one acres were re-examined following the April 2011 tornadoes and new decisions were made.

Figure 1.A.2-3: Status of Prior Forest Restoration Decisions – Payne Lake EA, DN and FONSI

	Original Decision (Acres)	Treated in Payne Lake Timber Sale (Acres)	Damaged/ Salvaged as result of 2011 Tornado (Acres)	Actions Remaining (Acres)
Clear-cut w/ Reserves; Site Prep; Plant to Longleaf; and Release (3 acres remapped to hardwoods as a result of the Payne Lake Timber Sale)	105	34	0	**71**
Heavy thin loblolly sites within Payne Lake Recreation Area. Introduce longleaf as landscape features (18 acres remapped to hardwoods as a result of the Payne Lake Timber Sale)	153	125	0	**10**
Thin Longleaf; Treat Midstory	590	112	21	**457**
	848	**271**	**37**	**538**

- **2011 Tornado Damage – Clary Hill Salvage Decision Memo (DM) signed June 3, 2011:** This document placed into decision commercial salvage operations on 219 acres of forested vegetation damaged by an EF 3 tornado on April 27, 2011. Approximately 88 of the 219 acres were included in prior decision documents listed above. The salvage contract was awarded June 30, 2011 and was cut by October 28, 2011. A total of 215 acres were placed under contract.

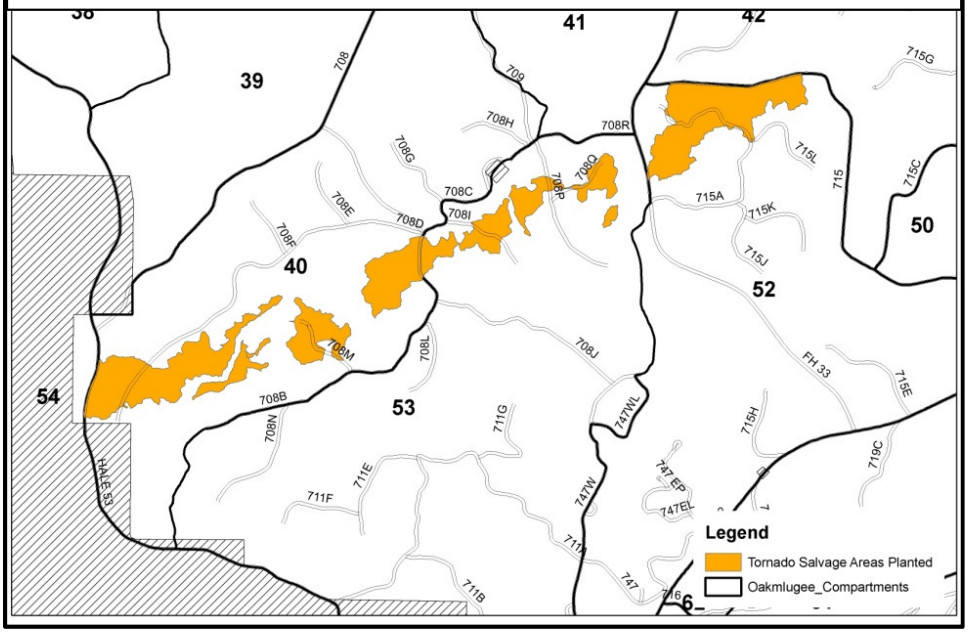
- **2011 Tornado Damage – Clary Hill Salvage Decision Memo (DM) signed June 3, 2011:** This document placed into decision commercial salvage operations on 219 acres of forested vegetation damaged by an EF 3 tornado on April 27, 2011. Approximately 88 of the 219 acres were included in prior decision documents listed above. The salvage contract was awarded June 30, 2011 and was cut by October 28, 2011. A total of 215 acres were placed under contract.

- **2011 Tornado Damage-Pine Flat Salvage Decision Memo (DM) signed June 10, 2011:** This document placed into decision commercial salvage operations on 202 acres of forested vegetation damaged by an EF 3 tornado on April 27, 2011. Approximately 67 of the 202 acres were included in prior decision documents listed

above. The salvage contract was awarded on July 14, 2011 and was cut by February 9, 2012. A total of 201 acres were placed under contract.

- **Longleaf Pine Hand-planting in Tornado Salvage Areas Decision Memo (DM) signed February 14, 2012:** This document placed into decision the hand planting of longleaf seedlings on 378 acres that were commercially salvaged August 2011 through February 2012. In March 2012, longleaf seedlings were planted on 295 acres. These acres were determined based on actual on-the-ground traverse with Global Positioning System (GPS) equipment. The remaining 159 acres identified in the DM were deemed acceptable for natural regeneration, not suitable for planting due to logging and storm debris, better managed as part of the adjacent stand, or within the margin of error associated with digitizing from aerial photos (**Reference Figure 1.A.2-4: Tornado Salvage Area and Restoration Map).**

Figure 1.A.2-4: Tornado Salvage Area and Restoration Map



- **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.

3. **Planning Area Assessment and Current Conditions:**

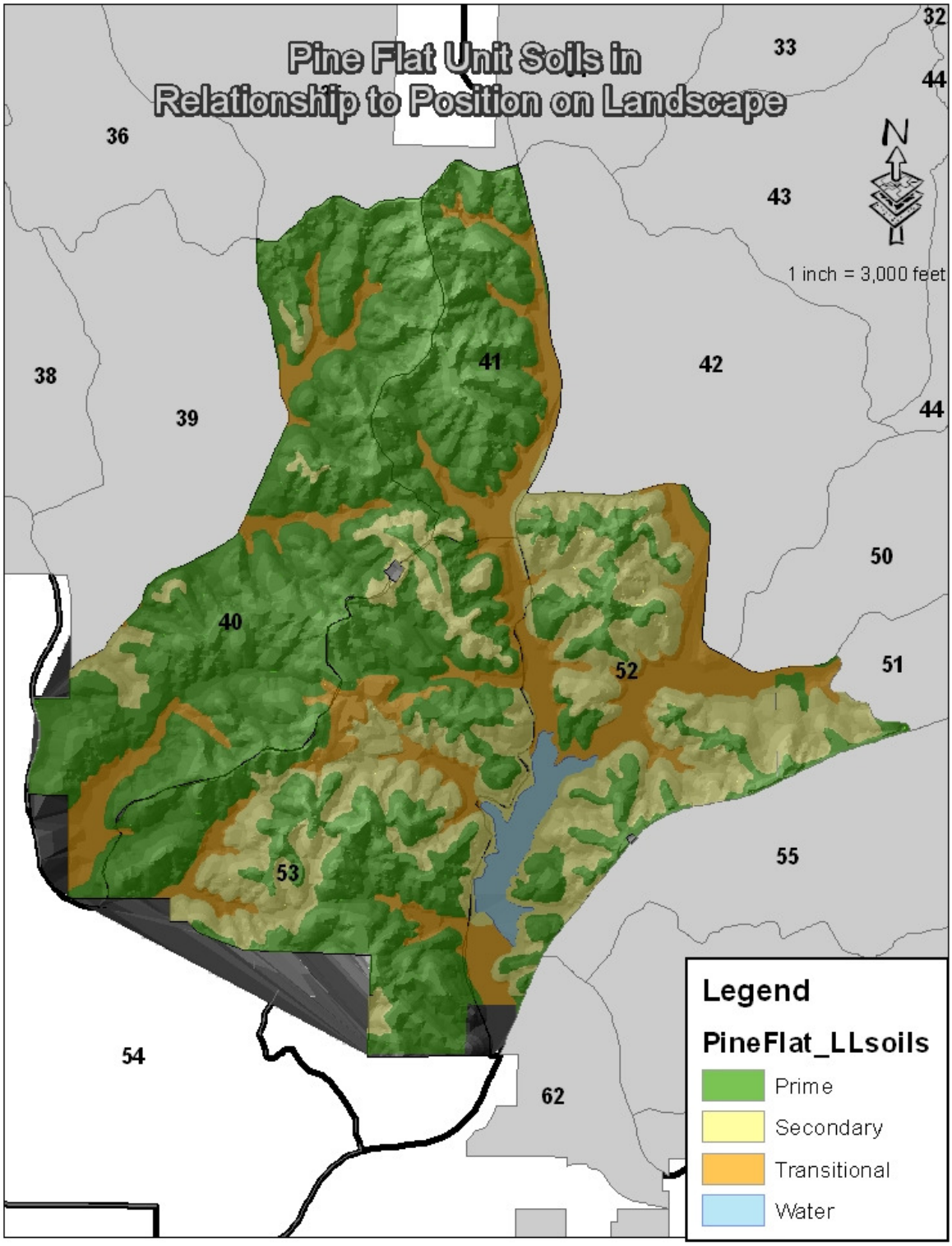
a) **Forest Communities and Potential Native Vegetation:** The Pine Flat planning area has been inventoried and mapped within three forest communities using the definitions outlined in the Forest Plan. These forest communities are described as existing conditions on the landscape. Current conditions were determined using satellite imagery and on-the-ground stand examinations. Acreages within each community type are displayed in **Figure 1.A.3-1: Forest and Non-forest Communities within the Pine Flat Planning Area.**

Figure: 1.A.3-1: Forest and Non-forest Communities within Pine Flat Planning Area		
Forest Communities	**Acres**	**Percentages**
Upland Longleaf Pine Forest & Woodland	2,546	44%
Dry and Dry-Mesic Oak-Pine Forest	2,280	40%
Mesic Deciduous Forest	757	13%
Sub-Total	**5,583**	**97%**
Non-Forest Communities	**Acres**	**Percentages**
Wetlands	114	2%
Wildlife Openings	14	<1%
Roads	37	<1%
Sub-Total	**165**	**<4%**
TOTAL	**5,750**	

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 for the counties included in the

Oakmulgee Ranger District. To map the potential distribution for longleaf pine within the Pine Flat planning unit a GIS soil layer was created by using inherent soil data reports for each soil series to select those soils which are "prime" longleaf soils (**Reference Figure 1.A.3-2: Pine Flat Planning Area – Longleaf Soils**). 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.

- **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, 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.

  In the 5,750 acre Pine Flat planning area, 3,379 (59%) acres are soils mapped as primary longleaf soils; 1,314 (23%) acres, located on ridges and south facing slopes are mapped as secondary longleaf soils for a total of 4,693 acres. Of those 4,693 acres 2,546 (54%) are currently stocked with longleaf. As a result of the 2011 tornadoes, 301 acres were planted or determined to have sufficient natural regeneration; 121 acres were recently thinned and now have an open canopy; and the remaining 1,269 acres have a dominant longleaf overstory but are heavily stocked averaging 120-140 ft^2 Basal Area (BA). In many cases longleaf in the 11-20 year age class has heavy loblolly stocking **(Reference Figure 1.A.3-3a: 10-Year Age class Distribution - Upland Longleaf Pine Forest and Woodland Community).**

Figure 1.A.3-3a: 10-Year Age class Distribution - Upland Longleaf Pine Forest and Woodland Community

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 41-50 year age class	Acres in 51-60 year age class	Acres in 60+ year age class	TOTALS
Post Tornado Artificial Planting	**295**	0	0	0	0	0	0	295
Post Tornado Natural Regeneration	**6**	0	0	0	0	0	0	6
Timber Sale: Payne Lake #1 Clearcut with reserves	**55**	0	0	0	0	0	0	55
Timber Sales: 1984-1994 Clearcut with reserves	0	**67**	**567**	**0**	**0**	**0**	**0**	634
Timber Sales: 1964-1973	0	0	0	0	**55**			55
Timber Sale: Payne Lake #1 Thinning	0	0	**17**	0	0	0	**121**	138
Natural Stands *(not treated within last 20 years)*	0	0	0	0	0	0	**1363**	1,363
TOTALS	**356**	**67**	**584**	**0**	**55**	**0**	**1,484**	**2,546**
Percentages	***14.0%***	***2.6%***	***23.0%***	***0%***	***2.1%***	***0%***	***58.3%***	

Note: All age determinations based on the year 2014

Embedded within the Upland Longleaf Pine Forest and Woodland Community is the xeric pine and pine-oak forest woodland community. Generally, this woodland community occurs as small inclusions on ridge tops and south and southwest facing slopes. The inventory used for this analysis does not break out this community type as individual stands. Xeric pine and pine-oak forest woodland overstory is characteristically open and consists of fire tolerant species such as longleaf pine, blackjack oak, southern red oak, post oak, turkey oak, and small quantities of white oak. Understory species are relatively sparse and may include mountain laurel, *vaccinium* species, and small patches of grasses such as bluestem. On the Oakmulgee District, xeric woodland types are situated on the top of the ridges and are generally very narrow, rocky and run the length of the ridge, one to 35 acres in size. Oakmulgee soils associated with this biome include Maubila flaggy loam, Maubila-Smithdale, and Maubila-Smithdale-Boykin Complex. The dry soil conditions slow the growth of longleaf competitors. In the Pine Flat planning area, there are 39 ridge tops of xeric pine and pine oak forest type containing approximately 670 acres along with smaller inclusions on soils and vegetative conditions of this forest type. The xeric pine forest community is at the center of each of the six active RCW clusters found in the Pine Flat planning area.

- **Dry and Dry-Mesic Oak-Pine Forest Community:** This community type is comprised of shortleaf and loblolly pine with mixed southern red oak, white oak, black oak, and northern red oak on the Oakmulgee District. Native conditions for this community occurs mid-slope as the site transitions from upland pine into moist hardwood drains. Non-native conditions exist from off-site conversions and afforestation efforts. As inventoried, 2,053 acres of loblolly and shortleaf exist on sites that are suited for longleaf and woodland communities **(Reference Figure 1.A.3-3b: 10-Year Age class Distribution – Dry and Dry-Mesic Oak-Pine Forest Community).**

Figure 1.A.3-3b: 10-Year Age class Distribution – Dry and Dry-Mesic Oak-Pine Forest Community

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 41-50 year age class	Acres in 51-60 year age class	Acres in 60+ year age class	TOTALS
Natural Regeneration post tornado damage and salvage	17	0	0	0	0	0	0	17
Two-aged mixed stand. Heavy overstory loblolly stocking on longleaf site within recreation area	0	0	0	0	0	0	75	75
Soil Stabilization, afforestation, & fire suppression (1920-1953)	0	0	0	0	0	0	1,578	1,578
Off-site Conversion (1960-1979)	0	0	0	46	213	123	0	382
Native on-site loblolly and pine hardwood	0	0	0	0	0	0	210	210
Mixed pine, originally planted to longleaf, but heavily mixed loblolly and hardwood	0	0	18	0	0	0	0	18
TOTALS	**17**	**0**	**18**	**46**	**213**	**123**	**1,863**	**2,280**

Percentages	*0.007%*	*0%*	*0.8%*	*2.0%*	*9.3%*	*5.4%*	*81.7%*	
Note: All age determinations based on the year 2014								

- **Mesic Deciduous Forests:** These forests include the River Floodplain, Dry Mesic Oak and Mixed Mesophytic communities and are found on more moist soils like the aforementioned pine communities. Below the upper ridges and positions on the landscape where longleaf primary and secondary soils reside, a "transition" occurs 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 pure 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 cane brakes 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. In some areas there may be standing open water depending on the current level of beaver activity **(Reference Figure 1.A.3-3c: 10-Year Age class Distribution –Mesic Deciduous Forest).**

Figure 1.A.3-3c: 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 41-50 year age class**	**Acres in 51-60 year age class**	**Acres in 60+ year age class**	**TOTALS**
Natural Regeneration to advance red oak, white oak, and hickory component.	0	0	33	0	0	0	0	**33**
Natural Stands	0	0	0	0	0	0	724	**724**
TOTALS	**0**	**0**	**33**	**0**	**0**	**0**	**724**	**757**
Percentages	*0%*	*0%*	*4.4%*	*0%*	*0%*	*0%*	*95.6%*	
Note: All age determinations based on the year 2014								

Non –Forest Communities:

- **Permanent Openings:** Seven permanent wildlife openings and 7 linear strips are maintained within the Pine Flat planning area to provide early successional habitat for wildlife and to provide wildlife viewing and hunting opportunities for the public. Wildlife openings are maintained by mowing, burning, and/or planting with forages including wheat, oats, and clover. Linear strips are maintained by annual mowing. Additional permanent openings are located around the entrance way to

Payne Lake Recreation Area. Total acres in permanent openings and linear strips are 8.4 and 6.4, respectively. Additional permanent openings are located around the entrance way to Payne Lake Recreation Area. Total acres in permanent openings are 14 acres.

- **Aquatic:** Payne Lake is a 110 acre developed impoundment. Clearing and construction began in 1936 and the lake was opened for use in July, 1940. It currently contains a marginal recreational fishery and has moderate to heavy growth of water lilies and other aquatic vegetation. The Decision Notice and FONSI from the Payne Lake Project 2009 included lake restoration. Implementation of that project is pending the completion of the Cultural Landscape Report.

- **Rights of Way:** There are 37 acres inventoried as roads or road rights of way within the Pine Flat planning area. These areas are along Hale County Road 49 and Alabama Highway 25.

b) **Threatened, Endangered, and Sensitive Species:** Annual monitoring is conducted for all active RCW cluster habitat. Along with RCW monitoring, annual breeding bird call counts and botanical surveys are conducted within the planning area.

- **Red-cockaded Woodpeckers (*Picoides borealis*), Status Endangered:** There are six active RCW clusters (family units) within the Pine Flat planning area. Currently, none of the stands containing active cluster trees meet the definition of GQFH as referenced in the Purpose and Need for Action, and defined by the RCW Recovery Plan. Monitoring conducted during the 2012 nesting season documented that each of the six 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 documents that the BA and midstory density levels are outside the GQFH criteria. Conditions within the 0.25 mile foraging radius are illustrated in **Figure 1.A.3-4: RCW Habitat Conditions**. The current inventory indicates the potential to support 12-14 RCW clusters over the next 5-15 years. This analysis is based on the assessment of longleaf as the PNV and the succession of younger stands into suitable habitat. One inactive cluster site exists within the planning area. This cluster has been documented as inactive for since 1985 and one cavity tree remains. The area surrounding the cluster site has a heavy loblolly and hardwood component and is not sustainable as RCW habitat.

Figure 1.A.3-4: RCW Habitat Conditions

Cluster #	Total Stand Density (BA)	Longleaf Composition within stand (BA)	Average Pine DBH	Midstory Ranking	Midstory Species	Partition Acres	Foraging Acres
223	90	87	15”	Moderate 7’-15’	Hardwood	121	81

224	105	86	17”	Moderate 7’-15’	Hardwood/Pine	92	82
225	97	83	16”	Moderate 7’-15’	Hardwood	101	89
226	97	83	16”	Moderate 7’-15’	Hardwood/Pine	100	92
228	108	88	16”	Moderate 7’-15’	Hardwood	126	94
439	105	86	17”	Moderate 7’-15’	Hardwood/Pine	96	78

- **Wood stork (*Mycteria americana),* Status Endangered:** Wood storks are not known to be present during breeding or wintering seasons on the TNF, Oakmulgee District. Occasional transients may exploit seasonal wetlands as post-breeding storks disperse in the late summer and fall.
- **Mitchell’s satyr *(Neonympha mitchelli)*, Status Endangered:** Several local populations were located in 2004 in beaver impoundments along the stream that feeds Payne Lake, and a few individuals have been seen near the lake.
- **Tennessee yellow-eyed grass (*Xyris tennesseensis*), Status Endangered:** Suitable habitat exists within the Pine Flat planning area. However, there are no documented occurrences.

c) **Regional Forester’s Sensitive Species:** Within the Pine Flat planning area there are records of two vascular plants, one amphibian, and one bird species. Occurrences were documented within the Pine Flat planning area **(Reference Figure 1.A.3-5: Known PETS Species within the Pine Flat Planning Area).**

Figure 1.A.3-5: Sensitive Species with suitable habitat in the Pine Flat Planning Area.

Classification	Scientific Name	Common Name	**Status
Amphibian	*Desmognathus aeneus*	Seepage salamander	G3
Bird	*Aimophila aestivalis*	Bachman’s sparrow	G3
Vascular Plant	*Quercus arkansana*	Arkansas oak	G3

***The Global Ranking System was developed by NatureServe. Each species is a rank representing its range-wide or global status (G rank). Species with a rank of 1 are most critically imperiled; those with a rank of 5 are most secure. For more information regarding Conservation Status Ranks, see http://www.natureserve.org/explorer/ranking.htm#globalstatus*

d) **Bald Eagle *(Haliaeetus leucocephalus)*, Status Protected by the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act:** At least one pair of bald eagles has nested successfully for the past five years in a location just east of the Pine Flat planning area. They are known to forage in and around Payne Lake. Several nesting pairs are documented along the Cahaba and Black Warrior Rivers and near the commercial catfish lakes to the west of the Pine Flat planning area.

e) **Understory conditions/Fire condition class:** Prescribed fire has traditionally been applied to the Pine Flat planning area on a compartment basis. Currently, only Compartment 52 is within its natural fire return interval of 3-5 years **(Reference Figure 1.A.3-6: Pine Flat Prescribed Fire Return Interval).** This is characterized on the ground by duff accumulation of less than 2 inches, understory herbaceous fuels less than 10 feet in height with an average of 5.58 tons/acre fine fuels. Compartment 40 is at the later stage of its natural fire return interval. It is showing signs of ecosystem loss including encroachment of offsite species (hardwoods and loblolly pine) into longleaf pine stands.

Within Compartment 40, fine fuels loading greater than 6.5 tons/acre and a herbaceous understory canopy greater than 10 feet in height. Compartments 41 and 53 are outside their natural fire return interval. In these stands off-site species have begun to dominate the over story, fine fuels loading are greater than 8 tons/acre, and needle drape is occurring in the herbaceous understory.

To achieve conditions consistent with a natural fire regime, the Pine Flat planning area would need to average 1,900 acres of fire treated area applied consistently on an annual basis. Over the past 20 years the Pine Flat planning area has received approximately 50% of the needed fire treatments. This lack of fire treatment is largely responsible for the transition of longleaf areas into mixed stands. This is especially evident in longleaf stands in the 11-20 year age class **(Reference Figure 1.A.3-7: Planning Area Acres - 3 Year Burn Rotation).**

Figure 1.A.3-6: Pine Flat Prescribed Fire Return Interval

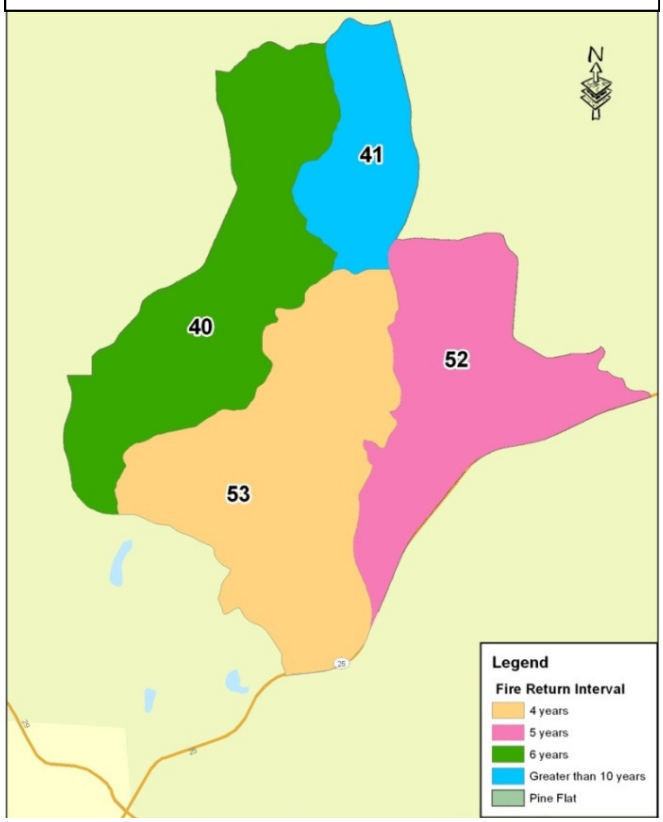
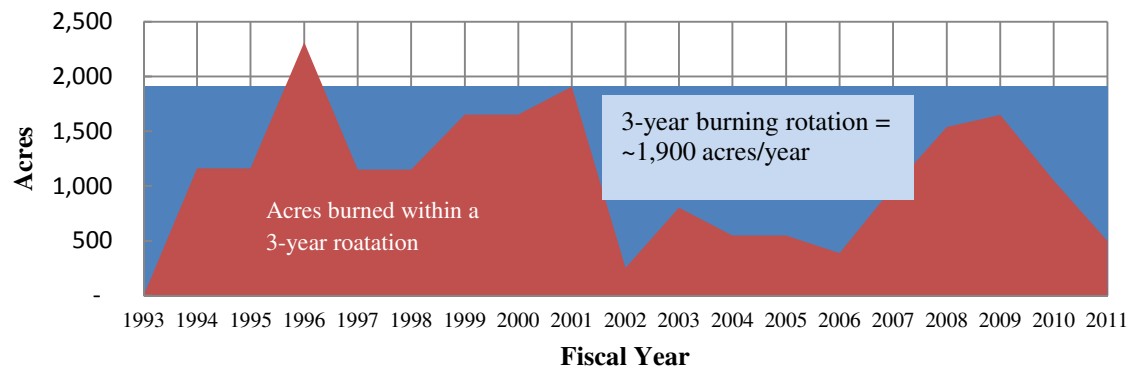
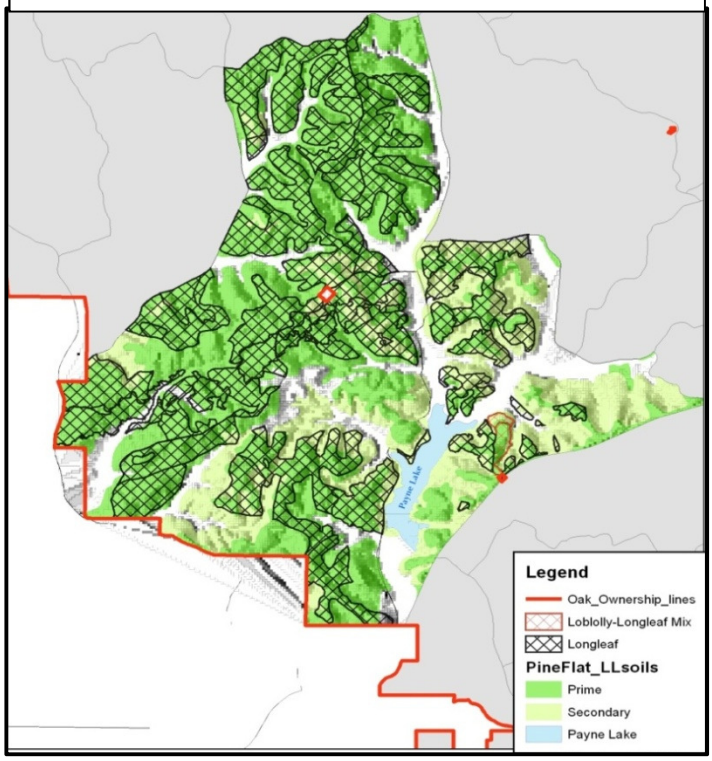


Figure 1.A.3-7: Planning Area Acres – 3 Year Burn Rotation



f) **Forest Health:** In the 5,750 acre planning area, there are approximately 4,693 acres of primary and secondary longleaf soils. Of those acres, 2,053 (36%) acres are currently stocked with loblolly pine, shortleaf pine and mixed hardwoods**. (Reference Figure 1.A.3-8: Distribution of longleaf on Prime and Secondary Longleaf Soils)** The presence of these species, especially at higher stocking levels, 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 include thinning crowns, chlorotic crowns and excessive cone production. These characteristics are indicative of site stress lowering the resilience of these stands to disturbance events. These symptoms are often described as "loblolly decline", and was addressed in the Longleaf EIS (pages 98-102). In most cases loblolly decline occurs in mature loblolly pine and mixtures of loblolly and shortleaf near fall-line forests of the southeast. In these locations, (which includes the Pine Flat Project Area) which historically supported longleaf pine, loblolly is considered "off-site". (Hess et al 1999, 2005a, Menard, et al 2006).

Figure 1.A.3-8: Distribution of Longleaf on Prime and Secondary Longleaf Soils



Younger loblolly stands, left in crowded, dense conditions, on longleaf sites are generally more susceptible to insect infestation as an immediate risk, but loblolly decline is a risk to these stands over the next 20- 30 years.

Insects and Disease: The current conditions as described for the Pine Flat Planning Area (**Reference Figure 1.A.3-8: Distribution of Longleaf on Prime and Secondary Longleaf Soils**) indicate that approximately one-third of the area is in degraded forest health conditions. This is due largely to the vegetative composition of "off-site" loblolly and shortleaf on native longleaf sites. These trees, especially as they age, undergo stress and weakened resistance to natural events such as insects, wind, etc. These stress conditions are often conducive to insect infestations that could result in a loss of forest resources and potentially spread to adjacent private lands. The 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 have been 91 documented SPB, *Dendroctonus fontalis* infestations in the Pine Flat planning area from 1988 to present. The individual infestations were generally contained to 0.5 to 2.0 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 revegetate with seed sources from surrounding vegetation. Now these areas are dense thickets of loblolly and shortleaf saplings mixed with light seeded hardwoods such as sweetgum. There have been no SPB outbreaks on the Oakmulgee District since 2007 and current populations are considered low, although preliminary survey data from 2013 indicate population may be increasing. (**Reference Figure 3.B.1 and 3.B.2, Pheromone Survey Data**).
- The Ips pine bark or engraver beetles *(Ips spp.)* are actively feeding in the areas stressed by the 2011 tornados. Although salvage operations removed many of the damaged trees, there remain several acres of damaged and stressed trees that were not removed. Studies conducted by FS, Forest Health and Protection on stands impacted by hurricane Katrina indicated that infestation of wind thrown and broken boles on the ground by Ips beetles began within a month and all broken and wind thrown material was infested by fall within one year of the wind event. Infestation of standing broken-boled pines began by nine months and all boles were infested by 18 months. Additional infestation continued over the next five years. Conditions within the Pine Flat planning area are equally conducive to additional Ips infestations similar to that experience after hurricane Katrina.

Non-Native Invasive Plant Species (NNIPS): In 2006 there were 20 documented NNIPS infestations within the Pine Flat planning area **(Reference Figure 1.A.3-9: Non-native invasive plant species within the Pine Flat Planning Area).** Over the past six years there have been ongoing control efforts and currently the twenty known infestations have been greatly reduced. Currently, NNIPS species include cogongrass, kudzu, mimosa, privet, and Japanese climbing fern. Of these sites, 1 active cogongrass site, 4

active kudzu sites, and 1 active Japanese climbing fern site remain. There is also a 10-12 acre at the southern edge of Payne Lake containing privet in the understory. 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.

Figure 1.A.3-9: Non-native invasive plant species within Pine Flat Planning Area (Treated 2006-2012)

Common Name	Scientific Name	Priority	Location	Size	Current Status
Cogongrass	*Imperata cylindrica*	High	T23N, R6E, Sec. 34	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 2	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 2	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 3	< 1 ac	Active
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 14	< 1 ac	*Controlled
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 14	< 1 ac	*Controlled
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 2	1.2 ac	Active
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 1	0.2 ac	Active
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 11	0.6 ac	Active
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 11	1.3 ac	Active
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 2	< 1 ac	*Controlled
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 2	< 1 ac	*Controlled
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 11	< 1 ac	*Controlled
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 23	< 1 ac	*Controlled
Japanese Climbing Fern	*Lygodium japonicum*	Low	T22N, R6E, Sec. 11	< 1 ac	Active
Privet	*Ligustrum spp.*	Low	T22N. R6E, Sec 11	10-12 ac	Active

* Not apparent on site, but potentially present in soil.

g) **Infrastructure:**

Roads: There are 30.2 miles of FS maintained roads within or along the perimeter of the Pine Flat planning area. Of the 30.2 miles of FS roads, 14.9 miles are closed to vehicle traffic, 7.9 miles are open from October 16 - April 30, and 7.4 miles are open year round. There are an additional 11.8 miles of state or county roads within or adjacent to the area (**Reference Figure 1.A.3-11: Pine Flat Planning Area – Current Roads**). Density of all roads (Forest Service, State, and County) within the area is 4.7 miles/square mile. Density of all roads open to vehicle traffic is 3.0 miles/square mile during the open road season (October 16 – April 30) and 2.1 miles/square mile during the closed road season (May 1 – October 15) (**Reference Figure 1.A.3-10: Pine Flat Planning Area – Current Road Miles and Road Density within the Pine Flat Planning Area).**

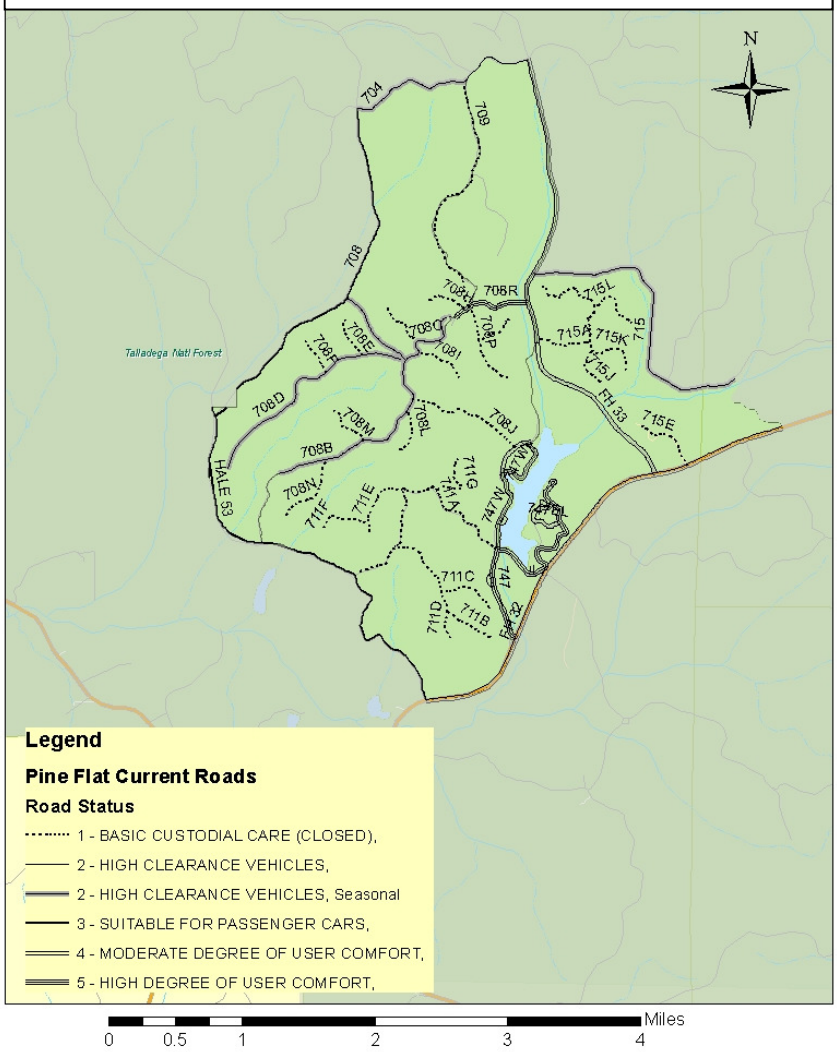
During the open road season 71% (4,075 acres) of the planning area is within 0.25 miles of an open road, and 96% (5528 acres) of the planning area is within 0.5 miles of an open road. During the closed road season 48% (2,748 acres) of the planning area is within 0.25 miles of an open road and 82% (4712 acres) of the planning area is within 0.5 mile of an open road. Throughout the year, regardless of road closure season, 97% or more of the planning area is within 0.75 miles of an open road.

All FS roads within and adjacent to the planning area are open to foot and non-motorized vehicle traffic. Roads open to vehicle traffic are open to equestrian traffic. No closed or seasonally closed roads have been designated for equestrian traffic. The roads within the Payne Lake Recreation Area are contained with the designation of a FS Fee Area (Recreation Enhancement Act, 2004) and thus require compliance with the approved fee structure.

Figure 1.A.3-10: Current Road Miles (Forest Service, State, and County) and Road Density (Miles/Square Mile) Within the Pine Flat Planning Area.

	All Roads	Seasonal Open Period 10/16 - 04/30	Seasonal Closed Period 05/01 – 10/15
Total Miles	42.0	27.1	19.2
Road Density	4.7	3.0	2.1

Figure 1.A.3-11: Pine Flat Planning Area- Current Roads



Payne Lake Fire Lookout Tower: A fire lookout tower is located roughly 0.8 miles northwest of Payne Lake. The tower is currently not in use and is closed to public access.

Payne Lake Recreation Area Facilities: A range of visitor amenities are located within Payne Lake Recreation Area. Facilities include: an entrance station building; 2 bath houses with flush toilets and heated showers; 1 restroom with flush toilets; 1 non-functioning restroom; 1 vault toilet; a workshop/storage building; an RV dumping station; 2 picnic pavilions; a boat ramp; 2 nature trails (2.8 miles total); 7 campsites with water and electric service; 11 campsites with water service; and 35 primitive campsites.

B. Goals and Objectives

The goals of the *Pine Flat Integrated Resource Restoration Plan* are designed to supplement ongoing restoration activities by providing additional resiliency, sustainability, and improved forest health within the planning area. Key actions are to increase restoration of 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.).

The goals carry forward those of existing management plans and 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 *Pine Flat Integrated Resource Restoration Plan*, 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 planning 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).**

- 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). Within this planning area those species are closely linked to the goals of Oakmulgee WMA **(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).**

- Provide a transportation system that supplies **safe and efficient access for forest users** while protecting forest resources **(Forest Plan Goal 35).**

C. Purpose of and Proposed Action

To achieve the goals listed in **Section B. Goals and Objectives,** the following actions are proposed. The proposed actions are described as the maximum treatment considered for the area. The actual treatment will be identified as "variations" of the maximum treatment based on Adaptive Management monitoring.

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 EIS (pages 13-16) 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 of the identified Areas of Concern (AOC) represents a scenario of species composition and structure restoration needs. **Reference Figure 1.C.1: Restoration Areas of Concern (AOC).** To further deal with the uncertainty in environmental management, an adaptive management protocol has been developed for each of the Areas of Concern. **Reference Appendix B: Adaptive Management Protocols.**

For the purpose of evaluating and establishing thresholds for significance of the potential cumulative effects of the actions, the maximum treatment proposed will be evaluated. Example: Site preparation is proposed by both herbicide and mulching. Both treatments will be evaluated in Chapter 3: Environmental Consequences; however, the actual treatment will be determined by the Adaptive Management Protocols.

Coordination and mitigation measures specific to the proposed action are listed in **Chapter 2. Management Standards**. Further coordination and mitigation measures will be developed as the environmental effects of the proposed actions are evaluated. The evaluation and analysis of the proposed action will be guided by the issues outlined in **Section E. Issues.**

Reference Figure 1.C.1: Restoration Areas of Concern (AOC)		
AOC	**VEGETATIVE DESCRIPTION**	**PRESCRIPTIVE GOALS**
1	• **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.** • Pine decline is evident.	• 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	• **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.	• 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	• **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.	• 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	• **Longleaf** at greater than 70% of overstory composition on primary and secondary longleaf soils. • Average age of overstory trees is **greater than 40 years.**	• Establish an open park-like stand with little to no midstory and primarily grasses and forbs in the understory.
5	• **Longleaf** at greater than 70% of overstory composition on primary and secondary longleaf soils. • **Certified as even-aged longleaf plantation** • Average age of overstory trees is **less than 40 years and greater than 20 years.**	• 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.

PROPOSED ACTIONS:

1. **Manage Forest and Woodland Ecosystems:** To continue species restoration of the longleaf pine damaged by the April 2011 tornadoes and subsequently salvaged and planted to longleaf seedlings, or identified as natural regeneration, by **treating 301 acres with herbicide** to reduce the competition from light seeded and coppiced hardwood species. The proposed herbicides are Triclopyr and Imazapyr. *Note: These acres are considered AOC 1T, as there restoration needs are aligned with AOC 1 sites albeit they were created by the tornado.*

2. **Manage Forest and Woodland Ecosystems:** To restore longleaf pine species on **203 acres** currently stocked with loblolly and/or shortleaf pine currently exhibiting signs of decline (81 acres in AOC 1 and 122 acres in AOC 2). 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 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 2.B: Alternative B – Proposed Action Initial Harvest Treatments – Forest and Woodland Ecosystems and Figure 2.C: Alternative B – Proposed Action Initial Harvest Treatments & Concurrent and Contemporaneous Actions (AOC 1 & AOC 2).** *Note: See item 5 for temporary haul road construction and restoration.*
3. **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine on **951 acres** over age 40 (AOC 4) by establishing open park-like forest conditions by commercially thinning including follow-up midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching. **(Reference Figure 2.B: Proposed Action Initial Harvest Treatments – Forest and Woodland Ecosystems and Figure 2.D: Alternative B – Proposed Action Initial Harvest Treatments & Concurrent and Contemporaneous Actions (AOC 3, AOC 4 & AOC5).** *Note: See item 5 for temporary haul road construction and restoration.*

4. **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine by establishing open park-like forest conditions by either commercially thinning or cut and leave thinning **620 acres** of planted longleaf pine less than 40 years old (AOC 5) and a follow-up midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching. **(Reference Figure 2.B: Proposed Action Initial Harvest Treatments – Forest and Woodland Ecosystems and Figure 2.D: Alternative B – Proposed Action Initial Harvest Treatments & Concurrent and Contemporaneous Actions (AOC 3, AOC 4 & AOC5)** *Note: See item 5 for temporary haul road construction and restoration.*

5. **Manage Forest and Woodland Ecosystems:** To support the above listed restoration treatments with the construction and restoration of 2.4miles of temporary haul roads. **Reference Figure 2.A.7: Alternative B – Proposed Action - Temporary Roads**

6. **Manage Forest and Woodland Ecosystems:** To perform follow-up midstory cut and leave treatment and/or herbicide application (Triclopyr), and/or mechanical mulching on **656 acres**. **Figure 2.D: Alternative B – Proposed Action Initial Harvest Treatments & Concurrent and Contemporaneous Actions (AOC 3, AOC 4 & AOC5).** *Note: Commercial harvest of these AOC 3, AOC 4, and AOC 5 areas have been addressed in prior decision documents.*

7. **Manage Forest and Woodland Ecosystems:** Add mechanical mulching as a potential treatment for site preparation on **537 acres** prior to hand planting longleaf seedlings. (Note: Commercial harvest of these AOC 1 areas have been addressed in prior decision documents. **(Reference Figure 1.A.2-2: Status of Prior Decision – Longleaf EIS and ROD; Figure 1.A.2-3: Status of Prior Decision – Payne Lake EA, DN and FONSI and Figure 2.C: Alternative B – Proposed Action Initial Harvest Treatments & Concurrent and Contemporaneous Actions (AOC 1 & AOC 2)**

8. **Recovery of Federally listed Threatened and Endangered Species:** Restore and maintain Good Quality Foraging Habitat (GQFH) for RCW expansion by maintaining 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.

9. **Recovery of Federally listed Threatened and Endangered Species:** Establish and maintain suitable habitat to recruit five new RCW clusters by establish 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.

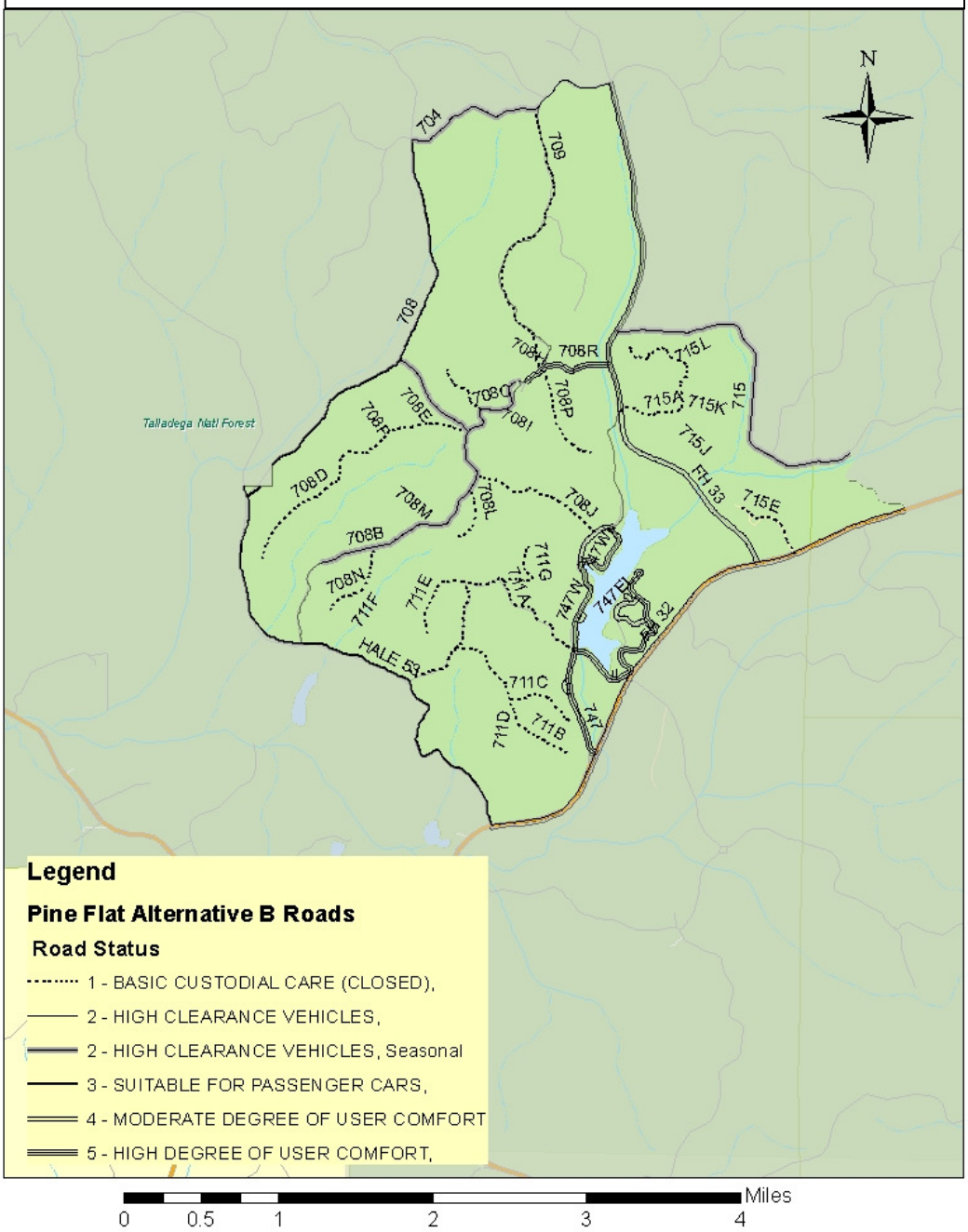
10. **Support Desirable Levels of Selected Species:** Maintain permanent early seral stage habitat to support wildlife habitat and hunter success by **annual mowing and planting of 6.4 acres of existing linear strips.**

11. **Nature-based Recreation/Safe and Efficient Access:** Enact opportunities for increased efficiency documented in the *Transportation Analysis Report V 1.0 Oakmulgee Ranger District, National Forests in Alabama October 2011* by decommission 3.7 miles of roads currently listed as permanently closed by removing them from inventory, thus eliminating the need for future maintenance and use **(Reference Figure 1.C.2: Pine Flat Planning Area – Proposed Road Decommissioning)**.

Figure 1.C.2: Pine Flat Planning Area - Proposed Road Decommissioning			
Road ID	**Current Status**	**Length (Mi.)**	**Proposed Status**
708E	Closed	0.3	Decommission
708F	Closed	0.3	Decommission
708H	Closed	0.3	Decommission
708I	Closed	0.4	Decommission
708M	Closed	0.3	Decommission
708Q	Closed	0.3	Decommission
711D	Closed	0.2	Decommission
711F	Closed	0.4	Decommission
715J	Closed	0.4	Decommission
715K	Closed	0.4	Decommission
715L	Closed	0.4	Decommission

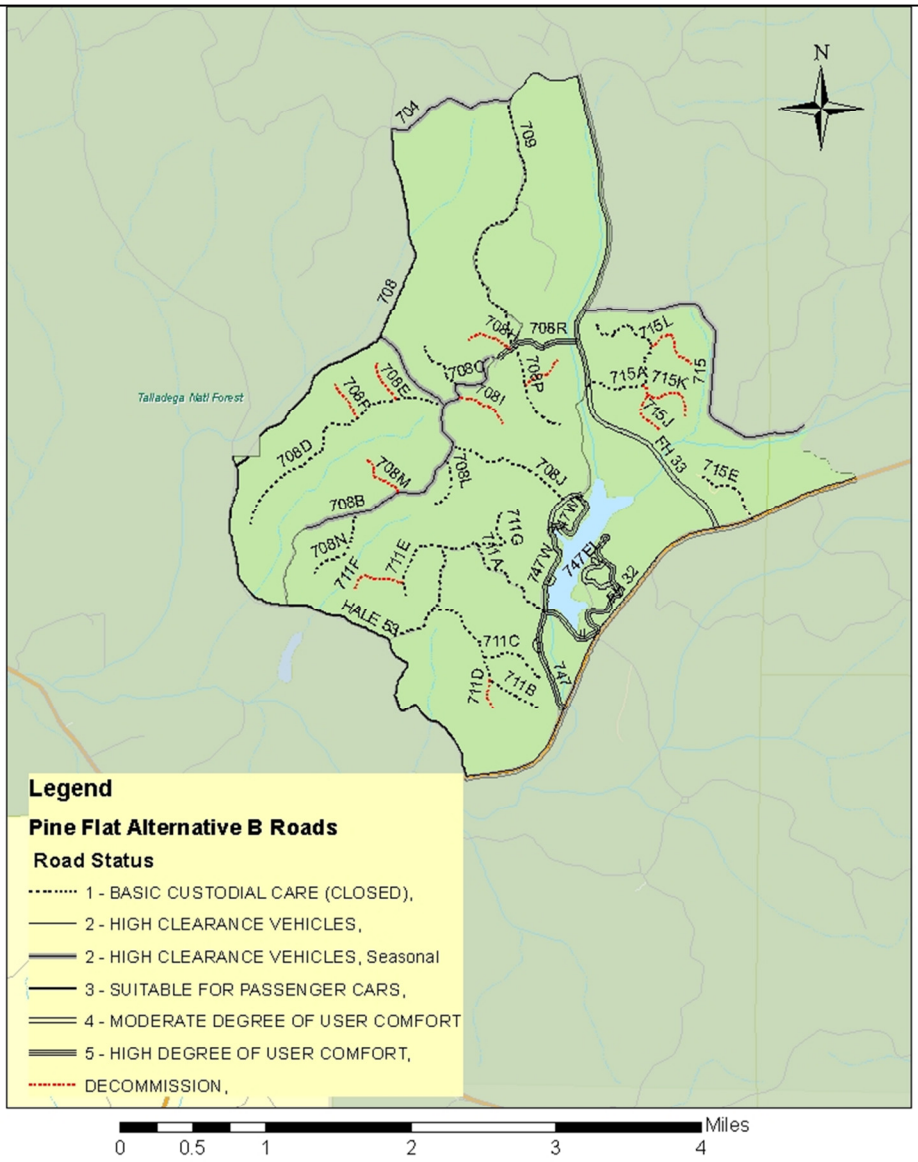
12. **Nature-based Recreation/Safe and Efficient Access:** Maintain and enhance proposed Forest Service maintained roads by **treating 26.4 miles** of roadsides with selective herbicide (Triclopyr) to reduce encroachment of brush and woody vegetation, provide for safety of motorists, increase early successional wildlife habitat, reduce the risk of establishment of NNIPS, and reduce the frequency of roadside mowing. Treatment area would extend 10 feet from road edges, totaling 64 acres. Roads would be treated on a one-two year rotation. Roadside mowing would occur as needed (**Reference Figure 1.C.3: Pine Flat Planning Area – Proposed Roads Maintenance**).

Figure 1.C.3: Pine Flat Planning Area Proposed Road Maintenance



13. **Nature-based Recreation/Safe and Efficient Access:** Enact opportunities for increased efficiency documented in the *Transportation Analysis Report V 1.0 Oakmulgee Ranger District, National Forests in Alabama October 2011* by changing status of FSR 708D from seasonal (open 10/16 – 04/30) to **closed on 1.8 miles**. **(Reference Figure 1.C.4: Pine Flat Planning Area – Proposed Road Status Changes)**.

Figure 1.C.4: Pine Flat Planning Area Proposed Road Status Changes



14. **Reduce Risk to Insect and Disease:** Implement a forest health strategy for integrated pest management for concentrated and dispersed recreation. The design criteria for the Suppression of Active SPB infestations is listed in Chapter 3.B.

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 indicate that approximately 20% of planned treatments acres are*

removed from treatment due to site specific implementation of the management standards listed in Chapter 2. For a summary proposed actions reference: **Figure 1.C.5: Summary of Proposed Actions.** Stand level Information is listed in **Appendix A: Proposed Action Treatment Areas.**

Figure 1.C.5: Summary of Proposed Actions

	Treatment	Units
	Treat, with herbicide, areas planted or naturally established to longleaf following 2011 tornados to release seedlings from encroaching hardwood competition. **(AOC 1)**	301 Acres
2	Commercially harvest areas currently stocked with loblolly and/or shortleaf pine over the age of 45 years exhibiting signs of decline or prior SPB infestation. **(AOC 1 & 2)** Concurrent and contemporaneous actions • Variation A: Herbicide site preparation and prescribed fire • Variation B: Mechanical mulching site preparation • Hand plant longleaf seedlings • Herbicide release seedlings from encroaching hardwood and loblolly	203 Acres
3	Treat loblolly stands with prior decisions to thin by establishing and maintaining open park-like woodland conditions. **(AOC 3)** • Variation A: Midstory removal by cut and leave method • Variation B: Midstory maintenance by herbicide application • Variation C: Midstory removal by mechanical mulching	123 Acres
4	Commercially harvest areas currently stocked with longleaf to establish open park-like woodland conditions. Concurrent and contemporaneous actions **(AOC 4 & 5)** • Variation A: Midstory removal by cut and leave method • Variation B: Midstory maintenance by herbicide application • Variation C: Midstory removal by mechanical mulching	1,571 Acres
5	Construct and restore after use, temporary roads to support timber harvest and concurrent and contemporaneous actions	2.4 Miles
6	Treat midstory in commercially thinned loblolly and longleaf areas, with variations of herbicide and/or cut and leave, and/or mechanical mulching to establish open park-like conditions. (Commercial harvest listed in prior decisions)	656 Acres
7	Variation: Site preparation by mechanical mulching prior to hand planting longleaf seedlings. (Note: Commercial harvest, herbicide and fire site prep, and planting listed in prior decisions)	839 Acres
8	Install and/or replace a minimum of 4 artificial nest cavities for each of the 6 active RCW clusters	24 - 36 Structures
9	Install and maintain a minimum of 4 artificial nest cavities for each of the 5 RCW recruitment areas	20 - 30 Structures
10	Maintain permanent early seral stage habitat on existing linear strips by annual mowing and planting of wildlife food crops	6.4 acres
11	Remove by passive decommissioning, roads currently under yearlong closure by deleting them from road system.	3.7 miles
12	Maintain seasonal and year round open road system with integrated treatments of herbicide and mowing. (26.4 miles by 20 feet)	64 acres
13	Change FDR 708D status from seasonal (open 10/16 – 4/30) to yearlong closed	1.8 miles
14	Suppress active SPB infestations, by variations of "cut and remove" or "cut and leave" treatments	TBD

D. 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: 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 - Early Succession Conditions:** The desired condition prescribed by the Forest Plan for lands in the management area: Dispersed Recreation Areas with Vegetation Management states that it is desirable to have 4% - 10% of the forested land base in early successional forest (age 0-10). These guidelines were established to encourage the sustained flow of early successional stage habitat throughout the landscape mimicking natural disturbance regimes and stand replacements. Currently 7.8% of the Pine Flat 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 Pine Flat 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) **Forest Composition and Structure - Forest Health:** The 2011 tornadoes resulted in wind stress along the tornado path. While the majority of trees that were severely damaged have been removed through the salvage process, trees along the perimeter were not treated, as they did not meet the broken or damage criteria for a salvage harvest. Research indicates a potential build-up of Ips pine bark and SPB beetles in those stressed trees and 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) **Forest Composition and Structure - RCW Expansion:** The proposed treatments may have both beneficial and adverse effects to the RCW population in or near the planning area. 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 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 planning 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:** 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) **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 planning

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.***

j) **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.***

k) **Proposed, Endangered, Threatened and Candidate (PETC) Species:** A biological evaluation will be completed to determine the effects of the proposed action on PETC 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.

l) **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 will be completed to determine the effects of proposed actions on a list of species compiled regionally that have been designated as sensitive***.

m) **Cultural Resources:** The intent of implementation of all actions is to avoid impacts to cultural resources. The Pine Flat planning area has undergone cultural resource survey. Those surveys will be reviewed and documentation will be provided to the Alabama State Historic Preservation Officer for their review and concurrence.

n) **Other Environmental Effects Relative to FONSI Significance Factors:** The proposed action will be evaluated relative to the following environmental effects; environmental justice, the degree to which it the effects on the quality of the human environment are likely to be highly controversial; the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks; 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; the degree the proposed action might affect public health and safety; and whether the action is related to other actions with individually insignificant but cumulatively significant impacts.

E. 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 Chapter One, Section C. The decision to implement the action items described in the proposed action will not alter the decision authority 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
  - Payne Lake Project 2009, Decision Notice and Finding of No Significant Impact signed Aug 11, 2009
  - 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
  - 2011 Tornado Damage - Clary Hill Salvage Decision Memo signed June 3, 2011
  - 2011 Tornado Damage - Pine Flat Salvage Decision Memo signed June 10, 2011
  - Longleaf Hand-planting in Tornado Salvage Areas Decision Memo signed February 14, 2012
  - 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.

F. Public Involvement

On February 14, 2013 a scoping document containing a draft of Chapter One was made available to the public. Notification was mailed to approximately 500 members of the public. We received 39 back as undeliverable addresses. Comments about the draft were requested by March 4, 2013.

We received four responses. Two were from state agency representatives and were fully supportive of the proposed action. One was from a professional forester employed by a land management company and adjacent landowner who provided supportive comments. The remaining response asked that we provide certain assurances regarding the stabilization of temporary roads. This comment is addressed in Chapter 3 Sections E and F.

The notice of completion of the Draft EA, selection of the proposed action, and subsequent 30-day comment period (ended May 31, 2013) was published in the *Tuscaloosa News* on

May 1, 2013. Six public responses were received during the 30-day public comment period (Pine Flat Integrated Resource Restoration Plan). For a list of comments and responses see **Appendix C**.

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 Pine Flat Integrated Resource Restoration Project that resulted in issues requiring further consideration. Furthermore, 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 2-1: 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, current management plans would continue to guide management of 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 approved under other existing environmental documents would continue to be implemented. 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 I. Section C. 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 Stream-side 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 percent). (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 crew members 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 or 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 s 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

33. **Stream-side Management:** Mechanical equipment is not allowed in any scoured stream channel except to cross at designated points (Forest-wide Standard 62)

34. **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)

35. **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)

36. **Stream-side Management:** Temporary roads, skid trails, and plow lines are not permitted in a SMZ except at designated crossings. (Forest-wide Standard 65)
37. **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)
38. **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 fires 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 us-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 crossing 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 re-vegetated 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)

Bald and Golden Eagle Protection Act Mitigation Measures

Eagle Management Guidelines & Conservation Measures:

(U.S. Fish and Wildlife Service)

- Avoid clear-cutting or removal of overstory trees within 330 feet (100 meters) of both active and alternate nests at any time.
- Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the nesting season within 660 feet (200 meters) of the nest. The distance may be decreased to 330 feet around alternate nests within a particular territory, including nests that were attended during the current nesting season but not used to raise young, after eggs laid in another nest within the territory have hatched.
- Selective thinning and other silviculture management practices designed to conserve or enhance habitat, including prescribed burning close to the nest tree, should be undertaken outside the nesting season.
- If burning during the nesting season is necessary, do the following:
  - Conduct burns only when adult eagles and young are absent from the nest tree (i.e., at the beginning of, or end of, the nesting season, either before the particular nest is active or after the young have fledged from that nest).
  - Take precautions such as raking leaves and woody debris from around the nest tree to prevent crown fire or fire climbing the nest tree.

Alternatives Considered but Eliminated from Detailed Study

A third alternative was considered but dropped from the detailed analysis. This third alternative was evaluated in an attempt to refrain from increasing the acres in early

successional conditions through additional clear cuts. However, it was determined that this alternative did not fully address the forest health conditions in three stands and thus did not achieve the stated goals and objectives of the project. The stands and considerations are as follows:

- **Compartment 53, Stand 18 (50 acres), Compartment 41, Stand 3 (40 acres), Compartment 52, Stand 22 (8 acres) and Compartment 52, Stand 26 (23 acres)** are 40 year old loblolly stands currently under EIS decision to thin as a means to reduce the risk of Southern Pine Beetle (SPB) infestation and to improve forest structure. The EIS decision was based on an assumption that the stand was in an overstocked condition and containing enough merchantable stems to support a commercial thinning operation. Upon additional stand inventory on behalf of the Pine Flat project, the stand was found to be heavily impacted by previous SPB damage and lacking enough merchantable stems to merit a commercial thinning.
- **Compartment 53, Stand 15 (86 acres)** is a 70 year old pine stand with both longleaf and loblolly. The original consideration was to thin the entire stand and select the loblolly for removal favoring longleaf. Additional stand inventory determined that about half of the stand was heavily stocked with loblolly. To remove all of the loblolly would have resulted in a sparse stand of longleaf. The predicted density of the residual longleaf would have fallen below what is considered a stocked stand; therefore, a thinning treatment for the entire stand was removed from consideration.

Figure 2.A.1: Comparison of Alternatives

Actions & Treatments	No-Action Alternative – Prior Decisions – Not Implemented					Proposed Action	Cumulative
	WLO 2003	Longleaf EIS 2005	Payne Lake EA 2009	NNIPS EAs[1]	Administrative	PFIRRP	
Restore longleaf on native longleaf sites. Includes concurrent and contemporaneous actions. (AOC1T)							
• **Commercial harvest – clear-cut with reserves (acres)**	0	565	71	0	0	203	839
• **Site Preparation – herbicide and burn (acres)[2]**	0	584	99	0	0	203	886
• **Site Preparation - machine mulching (acres)[2]**	0	0	0	0	0	839	839
• **Artificial Reforestation – planting longleaf pine (acres)**	0	584	99	0	0	203	886
• **Release – herbicide (acres)[3]**	0	584	99	0	0	504	1187
Shift species composition toward longleaf on native longleaf sites by heavily thinning loblolly and shortleaf pine. Under-plant longleaf to establish landscape features within the developed recreation area. (AOC 1A)							
• **Commercial harvest – heavy thin (acres)**	0	0	10[4]	0	0	0	N/A[4]
• **Artificial Reforestation – under plant longleaf (partial)**	0	0	7[4]	0	0	0	N/A[4]
Thin loblolly stands existing on native longleaf sites by removing approximately half of the existing stems. (AOC 3)							
• **Commercial harvest – thin (acres)** [5]	0	244	0	0	0	0	123[5]
• **Midstory control –machine mulching (acres)**	0	0	0	0	0	123[5]	123
• **Midstory control – cut and leave (acres)**	0	0	0	0	0	123[5]	123
• **Midstory control – herbicide (acres)**	0	0	0	0	0	123[5]	123
Thin overstocked native longleaf , over 40 years old, and treat midstory to achieve open park-like conditions (AOC 4)							
• **Commercial harvest – thin (acres)**	0	99	438	0	0	951	1488
• **Midstory control – cut and leave (acres)**	0	45	513	0	0	1005	1563
• **Midstory control –machine mulching (acres)**	0	0	0	0	0	1563	1563
• **Midstory control – herbicide (acres)**	0	45	0	0	0	1517	1563
Thin overstocked longleaf, greater than 20 and less than 40 years old, and treat midstory to achieve open park-like conditions (AOC 5)							
• **Commercial harvest – thin**	0	0	18	0	0	620	638
• **Midstory control – cut and leave (acres)**	0	0	36	0	0	620	656
• **Midstory control –machine mulching (acres)**	0	0	0	0	0	656[6]	656
• **Midstory control – herbicide (acres)**	0	0	0	0	0	656[6]	656

Figure 2.A.1: Comparison of Alternatives

Actions & Treatments	No-Action Alternative – Prior Decisions – Not Implemented					Proposed Action	Cumulative
	WLO 2003	Longleaf EIS 2005	Payne Lake EA 2009	NNIPS EAs[1]	Administrative	PFIRRP	
Supplement nest cavities for active cluster sites and recruitment areas by installing and maintaining artificial cavities (inserts).							
• **Insert installation and maintenance –active cluster sites (structures)**	0	0	0	0	0	24-36	24-36
• **Insert installation and maintenance –recruitment sites (structures)**	0	0	10	0	0	20-30	20-30
Provide safe and efficient access while providing nature-based recreation							
• **Remove yearlong closed roads from road system (miles)**	0	0	0	0	0	3.7	3.7
• **Change status of road from seasonal open to yearlong closed (miles)**	0	0	0	0	0	1.8	1.8
• **Maintain seasonal and year round open roads by mowing, blading & ditching (acres)**	0	0	0	0	64	0	64
• **Maintain seasonal and year round roads by herbicide (acres)**	0	0	0	0	0	64	64
• **Support woodland restoration activities by creation and restoration of temporary roads (miles)**	0	1.8	0.6	0	0	2.4	4.8
Maintain early seral stage habitat							
• **Opening maintenance (acres)**	8	0	0	0	0	0	8.4
• **Linear Strip maintenance (acres)**	0	0	0	0	0	6.4	6.4
Treat non-native invasive plant species (acres)				TBD		TBD	TBD
Suppress SPB infestations (acres)					TBD	TBD	TBD
Prescribed burn on a 2-5 year rotation (acres)	0	5,750	0	0	0	0	5,750

[1] The three EAs and DN/FONSIs for NNIPS all build on each other with the most recent decision, *Enhanced Invasive Plant Control*, 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.
[2] Includes 48 acres harvested in the Payne Lake #1 Timber Sale for herbicide and burn Not included in mechanical mulching
[3] Includes treatment of area planted due to tornado salvage
[4] Proposed action changes prior decision from a heavy thin to a clear cut in a former RCW cluster site that has been inactive for 30 years and habitat is non-sustainable
[5] Proposed action changes prior decision from a thinning to a clear cut due to recent inventory indicating the stands have heavy insect damage and not viable for thinning.
[6] Includes thinning areas treated in the Payne Lake #1 Timber Sale (Stand 52/7 = 18 acres) and adds mulching and herbicide treatment to stand under Payne Lake EA decision (Standd 52/11 – 18 acres)

Figure 2.A.2: Expected Trends Relative to Established Goals and Objectives		
Objectives	**Alternative A**	**Alternative B**
Goal: Manage Forest and Woodland Ecosystems		
• Issue: Early Successional Conditions	Places 646 acres into early successional conditions, upland longleaf pine communities. Increases Early successional conditions within the planning unit by 11.25%	Places 203 acres into early successional conditions, upland longleaf pine communities Increases Early successional conditions within the planning unit by 3.545%
• Issue: Species Composition w/in Forest Communities	Establishes upland pine woodland conditions on 244 acres of loblolly, currently existing on native longleaf sites Increases upland longleaf pine woodland conditions on 537 acres of native longleaf greater than the age of 40. Increases upland longleaf pine woodland conditions on 36 acres of restored longleaf less than the age of 40	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. Increases upland longleaf pine woodland conditions on 620 acres of restored longleaf less than the age of 40
• Issue: Forest Health	Does not address suppression of active pine beetle infestation Provides a long-term improvement to 15 acres of "at risk" of loblolly stands; and a short term improvement to 244 acres of "at risk" of loblolly stands.	Provides adaptive management protocols for suppression of active pine beetle infestation Provides a long-term improvement to 136 acres of "at risk" of loblolly stands; and a short term improvement to 123 acres of "at risk" of loblolly stands.
• Issue: RCW Population Expansion	Increases RCW recruitment areas to one.	Increases RCW recruitment areas to six.
Goal: Recovery of Federally Listed Endangered and Threatened Species		
Red-cockaded Woodpecker (*Picoides borealis*) Endangered	Proposed Action not likely to adversely affect	Proposed Action not likely to adversely affect
Mitchell's satyr (*Neonympha mitchellii*), Endangered	Proposed Action not likely to adversely affect	Proposed Action not likely to adversely affect
Wood Stork (*Mycteria americana)* Endangered	Proposed Action will have no effect	Proposed Action will have no effect
	Note: Determinations from prior decision documents with concurrence from U.S. Fish and Wildlife Service	*Note: Determinations from Biological Evaluation currently under review by U.S. Fish and Wildlife Service*

Objectives	Alternative A	Alternative B
Goal: Support Desirable Levels of Selected Species		
High quality of nature-based recreation	Short term habitat increases for **white-tailed deer** and **Eastern wild turkey**. Little to no change in long term habitat effects. Little to no short term change for **bob-white quail**, and a long term decrease in long term habitat. Short term habitat increases for the **prairie warbler;** little to no change in long term effects to habitat Decrease in short term habitat for the **wood thrush**; and little to no change in long term habitat	Short term and long term habitat increases for **white-tailed deer, Eastern wild turkey, and bob-white quail**. Short term habitat increases for the **prairie warbler**; little to no change in long term effects to habitat Relatively large decrease in short term habitat for the **wood thrush**; and a decrease in long term habitat
Safe and Efficient Access		
	Throughout the year, regardless of road closure season, 96% or more of the planning unit is within 0.75 miles of an open road. Open Road Season (October 1 – April 30) – **71% within 0.25 mile of an open road** – 96% within 0.50 mile of an open road Closed Road Season (May 1 – September 30) – 48% within 0.25 mile of an open road – 82% within 0.50 mile of an open road	Throughout the year, regardless of road closure season, 96% or more of the planning unit is within 0.75 miles of an open road. Open Road Season (October 1 – April 30) – **69% within 0.25 mile of an open road** – 96% within 0.50 mile of an open road Closed Road Season (May 1 – September 30) – 48% within 0.25 mile of an open road – 82% within 0.50 mile of an open road Increases visitor safety/visibility by enhanced vegetation along road sides Reduces road maintenance burden to tax payer by 7% of the annual road maintenance budget on the Oakmulgee District.

Figure 2.A.3: Alternative A – No Action Treatments

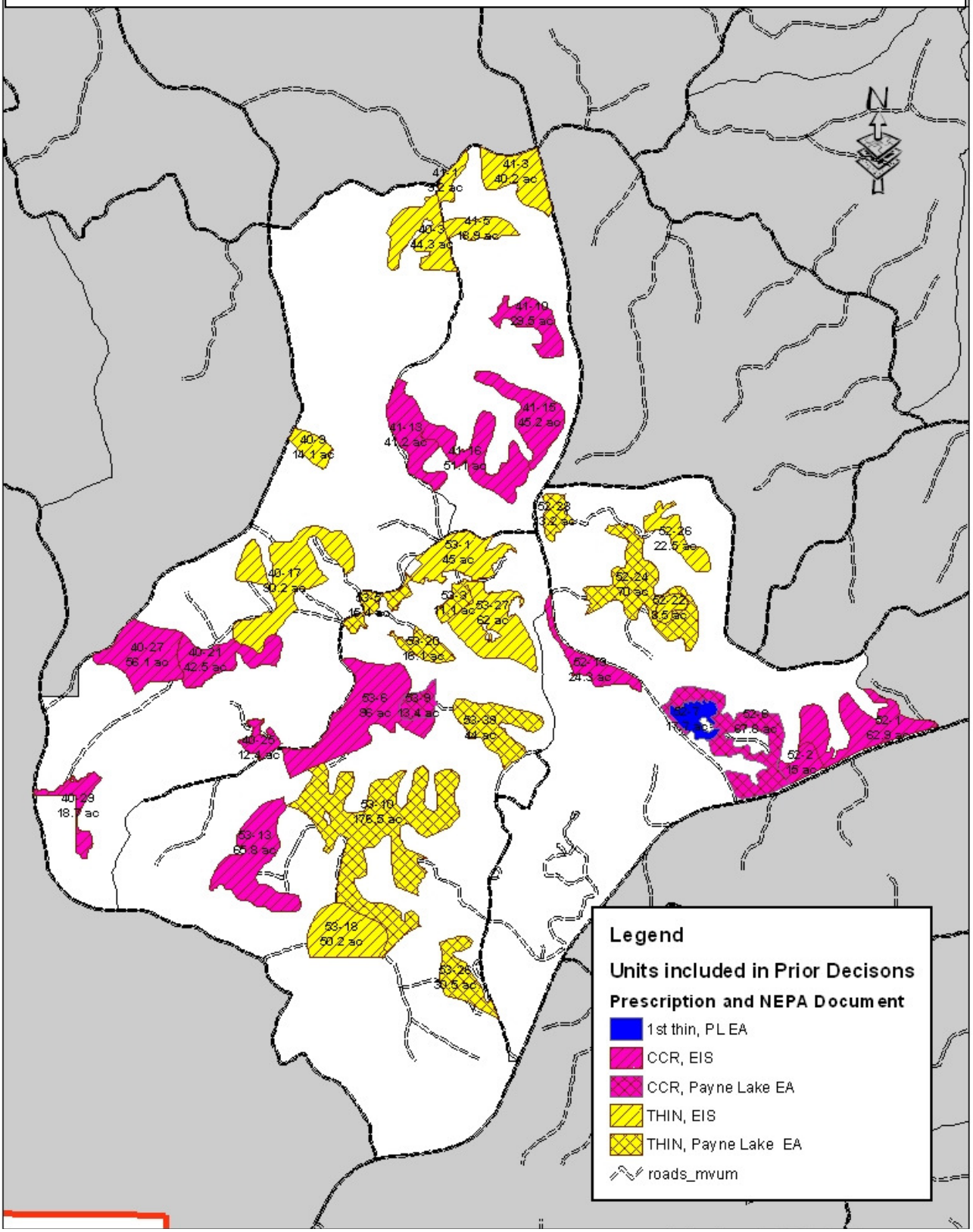


Figure 2.A.4: Alternative B – Proposed Action Initial Harvest Treatments – Forest and Woodland Ecosystems

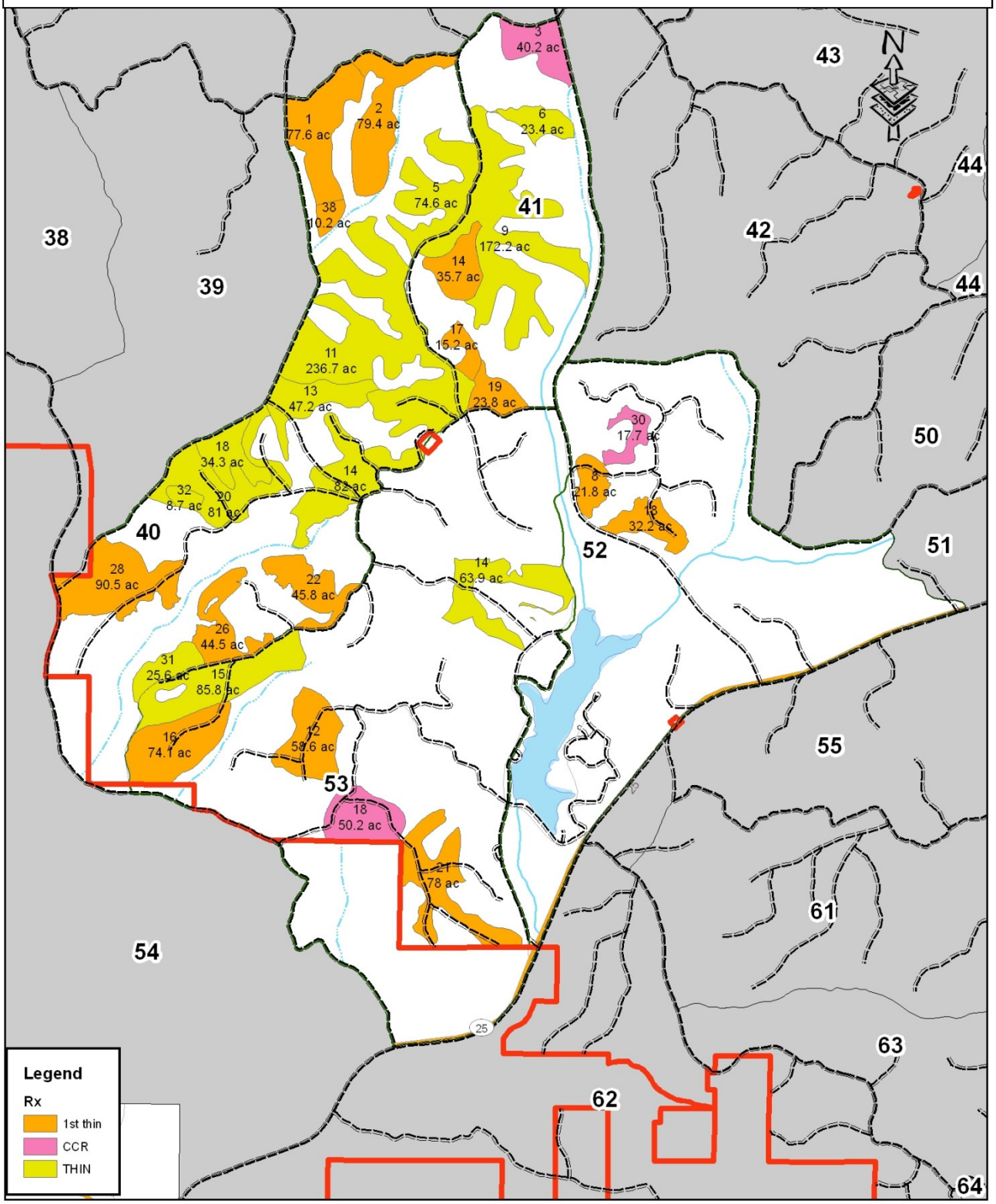


Figure 2.A.5: Alternative B – Proposed Action Initial Harvest Treatments & Concurrent and Contemporaneous Actions (AOC 1 & AOC 2)

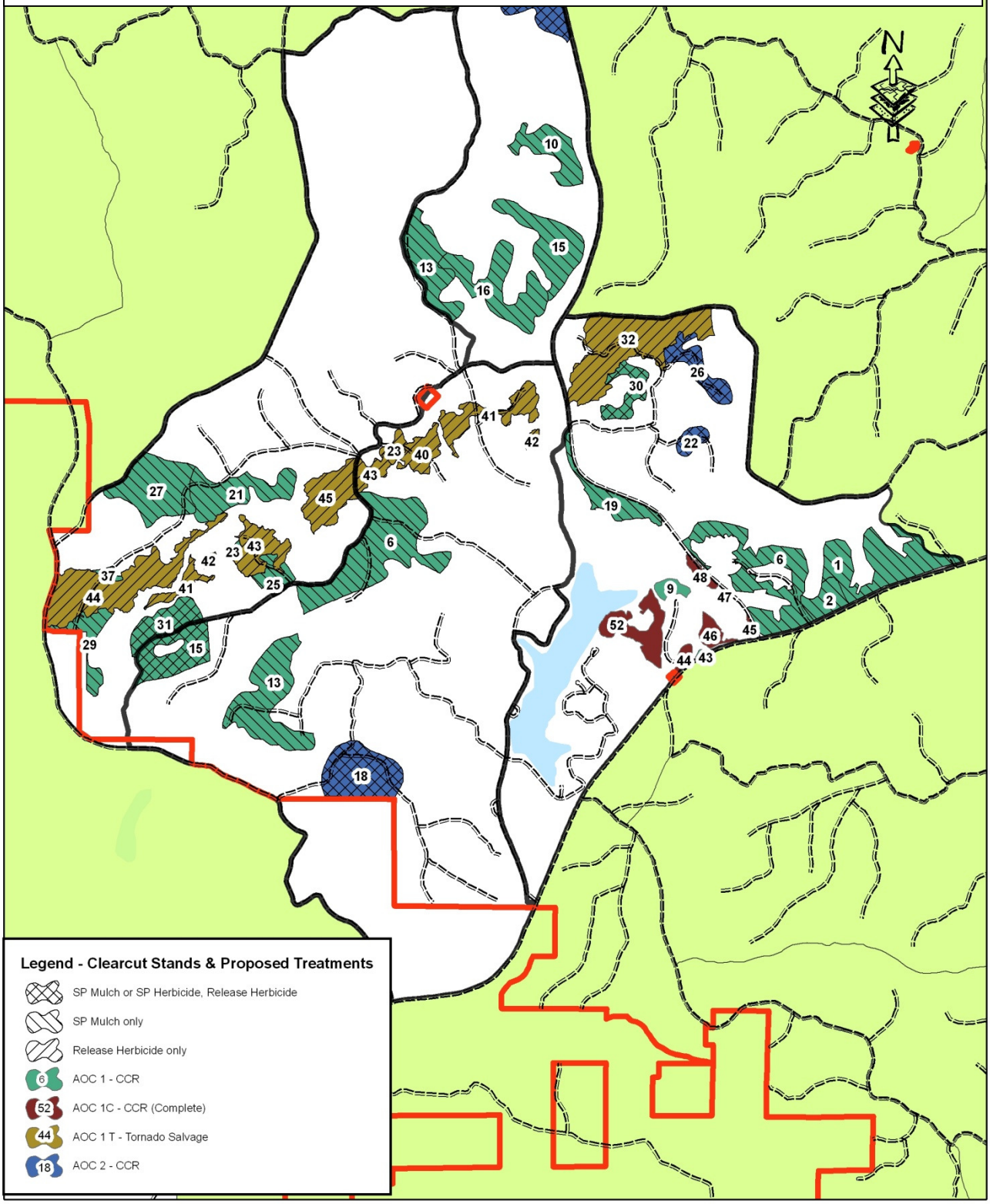


Figure 2.A.6: Alternative B – Proposed Action Initial Harvest Treatments & Concurrent and Contemporaneous Actions (AOC 3, AOC 4 & AOC5)

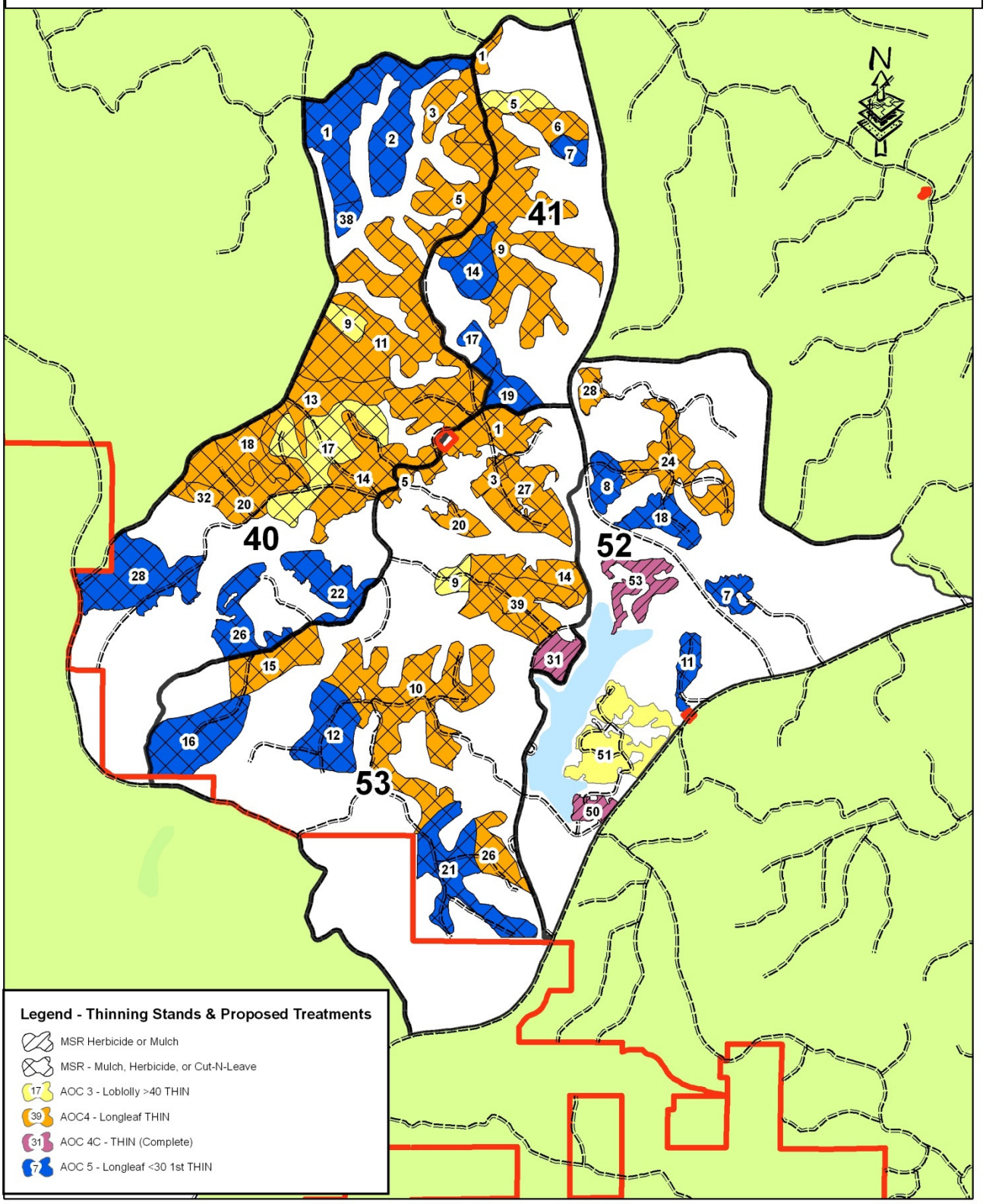
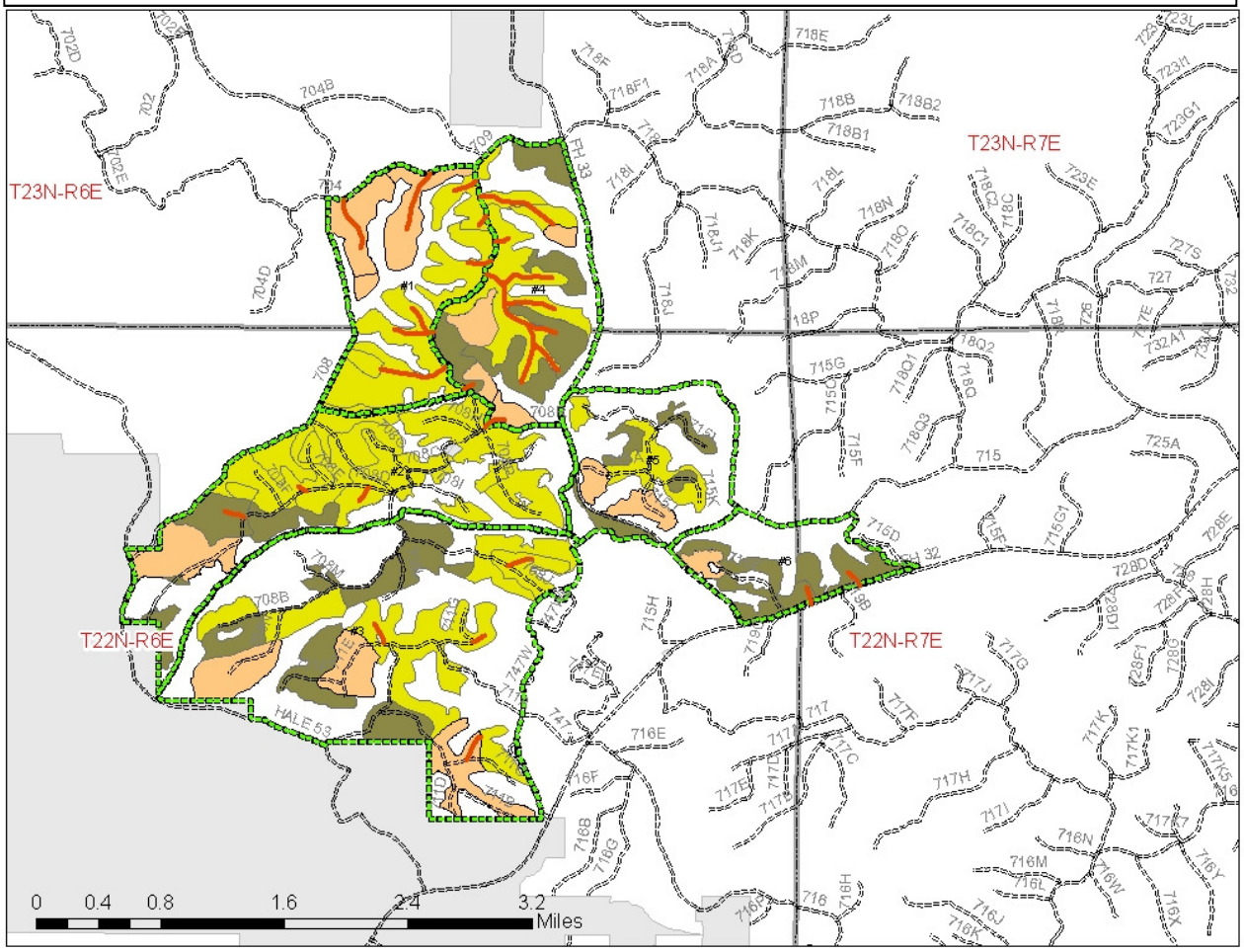


Figure 2.A.7: Alternative B – Proposed Action - Temporary Roads (——)

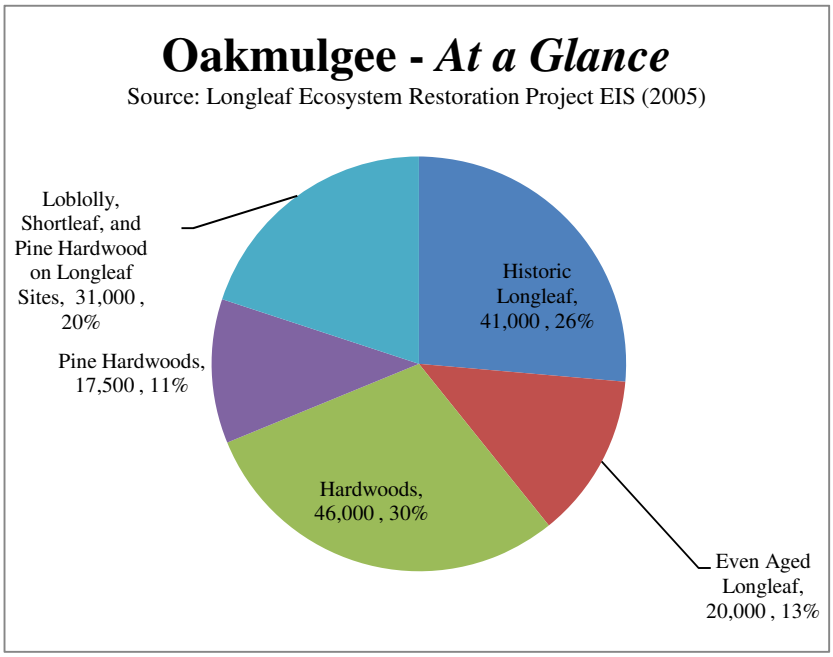


Chapter III: Environmental Consequences

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 E. 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 land forms, and given the soil composition for the Pine Flat Planning Area the forest and woodland ecosystem targeted for restoration is the Upland Longleaf Pine.

During the draft of the Longleaf Ecosystem Restoration Project EIS (2005) it was estimated that of the 157,000 acres managed as the Oakmulgee District, approximately 92,000 acres should have longleaf pine as the predominate overstory vegetation. Of those 92,000 acres it was further estimated that 31,000 acres were currently stocked with loblolly, shortleaf, and hardwoods as 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 approachs. First, is the restoration of species compositon 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.

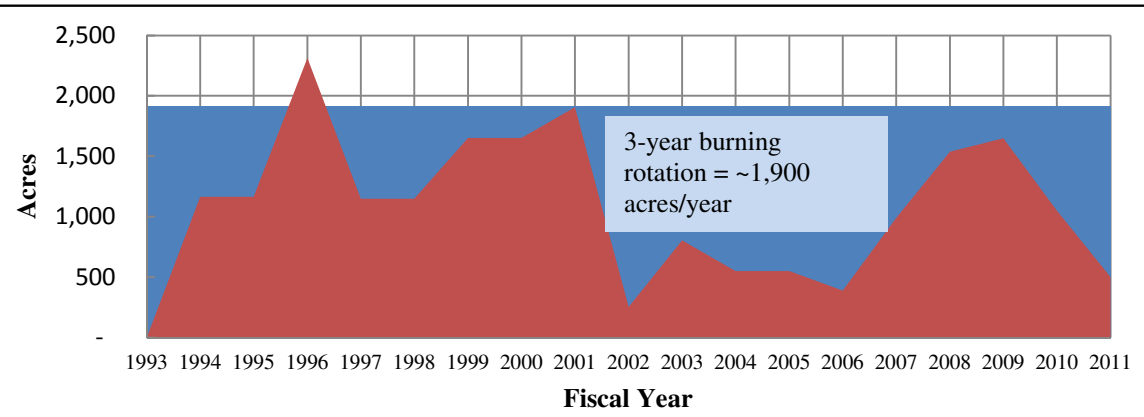
The second approach is to restore structure in stands where there is an existing longleaf component but it is either too dense, or contains a significant (>30%) hardwood or loblolly/shortleaf component. In these scenarios the treatment is to commercially thin favoring longleaf for retention, often followed 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 average 40-70 ft^2/ac., basal area of pine less than 10 inch DBH average 20 ft^2/ac., 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.

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.	

Reference Chapter 1, Figure 1.A. 3-7: Planning Area Acres – 3 Year Burn Rotation *(figure below)* to see documentation regarding the lack of attainment on achieving restoration through prescribed fire. During the years 2002 through 2006, the planning area received lower than the necessary fire needed to sustain longleaf. This it likely the cause of the heavy loblolly and hardwood stocking in the even-aged longleaf plantations established in the past 20-30 years. These stands are identified in the proposed action as AOC 5 stands. Other older longleaf areas also have heavy encroachment from hardwoods and loblolly pines. Those areas are identified as AOC 4 stands.

Figure 1.A.3-7: Planning Area Acres – 3 Year Burn Rotation



The classification system couched as "Areas of Concern" was developed to guide restoration of species composition and structure. **Reference Figure 3.A.1: Restoration Areas of Concern (AOC).** To further deal with the uncertainty in environmental management, an adaptive management protocol has been developed for each of the Areas of Concern. **Reference Appendix B: Adaptive Management Protocols.**

Reference Figure 3.A.1: Restoration Areas of Concern (AOC)		
AOC	**VEGETATIVE DESCRIPTION**	**PRESCRIPTIVE GOALS**
1	• **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.** • Pine decline is evident.	• 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. • *AOC1A stands were found in a developed recreation area, and removal of off-site species would result in a visually unappealing recreation experience, so the area is heavily thinned, and under planted with native vegetation. Not considered even aged management.*
2	• **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.	• 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	• **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.	• 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	• **Longleaf** at greater than 70% of overstory composition on primary and secondary longleaf soils. • Average age of overstory trees is **greater than 40 years.**	• Establish an open park-like stand with little to no midstory and primarily grasses and forbs in the understory.
5	• **Longleaf** at greater than 70% of overstory composition on primary and secondary longleaf soils. • **Certified as even-aged longleaf plantation** • Average age of overstory trees is **less than 40 years and greater than 20 years.**	• 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.

Early Successional Conditions Direct Effects:
Specific issues related to forest composition and structure for the Pine Flat planning area raised during internal scoping were concerns of the effects of increasing the amount of early successional conditions. 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. Across the 30,929 acres with the Dispersed Recreation Areas with Vegetation Management area, 2,161 acres (6.99% of the management area) are either in early successional conditions or under a contract that will create those conditions within the next two years **Reference Chapter 1, Figure 1.A.2-1: Forest Plan Management Prescriptions**.

Specific to the Pine Flat planning area, 373 acres (6.49% of the Pine Flat planning area) are currently in early successional conditions as a result of the 2011 tornado and the Payne Lake #1 Timber Sale. Implementation of Alternative A will add 646 acres (11.25% of the Pine Flat planning area) increasing that percentage to 17.8% and implementation of Alternative B will add another 203 acres (3.54%) increasing the overall percentage to 21.29% (**Reference Figure 3.A.2: Treatments, by Alternative, Creating Early Successional Habitat**). When added to the early successional conditions within the management area, the overall percentage is 10.94% bringing the total above the desirable level. However, the intent of the early successional condition policy was to guide management and natural disturbances were not to be included in the calculations. In that scenario, deducting acres created by the tornado, the percentage is reduced to an acceptable 9.73%. That percentage is likely to be reduced even further when management standards are applied and features such as protected soils and slopes are excluded from treatments.

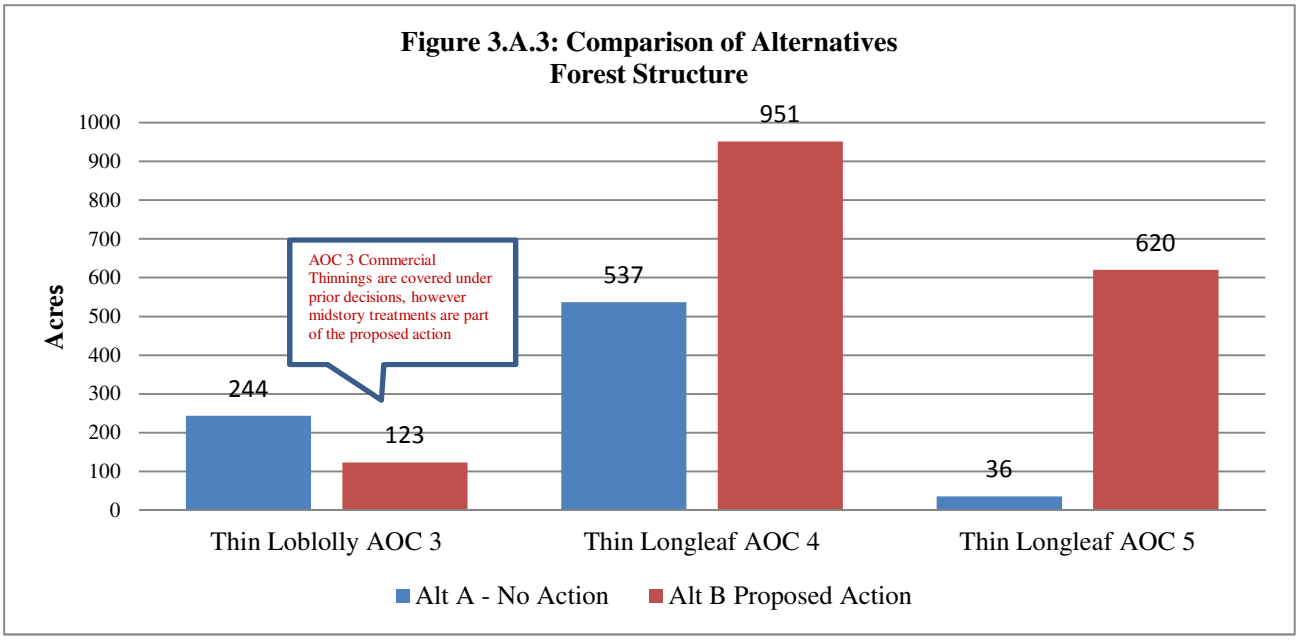
Figure 3.A.2: Treatments, by Alternative, Creating Early Successional Habitat

	AOC	Alternative A	Alternative B	Notes
C 40 Stand 21	1	42.54		
C 40 Stand 23	1	1.64		
C 40 Stand 25	1	12.36		
C 40 Stand 27	1	56.08		
C 40 Stand 29	1	18.69		
C 40 Stand 31	1		25.59	
C 40 Stand 37	1	3.04		
C 41 Stand 03	2		40.21	Changes EIS AOC 3 to AOC 2
C 41 Stand 10	1	29.48		
C 41 Stand 13	1	41.20		
C 41 Stand 15	1	45.22		
C 41 Stand 16	1	51.14		
C 52 Stand 01	1	62.90		
C 52 Stand 02	2	15.01		
C 52 Stand 06	1	67.77		
C 52 Stand 19	1	24.31		
C 52 Stand 22	2		8.47	Changes EIS AOC 3 to AOC 2
C 52 Stand 26	2		22.52	Changes EIS AOC 3 to AOC 2
C 52 Stand 30	1		17.72	
C 53 Stand 06	1	96.00		
C 53 Stand 09	1A	13.40		Remapped and reduced acres (-7.3)
C 53 Stand 13	1	65.84		
C 53 Stand 15a	1		37.8	
C 53 Stand 18	2		50.21	Changes EIS AOC 3 to AOC 2
TOTALS		**646.62**	**202.52**	

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 (**Reference Figure 3.A.3: Comparison of Alternatives Forest Structure**). *Note that in AOC 4 and AOC 4 treatments the acres are additive*. The difference in treatments in AOC 3 is due to the shifts of stands listed in **Figure 3.A.2: Treatments, by Alternative, Creating Early Successional Habitat** to AOC 2 prescriptions. As reflected in the chart below, the proposed alternative treats a total of 1,571 additional acres of existing longleaf and will move those acres closer to the native woodland community that is desired for this planning area. 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 of the commercial thin dissipates. All of these treatments will allow for improved fire behavior leading to improved fire effects.

The proposed thinning in the AOC 3 loblolly stands has much the same effect as the other thinnings. Within the AOC 3 treatments longleaf, when present will be selected as a leave tree gradually shifting species composition. The follow-up treatments of herbicide, cut and leave, and/or mulching will help transition the understory to the desired grass/herbaceous mix. However, the residual loblolly will soon reach cone producing age (if they are not already) and begin to seed in the understory. Prescribed fire under these stands is a must to control the re-establishment of loblolly in the midstory. It is unlikely that these stands are sustainable beyond the next twenty years, over time they will likely begin to show signs of decline and individual stressed trees will begin to die off. Decline on these off-site stands is inevitable regardless of whether these stands are thinned or not.

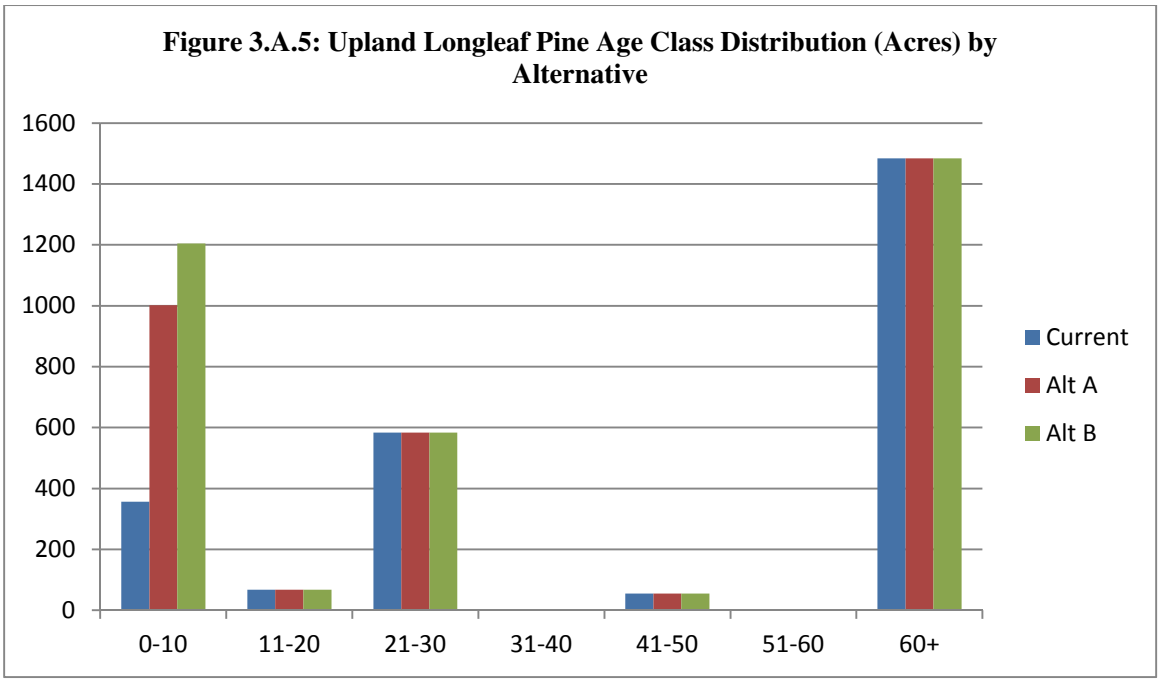


Forest Composition and Structure Indirect Effects:

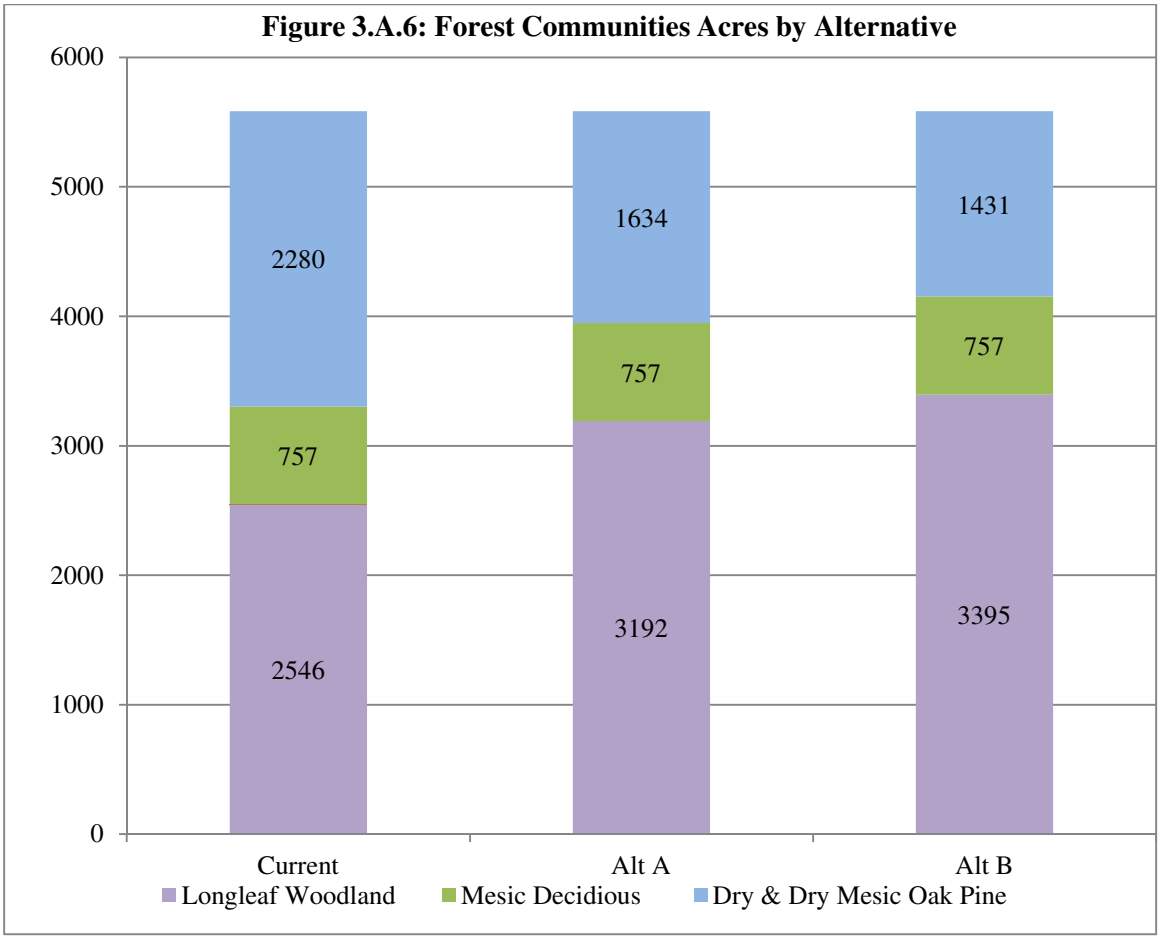
The proposed action will move 203 acres from Dry Mesic Pine-Oak communities to the Upland Longleaf Pine Woodland communities. It will also add approximately 4% to the early successional conditions in the Upland Longleaf Pine community as shown in **Figure 3.A.4: Upland Longleaf Pine Early Successional Conditions – Additive by Alternative** and **Figure 3.A.5: Upland Longleaf Pine Age Class Distribution (Acres) by Alternative.**

Figure 3.A.4: Upland Longleaf Pine Early Successional Conditions – Additive by Alternative

	Current Conditions	Alternative A No Action	Alternative B Proposed Action
Early Successional Acres	356	1,002	1,205
Longleaf Woodland Acres	2,546	3,192	3,395
Percent in Early Successional Condition	13.98%	31.39%	35.49%



Reference **Figure 3.A.6: Forest Communities Acres by Alternative** for the predicted shifts in each of the forest communities identified this this planning area.



Forest Composition and Structure Cumulative Effects:
The proposed action will make a shift both the forest composition and structure, specifically the early successional conditions. While it does bring the planning area closer to the desired condition of restored native communities, it places the management area (Vegetation Management, with Dispersed Recreation) in a situation where additional management leading to early successional conditions will need to be examined closely.

Within the Pine Flat Planning Unit, the complete implementation of Alternative B will position the area for successful maintenance prescribed burning. It will also position the area for potential transition to multi-aged or uneven aged management, where the upland longleaf pine community becomes sustaining woodland. **Reference Appendix B** for Adaptive Management Protocols which will guide the application of the concurrent and contemporaneous treatments.

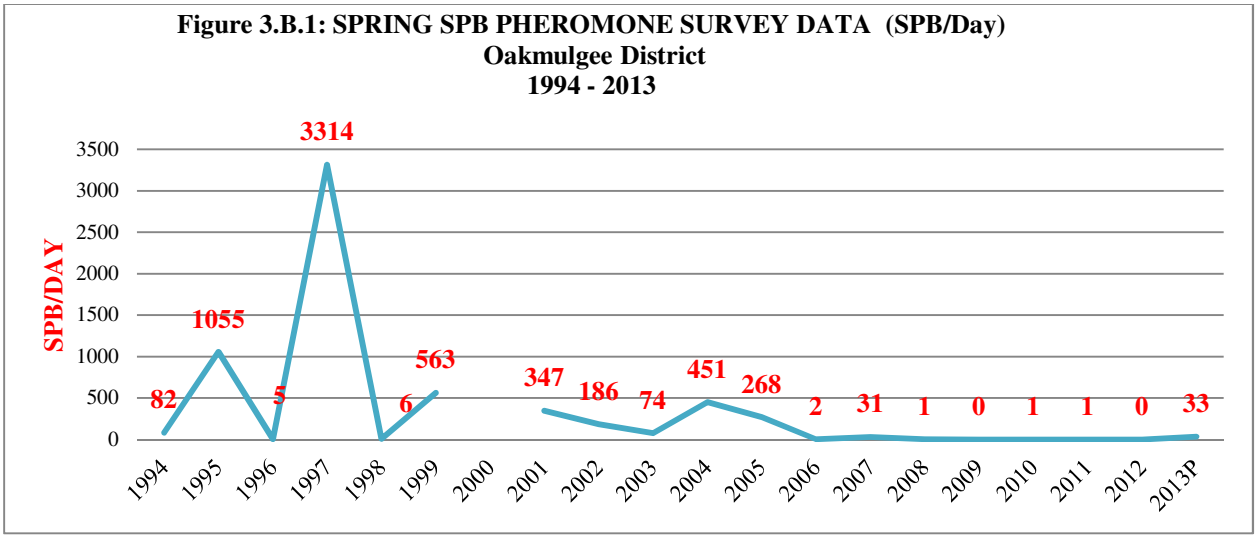
B: Forest Composition and Structure - Forest Health – Within its current conditions, the Pine Flat Planning Area has an estimated 2,053acres (36%) of its standing tree composition consisting of species not sustainable for the location. This is especially true for periods over 50 years **Reference Figure 1.A.3-8: Distribution of Longleaf on Prime and Secondary Longleaf Soils**. This "off-site" component is mostly loblolly and shortleaf pines existing in higher densities than naturally supported on primary and secondary longleaf soils. As these trees age, their resistance to natural events such as insects, disease, wind, drought, etc. is 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 to insect infestation increases due to the ease of spread from one tree to another. These conditions combined with the wind stress resulting from the 2011 tornados elevates the concern of whether the no action and proposed action alternatives will create additional stress in excess of what the system can naturally absorb. **(Reference Figure 1.A.2-4: Tornado Salvage Area and Restoration Map)**. These stress conditions are often conducive to insect infestations that could result in a loss of forest resources and potentially spread to private lands. The two insects of most concern, the SPB and Ips, are both bark beetles and the extent of their infestations are often associated with stressed trees, off-site conditions, and dense stocking.

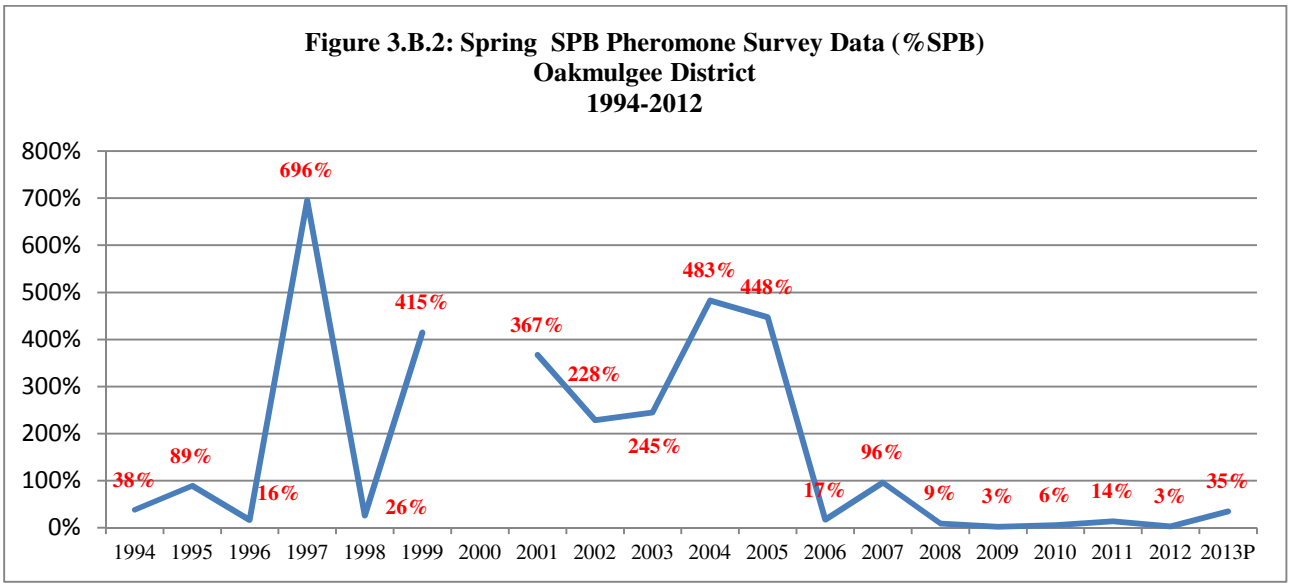
The Oakmulgee District has a history of SPB infestations and those infestations generally follow trends or cycles. To determine current risk and stay aware of population trends, the Oakmulgee District participates in a South-wide monitoring survey of populations of SPB and their associated predatory clerid (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. Indexes related to the number of SPB trap/day, the ratio of the predatory clerid beetles to the prey SPB, and the % SPB are applied to the SPB prediction model. Oakmulgee survey data from 2008 – 2012 indicates populations well below the threshold for a declining population. Additional trend data from other sample sites in the state predicts SPB populations in Alabama to be categorized as Static/Low for the same time frame.

However, it should be noted that the preliminary survey data for 2013 are reflecting SPB/Day indices of over 30 SPB/Day and percent SPB index of 35%. **(Reference Figure 3.B.1: Spring SPB Pheromone Survey Data (SPB/Day) and Figure 3.B.2: Spring SPB Pheromone Survey Data (%SPB))**. In general, average trap catches that exceed 30 SPB/day especially those in which SPB make up more than 35% of the total catch, are indicative of increasing or continued high SPB infestation levels. Conversely, when catches of predators (clerids) far outnumber those of SPB and fewer than 10 SPB adults are caught per day, infestation trends are likely to decline or remain at low levels. While the 2013 trap data reflected in the figures represent only one week of 2013 trapping data, it is likely that SPB populations are increasing on the Oakmulgee. Thus, relative to this project, actual implementation could occur during a period of population increase.

The Ips pine bark engraver beetle ranks next to SPB in importance as to its destructiveness to pines. Ips beetles are actively feeding in areas stressed by the 2011 tornados. However, at this time only scattered

mortality is occurring. The potential for increased Ips activity does exist in storm stressed areas of high density off-site loblolly pines.





Direct Effects:

Of the estimated 2,053 acres determined to be off-site or existing at higher densities than natural conditions warrant, the acres with the greatest risk to bark beetle infestations are the 382 acres of loblolly, shortleaf and mixed pine-hardwood resulting from off-site conversion. **Reference Figure 1.A.3-3b: 10-Year Age Class Distribution – Dry and Dry Mesic Oak Pine Forest Community**. Generally, these "at risk" stands are less than 50 years old, overstocked, often with a history of prior SPB infestation. Utilizing the Restoration Area of Concern classification established for this project **Reference Figure 1.C.1: Restoration Areas of Concern (AOC)**; these stands are AOC 2 and AOC 3. The established practice to improve the vigor of these stands, thus lessen the risk to bark beetles is to commercially thin the stands to a 50-60 ft^2/ac BA. Commercial thinning of these dense stands accomplishes two objectives. It increases the vigor of the residual trees by allowing them greater access to nutrients, moisture, etc. Thinning also increases the distance between trees making the spread of SPB from one

tree to the next more difficult. **Reference Figure 3.B.4: "At Risk" Stands to Be Treated under Both Alternatives**.

The No Action Alternative prescribes a commercial thinning for 244 (64%) of the 382 acres, and clear-cutting another 15 acres for a total of 259 acres. Under Alternative B, 121 of those acres would shift from a thinning to a clear-cut. **Reference Figure 3.B.3: Comparison of Treatments to "At Risk" Stands**. The impetus to proposing these acres for restoration to longleaf stems from recent inventory and documentation that these stands have sustained prior damage from SPB infestations. The damage is such that they are not suitable for commercial thinning. If dropped from thinning and left untreated, the stand composition will likely shift further into naturally seeded loblolly and light seeded hardwoods. While this species mix is not a high risk for SPB, it does not meet the project goals of restoring native communities.

Figure 3.B.3: Comparison of Treatments to "At Risk" Stands

	Alternative A No Action Acres	Alternative B Proposed Action Acres
Clear-cut with reserves, re-establish longleaf	**15**	**136**
Thin, favoring longleaf, to achieve open park-like conditions	**244**	**123**
Sum	**259**	**259**

The potential for increasing Ips infestation exists, especially in the trees along the tornado path with current Ips activity. Alternative B adds additional thinning along the path in an attempt to remove the stressed trees and increase stand vigor. Stand 40-31 is proposed for a clearcut with reserves and planting to longleaf due to the high number of broken, leaning and stressed trees from the tornado.

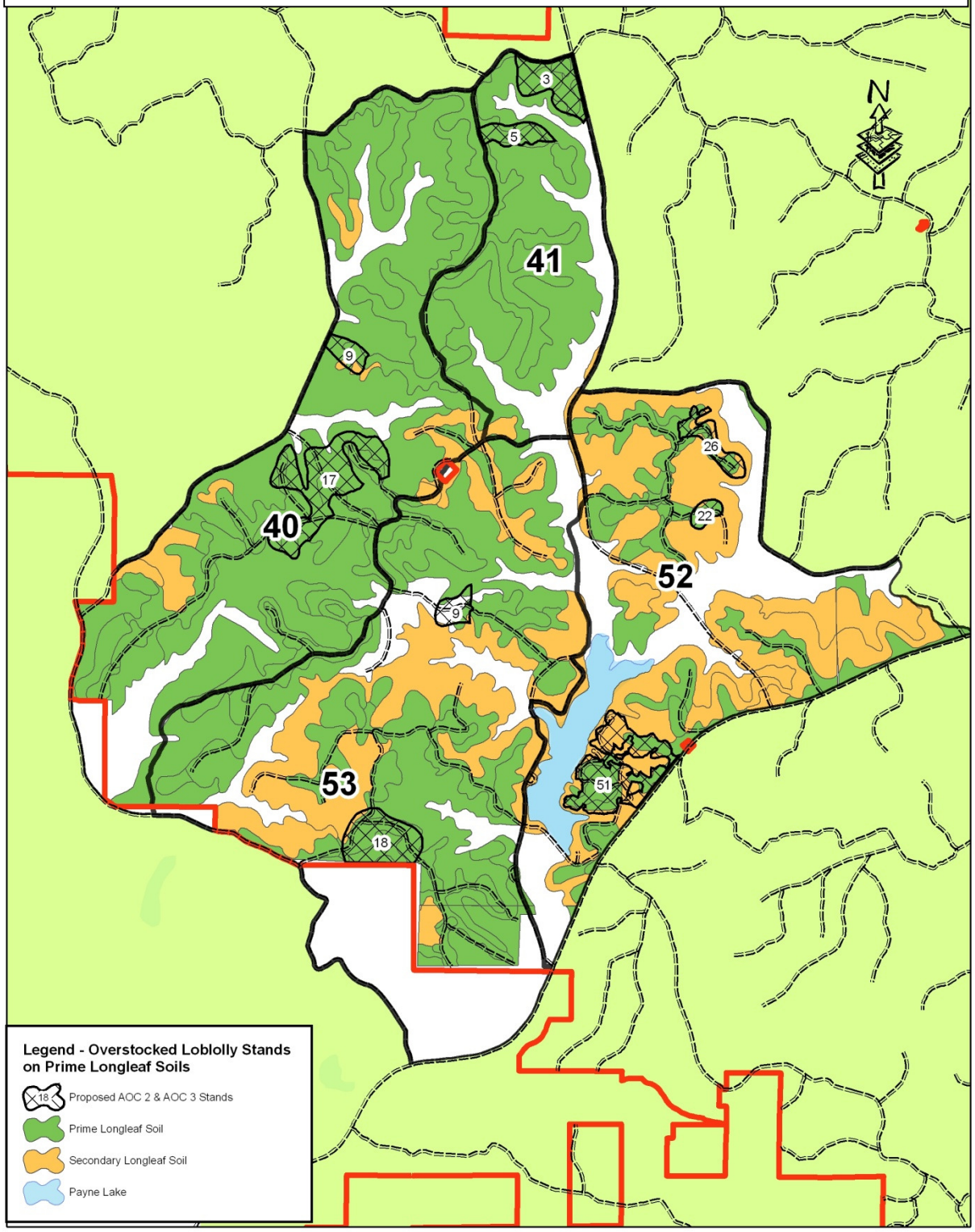
Indirect Effects:

Under Alternative B an additional 121 acres would be moved 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. While Alternative A would improve the resilience and vigor of these off-site stands, the improvement would be short term, as these stands mature they will likely become more susceptible to insects and disease. And as previously stated they are damaged such that they will not support a commercial thinning, which would require expenditure of funds for a non-commercial treatment.

The remaining 123 acres proposed for thinning are sufficiently stocked to support a viable commercial operation. While, in the long-term these acres should be moved toward a longleaf woodland species composition, they will have short term benefits to a variety of wildlife. The thinning treatment should allow these acres to increase their resistance to SPB infestations.

For all treatments in these *"off-site" and "at risk"* stands there is the risk of logging stress causing additional mortality. This potential exists for Ips as well as SPB. Generally, this is short-lived and the benefits from the thinning treatment regarding tree vigor are realized.

Figure 3.B.4: "At Risk" Stands to be Treated under both Alternatives



Cumulative Effects:
Since 2005, the Oakmulgee District has thinned or clear cut and planted to longleaf over 2,000 acres of heavily stocked, "off-site" loblolly stands. The 259 acres addressed in this project will increase that amount to 2,359 acres. An additional 2,600 acres remain in an "at risk" condition and have not been treated nor are they scheduled for treatment in the near future. As referenced in the data from the Spring SPB Pheromone Survey, SPB indices have been relative low since 2005, thus it is impossible to determine if the preventative treatments have been successful in retarding 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 259 acres within the Pine Flat 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.

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….**
There are a minimum of 5-10 freshly SPB attacked trees present in a grouping, and…. • There are suitable host trees (live pines) available for additional infestation, *and* • The infested trees and nearby suitable host trees are of merchantable size (> 4.9 inches DBH), *and* • It is determined that a suitable market exists	• 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).
There are a minimum of 5-10 freshly SPB attacked trees present in a grouping, and…. • There are suitable host trees (live pines) available for additional infestation, *and* • The infested trees and nearby suitable host trees are NOT of merchantable size (> 4.9 inches DBH), *and* • No suitable market exists	• 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).
• 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.	

Mitigation Measures:

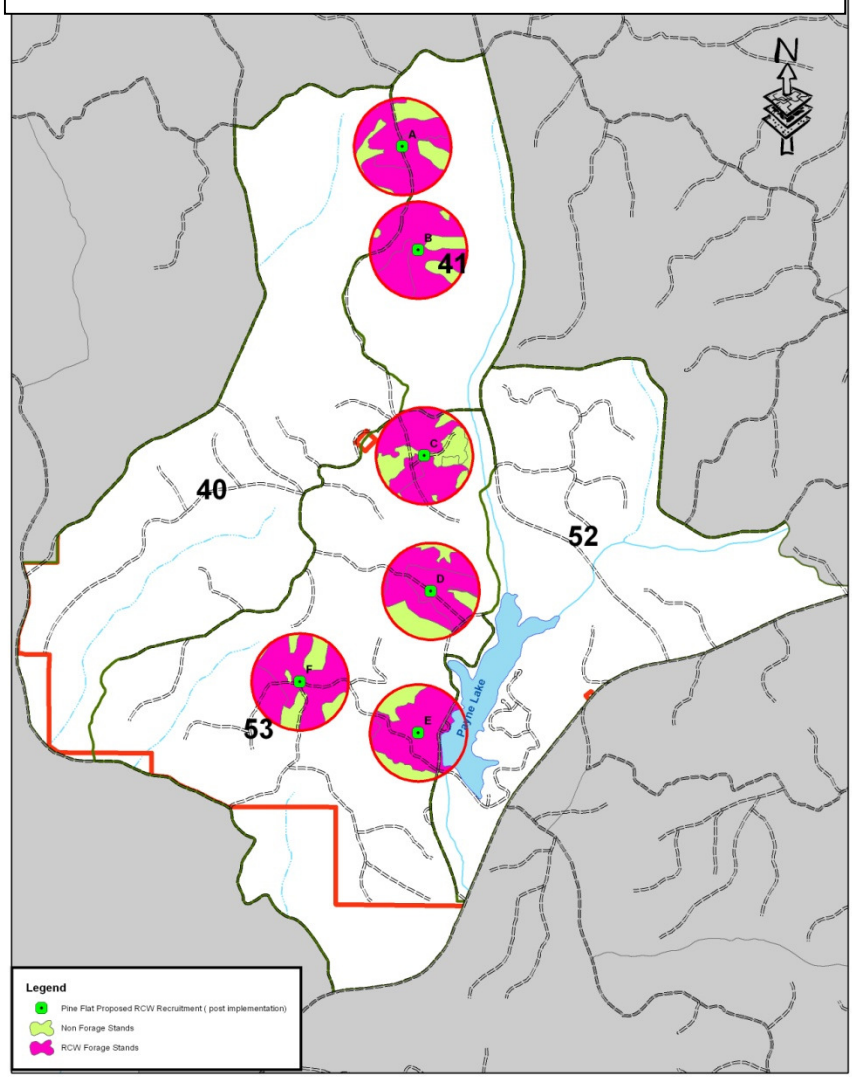
- Should epidemic conditions occur during the implementation of this project, steps will be taken to avoid mechanical treatments in at-risk stands during the periods of SPB dispersal (March – May). Appropriate restrictions will be added to contracts.

- 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 116 active RCW clusters. The majority of these occur on the western half of the district. There are six active RCW clusters (family units) within the Pine Flat planning area. 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. Monitoring conducted during the 2012 nesting season documented that each of the six 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 Pine Flat Planning Area reveals six highly likely candidate areas for placement of recruitment clusters as shown in **Figure 3.C.1**.

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



The recruitment clusters are labeled using letters "A – F" 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.**

Figure 3.C.2: Forage Habitat

Recruitment Cluster #	Acres of Potential Forage Habitat	Percentage of Partition
A	92	73.6%
B	108	86.4%
C	83	66.4%
D	93	74.4%
E	81	64.8%
F	98	78.4%

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.

Providing all six recruitment clusters are inhabited by nesting RCW, the Pine Flat Planning Unit will have achieved a 100% 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 –

Affected Environment: The proposed project area falls within the boundaries of one assessment watershed, Latner Branch-Upper Five Mile Creek. Public ownership within the Latner Branch-Upper Five Mile Creek watershed is approximately 39 percent. Acre distribution is shown in the table below.
Reference Figure 1.A.1-2: Upper Five Mile Creek Sub Watershed

6th level Watershed	Latner Branch-Five Mile Creek
Public Ownership Acres	18,340
Private Ownership Acres	28,882
Total Watershed Acres	47,162
State Designated Water Classification	Fish & Wildlife

Named creeks affected by land management within this analysis are Latner Branch (flows into Five Mile Creek) and Five Mile Creek. Only one named lake, Payne, and scattered small private ponds are located within the watershed. State designated water classification for each of the named creeks and Payne Lake 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 waterhsed 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 is approximately half riverine riparian located to the northwest including Latner Branch and lower Five Mile Creek and approximately half 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 (cfsm)]. Average discharge is about 22 inches (1.5 cfsm). 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

Environmental Effects:

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.

Direct, Indirect Effects of the Proposed Action Alternative

Latner Branch - Five Mile Creek watershed will be less than 4 percent affected from proposed timber harvest actions reflected in the table below. Mid-story treatments will affect less than 6 percent of the watershed. Prescribe burn affects approximately 4 percent of the watershed. Mechanical mulching and herbicide treatment acreage assume each treatment to occurr 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 7 percent 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	Latner Branch – Five Mile Creek
Watershed Acres	47,162
Proposed Thin Acres	1,571
Proposed Clear Cut Acres	203
Proposed Mid-story Removal	2,342
Proposed Mechanical Mulch	3,181
Propoed Herbicide Application	3,208
Prescribe Burn Acres (prior decision)	1,900

Silvicultural practices of clear cut and thinning (including mid-story treatmetns) 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 203 acres, thinning of approximately 1,571 acres, mid-story treatment on approximately 2,342 acres which involves either cut stems and leave on site, use of herbicdes, or mechanical mulching or combinations of herbicide and mulching. In addition mechanical mulching will occur on an additional 3,181 acres for a total of potentially treating 3,291unique acres. Prescribe burn is proposed for an average 1,900 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 to 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).

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.

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:

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 to 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.

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.

Triclopyr

- *Solubility*: moderate to low
- *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. Stream side 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 soil a soil active 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.

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; Shahlaee 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.

Mechanical mulching has the potential to affect the water resource through sedimentation. 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.

Reforestation by hand planting is proposed**.** Hand planting of trees has no potential for direct/indirect impacts to the water resource.

Red cockaded Woodpecker Management has no potential for direct/indirect impacts to the water resource.

Linear wildlife opening maintenance proposed for approximately 7 acres. Soil disturbance from mechanical treatments involving seed bed preparation at this small scale will not greatly increase the amount of sediment transported downstream.

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.

Southern pine beetle suppression (SPB) 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.

Cumulative Effect of the No Action and Proposed Action Alternatives

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, 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, 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. A detailed discussion of direct, indirect, and cumulative effects of vegetative management and associated treatments, and prescribed fire on the water resource, is presented in the 2005 Longleaf Ecosystem Restoration Project, Talladega National Forest, Oakmulgee District, Final Environmental Impact Statement, and are hereby incorporated into this document. In addition, a detailed discussion of direct, indirect and cumulative effects of prescribed burns and mechanical methods on soil productivity is presented in the Vegetative Management-Final Environmental Impact Statement (VM-FEIS) and is hereby incorporated into this document.

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.

Action Alternative

Cumulative watershed effects that result from past and current conditions in the Latner Branch-Five Mile 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, prescribe burning and wildlife linear strip maintenance. 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 8 percent of Latner Branch-Five Mile 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 10-12 percent of the watershed.

The cumulative effects associated with the Action Alternative would occur in the years 2014 thru 2016. The risk from vegetative management begins to be reduced by 2017 returning to pre-exisitng conditions by the year 2018 (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 –

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 5 soil map units within the proposed project boundary located in Hale County.

Six 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 72 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 72 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 percent slopes, frequently flooded
- Maubila flaggy loam, 2-8 percent slopes, eroded
- Maubila-Smithdale-Boykin complex, 5-15 percent slopes
- Maubila-Smithdale complex, 15-35 percent slopes
- Smithdale sandy loam, 2-8 percent 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 percent were more than likely farmed over a short period at some point in time. Slopes greater than 10 percent 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.

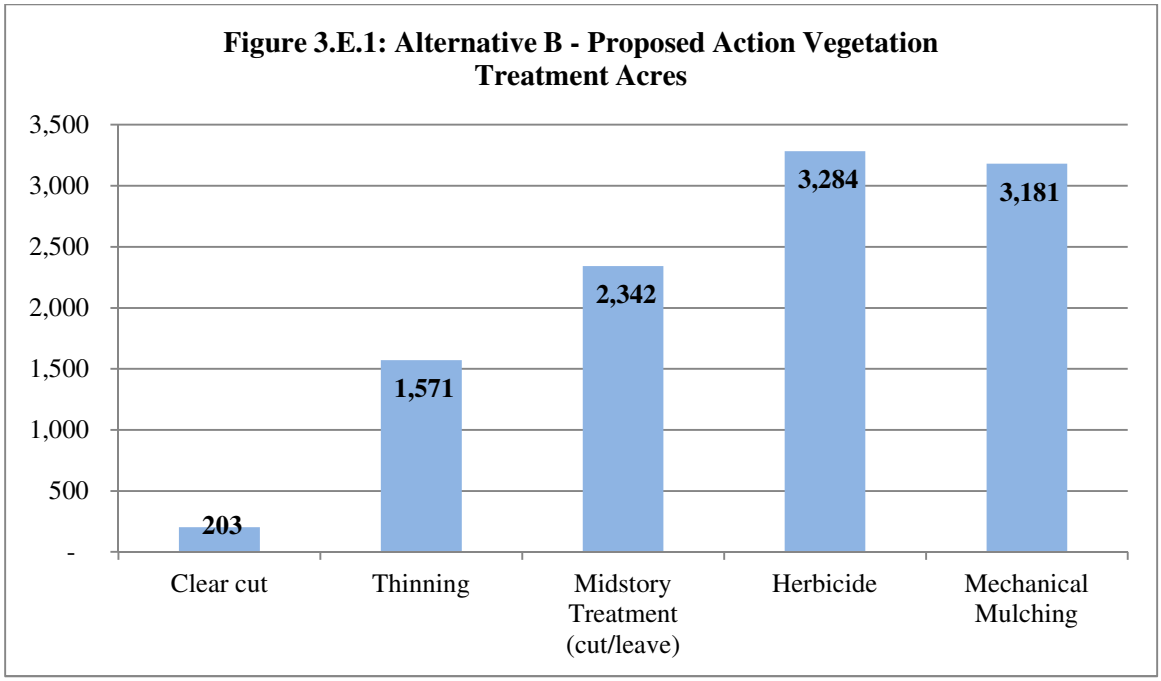
Maubila soils have flaggy (small stones) loam surface textures 3 inches or less with clay loam subsurfaces. Maubila soils are located on narrow ridge tops and lower slopes. The surface horizon on ridge tops has been eroded leaving a mixture of loam and clay loam surface textures with small pieces

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. Iuka, Kinston, 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.

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.

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 Restoratoin Project EIS and Payne Lake Project 2009 EA). 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 exists for treatments from the decision documents that are not yet implemented. That is, soil erosion is expected to last from 2 to 3 years from date of treatment. While there is no long term (3+ years) soil lost 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.

Direct, Indirect Effects of the Proposed Action Alternative:
This alternative proposes approximately 1,571 acres of thinning, approximately 203 acres of clear cutting, approximately 2,342 acres of mid-story treatment (cut and leave), approximately 3,284 acres of herbicide application, approximately 3,181 acres of mechanical mulching, approximately 7 acres of linear wildlife openings, and 2.4 miles of temporary roads. Also proposed is 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.



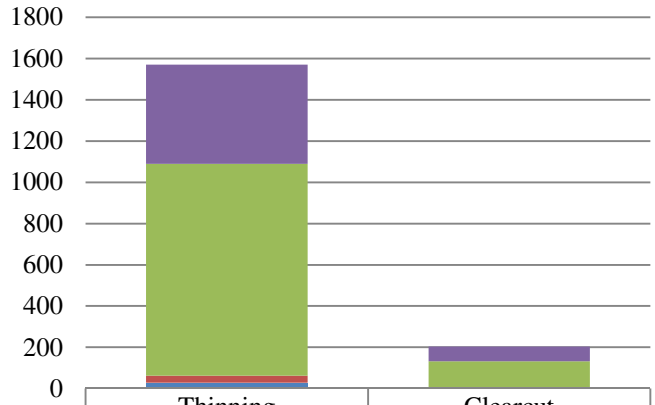
- ***Silvicultural practices*** (clear cut and thinning) are known to potentially affect the soil resource primarily through nutrient removal. Tree harvest methods prescribed by the proposed action involve treatments by clear cutting and thinning. Proposed thinning and restoration activities will harvest 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 72 acres have a moderate/severe to severe potential for soil compaction (**Figure 3.E.2: Soil Compaction Hazard**). These acres are soils located in floodplains and will be elimianted 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: Soil Compaction Hazard by Treatment Acres Proposed Action

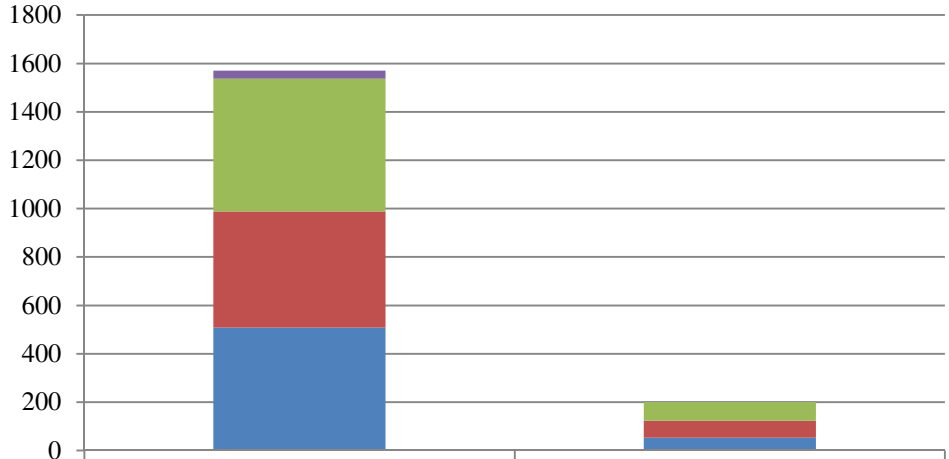


	Thinning	Clearcut
Moderate/Slight	482	70
Moderate	1027	132
Moderate/Severe	33	1
Severe	29	0

The slightly more 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 percent) 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 percent slope but isolated small areas exist. Slopes exceeding 40 percent 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. Re-vegetation 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 percent of the acreage for thinning and 10 percent of the acreage from restoration.

Figure 3.E. 2: Soil Erosion Hazard by Treatment Acres Proposed Action



	Thinning	Clear cut
Slight	33	1
Moderate	550	79
Moderate/Severe	479	70
Severe	509	53

- ***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 5 miles or 8 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 percent. Secondary skid trails can be expected to have loss of organic surface and soil exposure as high as 25 percent. 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.
- ***Midstory Treatment*** is proposed on approximately 2,342 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.

- ***Herbicides*** such as Glyphosate, Imazapyr, and Triclopyr, are proposed for use on approximately 3,284 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 too 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./ac 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 to 35 days and in soil from 19 to 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.
- ***Prescribe burn and site preparation burning*** on approximately 203 acres and prescribe burning approximately 1900 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.

- ***Mechanical Mulching*** is proposed on approximately 3,181 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.
- ***Reforestation*** by hand planting is proposed. Hand planting of trees has no potential for direct/indirect impacts to the soil resource.
- ***Red-cockaded Woodpecker Management*** has no potential for direct/indirect impacts to the soil resource.
- ***Linear Wildlife Opening Maintenance*** is proposed on approximately 7 acres. Treatment involves preparing a seedbed for planting involving disking, fertilizing, and seeding which will establish vegetation limiting soil erosion and reducing soil compaction. Addition of fertilizer and lime aids in improving soil productivity. Sites are usually maintained in a vegetative condition which protects the soil surface from erosion. Maintaining a vegetative cover will improve soil conditions over time. Implementation of forest standards for controlling water runoff and re-vegetation will reduce the effects of soil loss and sedimentation of nearby waterways.
- ***Road Maintenance*** is scheduled on 64 acres using treatments of herbicide (Triclopyr) and mowing where needed to control brush and woody vegetation 10 feet beyond the road corridor. Effect of herbicides is taken into account under the herbicide section and is a part of the acres displayed in **Figure 3.E.1: Alternative B – Proposed Action Vegetation Treatments Acres**. Mowing consists of a side arm bush hog which has no impact on the soil resource. Equipment,

such as a wheeled tractor, would remain in the road corridor which is already disturbed from road construction and maintenance. Overall, the objective is to maintain a grass and forb vegetative cover which controls soil erosion and aids in improving soil conditions from root structure.

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, 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.

- ***Southern pine beetle suppression (SPB)*** 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 5 acres and scattered if the SPB site(s) are detected and addressed early. Under epidemic situations, the acreage can be greater than 5 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.

Cumulative Effect of the No Action and Proposed Action Alternatives

- *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.

- *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, 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 is expected to peak between the years 2014 and 2016. 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 -

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 Pine Flat planning area.

Important dispersed recreation activities in the Pine Flat 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.

Affected Environment:
The PFIRRP area consists of 5,750 acres of NFS lands located in the west central portion of the TNF, Oakmulgee District in Bibb and Hale Counties, Ala. The area is inventoried as Oakmulgee Compartments 40, 41, 52, and 53. The planning area lies 12 miles south of Tuscaloosa, Ala., and 14 miles northeast of Greensboro, Ala. It extends from Hale County Highway #53 (Clary Hill Road) on the west, to Hale County Highway #49 and Forest Service Road (FSR) 715 on the east, and Alabama Highway #25 on the south to FSR 704 and 708 on the north. See Chapter 1.A for a detailed description of the planning area.

Environmental Effects:

- *Alternative A – No Action:* There are 30.2 miles of FS maintained roads within or along the perimeter of the Pine Flat planning area. Of the 30.2 miles of FS roads, 14.9 miles are closed to vehicle traffic, 7.9 miles are open from October 1 - April 30, and 7.4 miles are open year round. There are an additional 11.8 miles of state or county roads within or adjacent to the area (**Reference Figure 3.F.1: Pine Flat Planning Area – Alternative A Roads**). Density of all roads (Forest Service, State, and County) within the area is 4.7 miles/square mile. Density of all roads open to vehicle traffic is 3.0 miles/square mile during the open road season (October 1 – April 30) and 2.1 miles/square mile during the closed road season (May 1 – September 30) (**Reference Table 3.F.2: Pine Flat Planning Area – Alternative A Road Miles and Road Density Within the Pine Flat Planning Area**).

Figure 3.F.1: Pine Flat Planning Area – Alternative A Roads

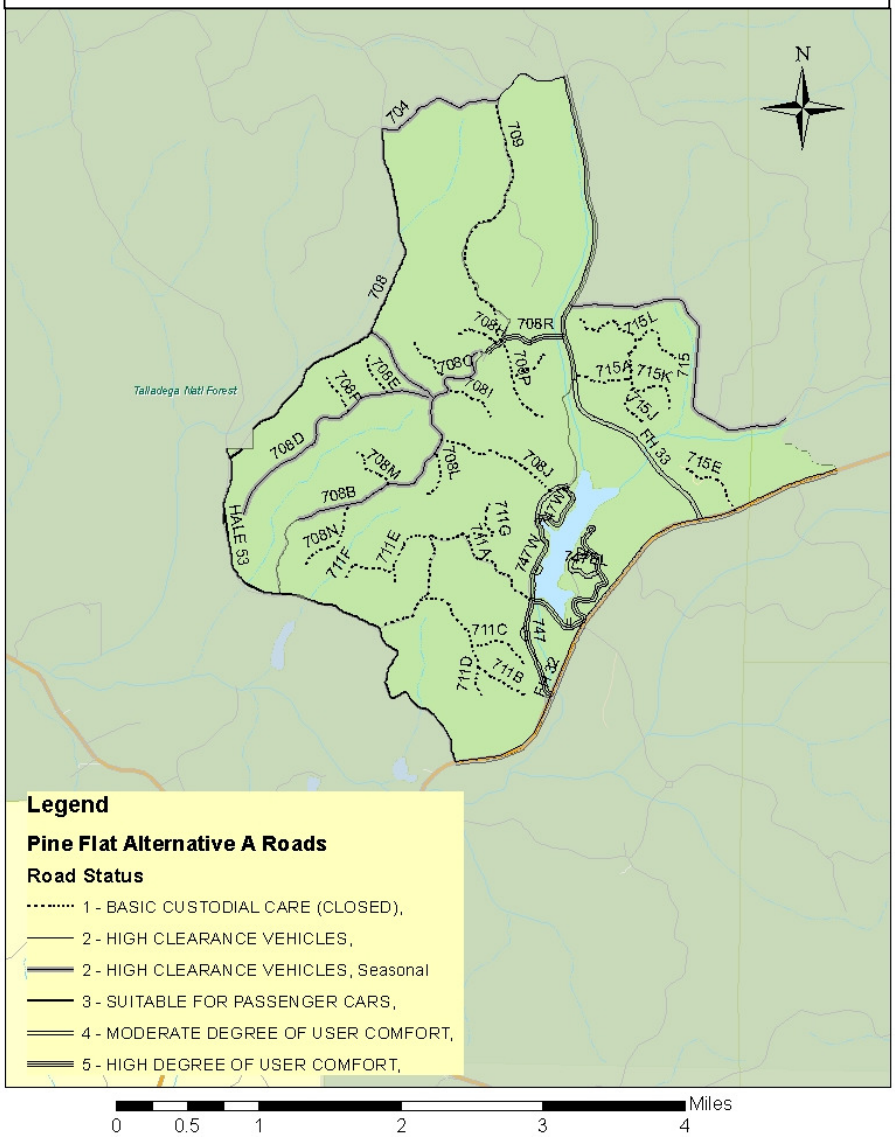


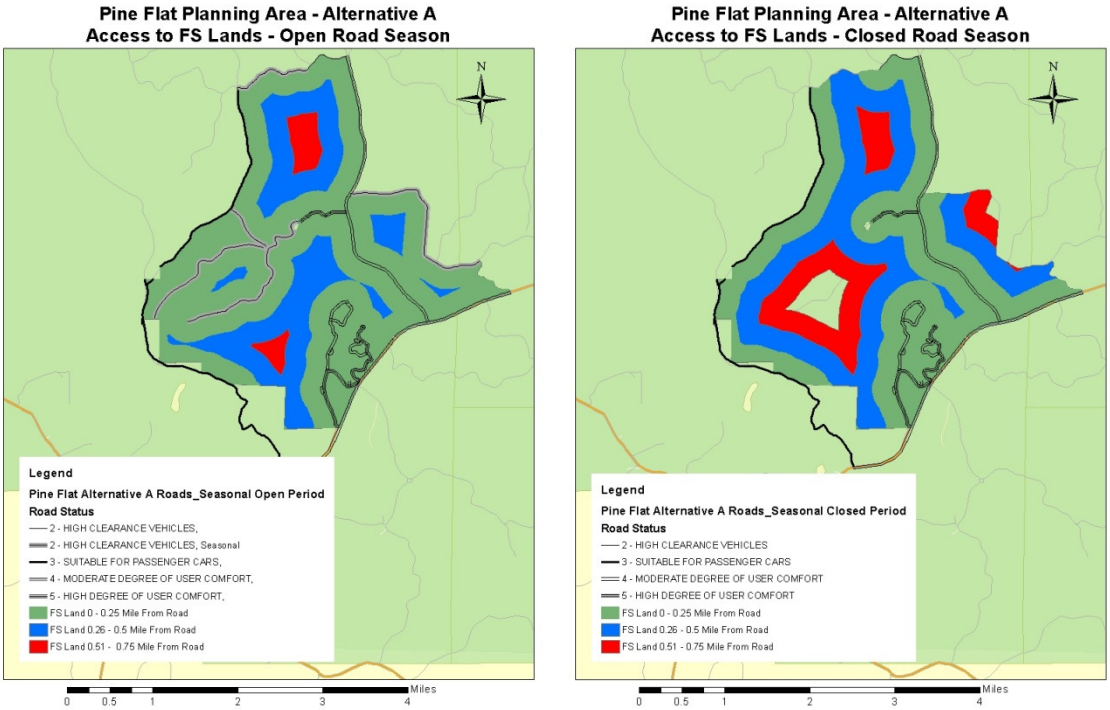
Table 3.F.2: Pine Flat Planning Area – Alternative A Road Miles and Road Density Within the Pine Flat Planning Area

	All Roads (FS, State, County)	Open Road Season (Oct 1 - Apr 30)	Closed Road Season (May 1 - Sept 30)
Road Miles	42	27.1	19.2
Road Density	4.7	3.0	2.1

During the open road season 71% (4,075 acres) of the planning area is within 0.25 miles of an open road, and 96% (5528 acres) of the planning area is within 0.5 miles of an open road. During the closed road season 48% (2,749 acres) of the planning area is within 0.25 miles of an open road and 82% (4712 acres) of the planning area is within 0.5 mile of an open road.

Throughout the year, regardless of road closure season, 96% or more of the planning area is within 0.75 miles of an open road (**Reference Figure 3.F.3: Pine Flat Planning Area – Alternative A Road Access to FS Lands**).

Figure 3.F.3: Pine Flat Planning Area – Alternative A Road Access to FS Lands



All FS roads within and adjacent to the planning area are open to foot and non-motorized vehicle traffic. Roads open to vehicle traffic are open to equestrian traffic, but no closed or seasonally closed roads have been designated for equestrian traffic. The roads within the Payne Lake Recreation Area are contained with the designation of a FS Fee Area (Recreation Enhancement Act, 2004) and thus require compliance with the approved fee structure.

Estimated road maintenance costs for the current road system in the Pine Flat Planning Area are $35,993.00 annually based on average maintenance costs per mile reported in the 2011 Oakmulgee Ranger District Travel Analysis Report (USDA, 2011).

- *Alternative B – Proposed Action:* The Oakmulgee District completed its Travel Analysis Report in 2011 (USDA Forest Service, 2011). Through the travel analysis process, the District evaluated the existing road system and made recommendations on future road management decisions with the goal of maintaining an efficient, safe, and affordable road system. Changes to the road system within the Pine Flat planning area proposed in Alternative B are consistent with recommendations from the Oakmulgee Ranger District Travel Analysis Report.

If the proposed action is implemented, 3.7 miles of roads currently closed to vehicle traffic will be passively decommissioned by blocking access and allowing the road to revegetate and 1.8 miles of road will change in status from seasonally open to closed to vehicle traffic as referenced in the table below.

Table 3.F.4: Pine Flat Planning Area – Proposed Road Decommissioning and Status Change

ID	CURRENT STATUS	PROPOSED STATUS	LENGTH (MI)
708E	Closed	Decommission	0.3
708F	Closed	Decommission	0.3
708H	Closed	Decommission	0.3
708I	Closed	Decommission	0.4
708M	Closed	Decommission	0.3
708Q	Closed	Decommission	0.3
711D	Closed	Decommission	0.2
711F	Closed	Decommission	0.4
715J	Closed	Decommission	0.4
715K	Closed	Decommission	0.4
715L	Closed	Decommission	0.4
708D	High Clearance Vehicles - Seasonal	Closed	1.8

Roads proposed for decommissioning do not provide public access, but will be used during commercial timber harvest activities associated with the project. Upon complete of the project, they will not be needed to provide access for resource management activities by the Forest Service. Passive decommissioning was selected as the best decommissioning method for these roads because they are typified by natural surfaces (no gravel or rock surface material added) that have become revegetated. Upon completion of project activities, erosion mitigation measures including water bars and seeding will be implemented on all roads used in support of the timber harvest, including those roads proposed for decommissioning. Given that the proposed vegetation treatments will allow for greater sunlight to reach the road bed it is anticipated that native grasses and herbaceous vegetation will easily establish in the road area. Active decommissioning (e.g. using mechanical equipment to obliterate the road prism and reshape the road corridor to blend to the surrounding landscape) would likely result in a more obvious disturbance and would increase the risk of erosion and introduction of non-native invasive plant species..

The road proposed for status change from High Clearance Vehicles – Seasonal to Closed (708D) is functionally closed to vehicle traffic due to encroachment by vegetation **(Figure 3.F.5)**. While this road is recorded as open to vehicle traffic on a seasonal basis, it does not provide vehicle access in its current condition. This road is proposed for use to support the commercial timber harvest associated with the vegetation restoration treatments. Upon completion of the harvest activities, erosion mitigation will be implemented and an access control structure will be installed. The proposed status change will align the administrative status of this road with its on-the-ground condition.

Figure 3.F.5: Current condition of FSR 708D

After implementation, there will be are 26.4 miles of FS maintained roads within or along the perimeter of the Pine Flat planning area. Of the 26.4 miles of FS roads, 12.8 miles will be closed to vehicle traffic, 6.1 miles will be open from October 1 - April 30, and 7.4 miles will be open year round (**Reference Figure 3.F.7: Pine Flat Planning Area – Alternative B Roads**). Density of all roads (Forest Service, State, and County) within the area will be 4.3 miles/square mile. Density of all roads open to vehicle traffic will be 2.8 miles/square mile during the open road season (October 1 – April 30) and 2.1 miles/square mile during the closed road season (May 1 – September 30) (**Reference Figure 3.F.8: Pine Flat Planning Area – Alternative B Road Miles and Road Density Within the Pine Flat Planning Area**).

Table 3.F.7: Pine Flat Planning Area – Alternative B Roads

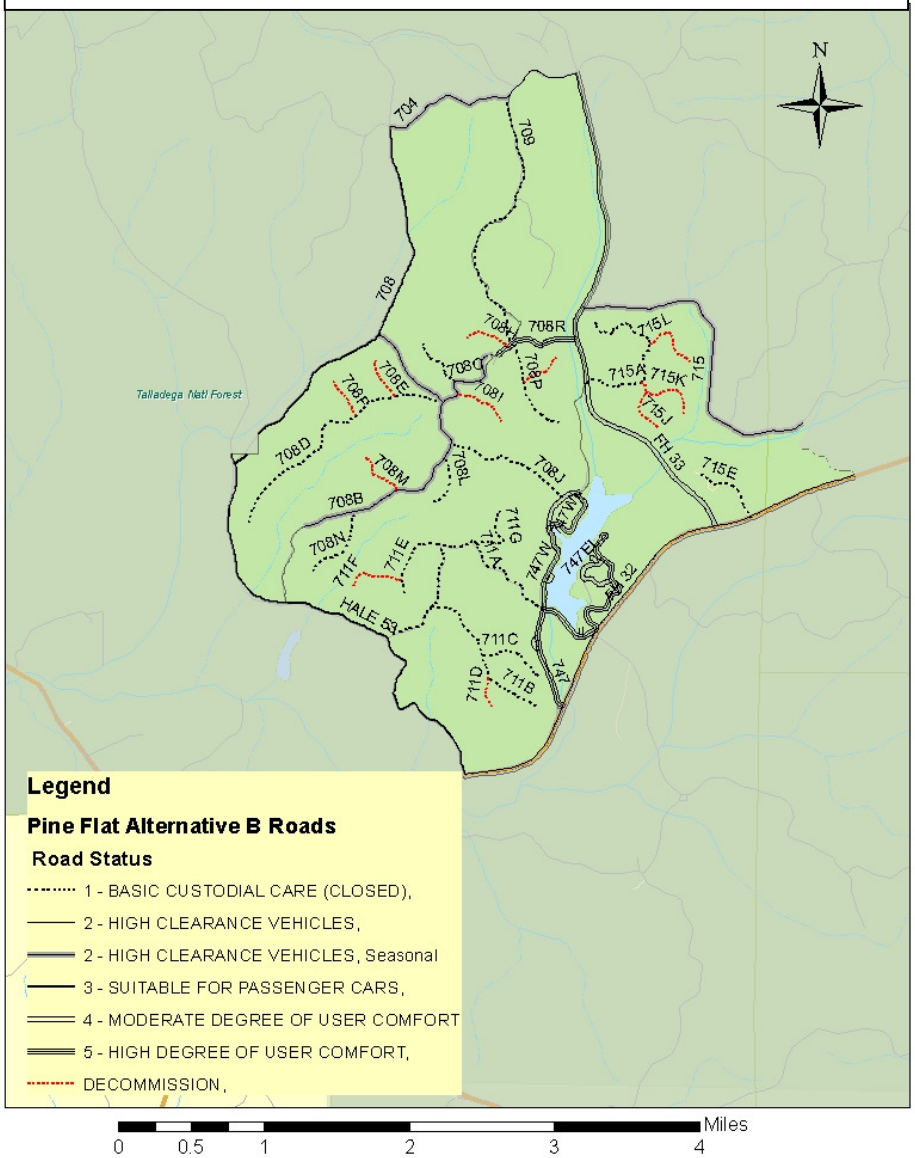


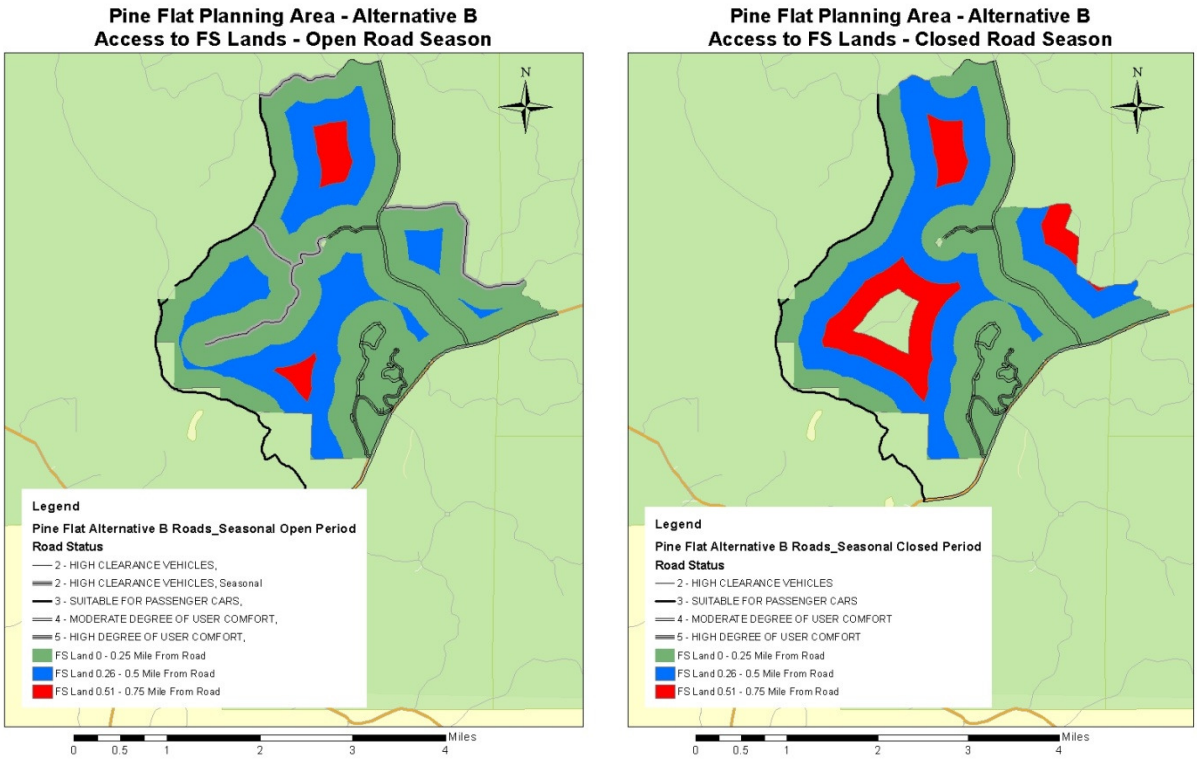
Table 3.F.8: Pine Flat Planning Area – Alternative B Road Miles and Road Density Within the Pine Flat Planning Area

	All Roads (FS, State, County)	Open Road Season (Oct 1 - Apr 30)	Closed Road Season (May 1 - Sept 30)
Road Miles	38.2	25.3	19.2
Road Density	4.3	2.8	2.1

During the open road season 67% (3,874 acres) of the planning area will be within 0.25 miles of an open road, and 96% (5528 acres) of the planning area will be within 0.5 miles of an open road. During the closed road season 48% (2,748 acres) of the planning area will be within 0.25 miles of an open road and 82% (4713 acres) of the planning area will be within 0.5 mile of an open road. Throughout the year, regardless of road closure season, 96% or more of the planning

area will be within 0.75 miles of an open road (**Reference Figure 3.F.9: Pine Flat Planning Area – Alternative B Road Access to FS Lands**).

Figure 3.F.9: Pine Flat Planning Area – Alternative B Road Access to FS Lands



All FS roads within and adjacent to the planning area will remain open to foot and non-motorized vehicle traffic and roads open to vehicle traffic will remain open to equestrian traffic. No closed or seasonally closed roads will be designated for equestrian traffic. The roads within Payne Lake Recreation Area are contained with the designation of a FS Fee Area (Recreation Enhancement Act, 2004) and thus require compliance with the approved fee structure.

Estimated road maintenance costs for the proposed road system in the Pine Flat Planning Area are $33,384.00 annually based on average maintenance costs per mile reported in the 2011 Oakmulgee Ranger District Travel Analysis Report (USDA, 2011).

Effects of Road System Changes:

The proposed action would reduce miles of Forest Service roads and road density within the Pine Flat Planning Area, indicating decreased vehicle access to Forest Service land. Despite this, few changes will occur to the road system open to vehicle traffic. All roads proposed for decommissioning are currently closed to vehicle traffic and the 1.8 miles of seasonally closed road that will be closed to vehicle traffic under the proposed action is currently impassable to vehicles.

The proposed action will result in a 4% decrease in the amount of Forest Service land within 0.25 miles from an open road and will result in no change in the amount of Forest Service land within 0.5 miles and 0.75 miles of an open road during the open road season. There will be no changes in distances

from open roads during the closed road season. The proposed road system will continue to afford high levels of vehicle and foot access for dispersed recreation activities in the area.

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 Pine Flat planning area by 7%. While the Pine Flat 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.

G. Forest Composition and Structure – Wildlife -

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 alternatives 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.L.

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)). **Table 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 **Table 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. **Table 3.G.1** also lists the reason each MIS was selected and relates them to management objectives in the Revised Forest Plan.

Table 3.G.1: Management Indicator Species

Common Name	Reason for Selection	Related Revised 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, clearcuts, 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 of time because preferred breeding habitat (early seral) coincides with rapid structural change in plant structure and composition.

Affected Environment:

The PFIRRP area consists of 5,750 acres of NFS lands located in the west central portion of the TNF, Oakmulgee District in Bibb and Hale Counties, Ala. The area is inventoried as Oakmulgee Compartments 40, 41, 52, and 53. The planning area lies 12 miles south of Tuscaloosa, Ala., and 14 miles northeast of Greensboro, Ala. It extends from Hale County Highway #53 (Clary Hill Road) on the west, to Hale County Highway #49 and Forest Service Road (FSR) 715 on the east, and Alabama Highway #25 on the south to FSR 704 and 708 on the north. For a detailed description of the planning area, see Chapter 1.A, pg. 5.

The Pine Flat 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 woodpeckers, but also for Bachman's sparrows, brown-headed nuthatch, prairie warbler, northern bobwhite quail, and southeastern American kestrels, 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.

Environmental Effects:

Alternative A – No Action

Current forest conditions in the Pine Flat 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 loblolly stands on native longleaf sites will shift stand composition and structure, but restoration of stand function will be constrained by limited midstory control treatments. While prescribed fire will control some hardwood midstory, establishment of an herbaceous understory will be difficult to achieve because hardwood midstory species have developed to a point where reduction and control by prescribed fire will be mostly ineffective.

Thinning of overstocked longleaf over 40 years old will alter stand structure and decrease canopy closure, but restoration of stand function will be limited by the lack of midstory control treatments for stands where there is not a decision to implement midstory control. While prescribed fire will control some hardwood midstory in these stands, establishment of an herbaceous understory will be difficult to achieve because hardwood midstory species have developed to a point where reduction and control by prescribed fire will be mostly ineffective.

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.

Thinning of overstocked longleaf pine under 40 years old 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 midstory control and prescribed fire is utilized to promote and maintain an herbaceous understory.

The current road system in the Pine Flat 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, 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 loblolly stands existing on native longleaf sites by removing approximately half of the existing stems:** The primary objective of this treatment is to restore native species to native sites while also restoring the desired composition, structure, and function of these stands. Thinning, which is the result of a prior decision, will decrease canopy closure. Addition of midstory treatments in these areas through the proposed action will help control the hardwood midstory present in these stands and expedite establishment of an herbaceous understory. This treatment will result in a rapid change in stand composition and structure coupled with a more gradual and long-term change in stand function as midstory control treatments and application of prescribed fire are 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 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 overstocked longleaf, 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 Pine Flat Planning Area are discussed in section 3.F. Decommissioning of closed roads will not alter vehicle access and will not impact wildlife resources in the area. Changing status of 1.8 miles of seasonally closed road to year-round closed will slightly decrease disturbance to wildlife from spring through early fall. Maintaining road 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.

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 Pine Flat planning area and are summarized in **Table 3.G.2**.

Wood thrush
Wood thrush habitat exists within the Pine Flat 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 Pine Flat 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, clearcuts 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 Pine Flat 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, clearcuts, 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 large 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 Pine Flat 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 large 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 Pine Flat planning area because the area is predominately forested. Existing habitat consists of managed openings and recent clear cut areas.

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.

Table 3.G.2: Expected population trends[1] 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) –

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 Pine Flat 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 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 NFsAL 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.2).**

Affected Environment:
The PFIRRP area consists of 5,750 acres of NFS lands located in the west central portion of the TNF, Oakmulgee District in Bibb and Hale Counties, Ala. The area is inventoried as Oakmulgee Compartments 40, 41, 52, and 53. The planning area lies 12 miles south of Tuscaloosa, Ala., and 14 miles northeast of Greensboro, Ala. It extends from Hale County Highway #53 (Clary Hill Road) on the west, to Hale County Highway #49 and Forest Service Road (FSR) 715 on the east, and Alabama Highway #25 on the south to FSR 704 and 708 on the north. For a detailed description of the planning area, see Chapter 1.A, pg. 5.

Environmental Effects:
Alternative A – No Action
In 2006, there were 20 documented NNIPS infestations within the Pine Flat planning area (**Table 3.H.1: Known non-native invasive plant species within the Pine Flat Planning Area**). Over the past six years there have been ongoing control efforts and currently the twenty known infestations have been greatly reduced. Currently, NNIPS species include cogongrass, kudzu, mimosa, privet, and Japanese climbing fern. Of these sites, 1 active cogongrass site, 4 active kudzu sites, and 1 active Japanese climbing fern site remain. 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.

Table 3.H.1: Non-native invasive plant species within Pine Flat Planning Area (Treated 2006-2012)					
Common Name	**Scientific Name**	**Priority**	**Location**	**Size**	**Current Status**
Cogongrass	*Imperata cylindrica*	High	T23N, R6E, Sec. 34	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 2	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 2	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 3	< 1 ac	Active
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 14	< 1 ac	Controlled*
Cogongrass	*Imperata cylindrica*	High	T22N, R6E, Sec. 14	< 1 ac	Controlled*
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 2	1.2 ac	Active
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 1	0.2 ac	Active
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 11	0.6 ac	Active
Kudzu	*Pueraria montana*	High	T22N, R6E, Sec. 11	1.3 ac	Active
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 2	< 1 ac	Controlled*
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 2	< 1 ac	Controlled*
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 11	< 1 ac	Controlled*
Mimosa / Silktree	*Albizia julibrissin*	Low	T22N, R6E, Sec. 23	< 1 ac	Controlled*
Japanese climbing fern	*Lygodium japonicum*	Low	T22N, R6E, Sec. 23	<1 ac	Active
* 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**.

Figure 3.H.2: 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 get 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.

Alternative B – Proposed Action:
Implementation of the proposed action will also involve risk of NNIPS introduction and spread in the Pine Flat 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**.

Figure 3.H.3: 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.	

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 Pine Flat 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 Pine Flat 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 3 consecutive years.
    a. Monitor known infestations.
        i. Known infestations (active and controlled) within the Pine Flat 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 3 consecutive years after control is achieved.
    b. Survey the planning area.
        i. Surveys for NNIPS will occur within the Pine Flat planning area throughout project implementation and for 3 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 Pine Flat 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 Pine Flat 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 –

Affected Environment: Climate change can affect the resources in the Pine Flat 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 CO_2 emissions by forests, increasing CO_2 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).

[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 CO_2 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.

Carbon dioxide and water vapor generally make up over 90 percent of the total emissions from wildland fire (Hardy, Ottmar et al. 2001), releasing approximately 3,000 pounds of CO_2 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 CO_2 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).

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 CO_2 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).

Direct, Indirect Effects of Alternative B:

The impacts of the action alternative on global carbon sequestration and atmospheric concentrations of CO_2 are miniscule. However, the forests of the United States reduce atmospheric concentrations of CO_2 resulting from fossil fuel emissions. The forest and wood products of the United States currently sequester approximately 200 teragrams[2] of carbon per year (Heath and Smith, 2004). This rate of carbon sequestration offsets approximately 10% of CO_2 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 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 which may be more resilient to changes in climate. There will be a direct, short-term (length of time the p-burn 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 p-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

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

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.

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.1: 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 road decommissioning and maintenance costs are addressed in Chapter 3, Section F.

The calculations listed in **Figure 3.J.1** 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.

Figure 3.J.1: Summary of Economic Considerations by Alternative

	ALT A	ALT B
Estimated Volume		
AOC 1 (22 CCF/ac)	13,895	1,395
AOC 2 (12 CCF/ac)	180	3,436
AOC 3 (10 CCF/ac)	2,444	1,230
AOC 4 (15 CCF/ac)	8,055	14,265
AOC 5 (7.5 CCF/ac)	270	4650
	24,844	**24,976**
Estimated Value	**$1,242,200.00**	**$1,248,800.00**
Reforestation Costs		
Site Prep Herbicide ($235/ac)	$149,460	$47,705
Site Prep Burning ($38/ac)	$24,168	$7,714
Site Prep Mulching ($350/ac)	0	$293,650
Planting ($208/ac)	$132,288	$42,224
Release Herbicide ($235/ac)	$149,460	$47,705
	$455,376.00	**$438,998.00**
Woodland Treatments		
Midstory Cut/Leave ($151/ac)	$29,294	$263,948
Midstory Mulch ($350/ac)	0	$807,100
Midstory Herbicide ($216/ac)	$9,750	$495,936
	$39,044.00	**$1,566,984.00**
RCW Artificial Cavities		
Insert Installation ($120/ea.)	$1,200	$7,200

Note: Prescribed fire is not included in this assessment as the prior decision affects the entire planning area and the cost will be the same regardless of the alternative.

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 benefits 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 may other products sold to

wholesale and retail distributers. 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-tern benefits both economically and ecologically. Economic benefits include a restored landscape of higher value longleaf trees replace declining loblolly pine trees. This in turn will create woodlands stocked with healthy longleaf pine, 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 an increased long-term benefits resulting from healthy sustainable forests and woodlands.

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

This section is written as a Biological Evaluation and will be sent to U.S. Fish and Wildlife Service for (informal consultation) review. Concurrence from U.S. Fish and Wildlife Service will be required before a decision on the proposed action can be made.

This Biological Evaluation (BE) summarizes and documents the process and makes determinations regarding the effects on the Proposed, Endangered, Threatened, and Candidate species of the Oakmulgee Ranger District for management activities as proposed within the Pine Flat Integrated Resource Restoration Project (PFIRRP). The affected areas are within Compartments 40, 41, 52, and 53, and are shown on the maps in Sections II and III of this BE, and the PFIRRP Environmental Analysis. The proposed project will restore and maintain resiliency in native ecosystems within the Pine Flat planning area of the Oakmulgee Ranger District on the Talladega National Forest.

A Biological Evaluation, in coordination with informal consultation with the U.S. Fish and Wildlife Service (USFWS), is required for proposed U.S. Forest Service management actions that have the potential to affect Proposed, Threatened, Endangered and Candidate Species.

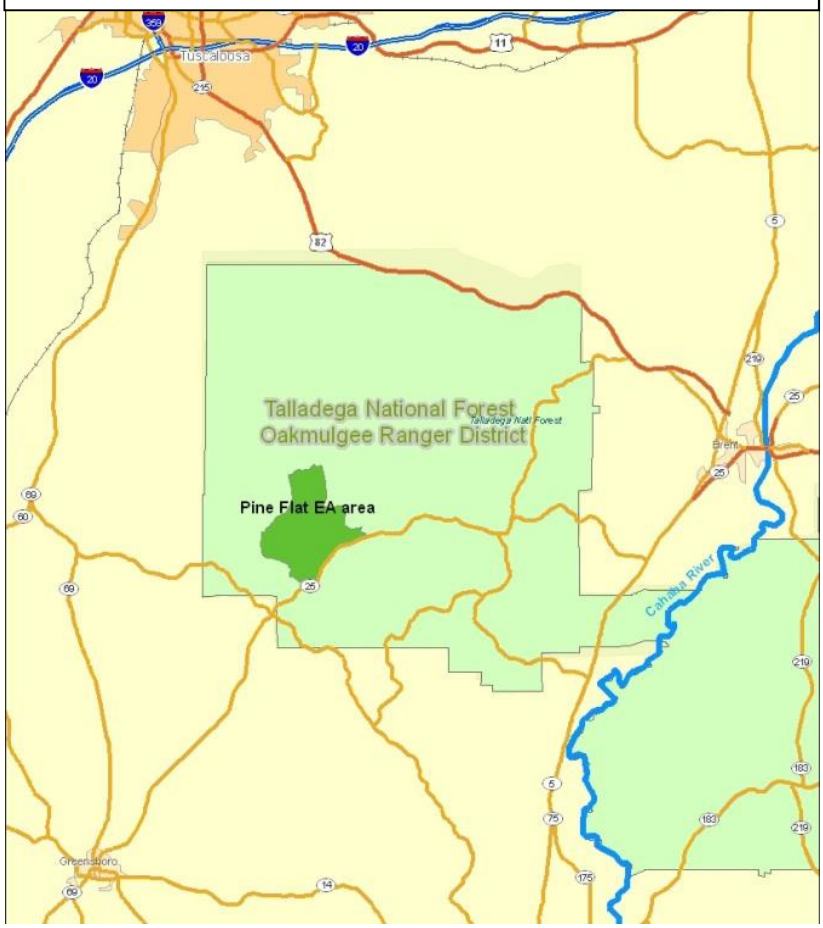
Forest Service Manual 2670.31 requires the Forest Service to review management actions to determine the potential effects upon threatened and endangered species and species proposed for listing. In addition, the Forest Service shall initiate consultation with the USFWS when the agency determines that proposed activities may have an effect on threatened or endangered species; is likely to jeopardize the continued existence of a proposed species; or result in the destruction or adverse modification of critical or proposed critical habitat. In conjunction with the regulatory agencies, actions should be taken to identify and prescribe measures to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened and proposed species. The objectives of this biological evaluation are to determine the effects of the proposed actions on Federally Proposed, Threatened, Endangered and Candidate species and their habitats that may occur within the planning areas.

Note: Figures in this BE are labeled in the same manner as the respective figures found in the project EA for consistency between the documents.

Affected Area:

The PFIRR Planning area consists of 5,750 acres of NFS lands located in the west central portion of the TNF, Oakmulgee District in Bibb and Hale Counties, Ala. The area is inventoried as Oakmulgee Compartments 40, 41, 52, and 53. The planning area lies 12 miles south of Tuscaloosa, Ala., and 14 miles northeast of Greensboro, Ala. It extends from Hale County Highway #53 (Clary Hill Road) on the west, to Hale County Highway #49 and Forest Service Road (FSR) 715 on the east, and Alabama Highway #25 on the south to FSR 704 and 708 on the north. **Reference Figure 1.A.1-1: Pine Flat Planning Area Vicinity Map** below. *Note: Figures in this BA are labeled in the same manner as the respective figures found in the project EA for consistency between the documents.*

Figure 1.A.1-1: Pine Flat Planning Area Vicinity Map



The Pine Flat planning area has been inventoried and mapped within three forest communities using the definitions outlined in the Forest Plan. These forest communities are described as existing conditions on the landscape. Current conditions were determined using satellite imagery and on-the-ground stand examinations. Acreages within each community type are displayed in **Figure 1.A.3-1** (see below).

Figure: 1.A.3-1: Forest and Non-forest Communities within Pine Flat Planning Area		
Forest Communities	**Acres**	**Percentages**
Upland Longleaf Pine Forest & Woodland	2,546	44%
Dry and Dry-Mesic Oak-Pine Forest	2,280	40%
Mesic Deciduous Forest	757	13%
Sub-Total	**5,583**	**97%**
Non-Forest Communities	**Acres**	**Percentages**
Wetlands	114	2%
Wildlife Openings	14	<1%
Roads	37	<1%
Sub-Total	**165**	**<4%**
TOTAL	**5,750**	

On the Oakmulgee District, xeric woodland types are situated on the top of the ridges and are generally very narrow, rocky and run the length of the ridge, one to 35 acres in size. Oakmulgee soils associated with this biome include Maubila flaggy loam, Maubila-Smithdale, and Maubila-Smithdale-Boykin Complex. The dry soil conditions slow the growth of longleaf competitors. In the Pine Flat planning area, there are 39 ridge tops of xeric pine and pine oak forest type containing approximately 670 acres along with smaller inclusions on soils and vegetative conditions of this forest type. The xeric pine forest community is at the center of each of the six active RCW clusters found in the Pine Flat planning area.

The dry and dry-mesic oak-pine forest community type is comprised of shortleaf and loblolly pine with mixed southern red oak, white oak, black oak, and northern red oak on the Oakmulgee District. Native conditions for this community occurs mid-slope as the site transitions from upland pine into moist hardwood drains. Non-native conditions exist from off-site conversions and afforestation efforts. As inventoried, 2,053 acres of loblolly and shortleaf exist on sites that are suited for longleaf and woodland communities.

The mesic deciduous forests include the River Floodplain, Dry Mesic Oak and Mixed Mesophytic communities and are found on more moist soils. Below the upper ridges and positions on the landscape where longleaf primary and secondary soils reside, a “transition” occurs where soil moisture and fertility from organic matter combined with less intense fire activity create stands of mixed hardwoods and pine species.

Non-forested areas within the planning area include seven permanent wildlife openings and 7 linear strips (14 acres total), Payne Lake (110 acres), and various Rights of Way (37 acres) including those along Hale County Road 49 and Alabama Highway 25.

In the 5,750 acre Pine Flat planning area, 3,379 (59%) acres are soils mapped as primary longleaf soils; 1,314 (23%) acres, located on ridges and south facing slopes are mapped as secondary longleaf soils for a total of 4,693 acres. Of those 4,693 acres 2,546 (54%) are currently stocked with longleaf. As a result of the 2011 tornadoes, 301 acres were planted or determined to have sufficient natural regeneration; 121 acres were recently thinned and now have an open canopy; and the remaining 1,269 acres have a dominant longleaf overstory but are heavily stocked averaging 120-140 ft2 Basal Area (BA). In many cases longleaf in the 11-20 year age class has heavy loblolly stocking.

2,053 (36%) acres are currently stocked with loblolly pine, shortleaf pine and mixed 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 include thinning crowns, chloric crowns and excessive cone production. These stressors lower the resilience of these stands to natural events. Younger loblolly stands on longleaf sites are generally more susceptible to insect infestation, especially when in over stocked conditions.

There are six active RCW clusters within the Pine Flat planning area. Currently, none of the stands containing active cluster trees provide Good Quality Foraging Habitat, as defined by the RCW

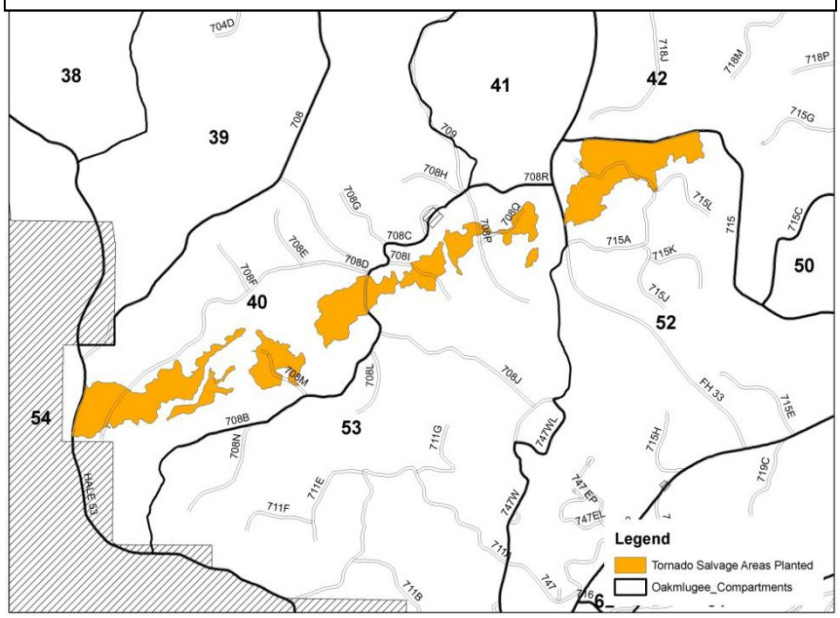
Recovery Plan. Existing conditions related to RCW's and other relevant federally listed species are further discussed in their respective parts of Section IV (Species Considered and Evaluated) of this BE.

Proposed Management Actions: The goals of the PFIRRP 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.). 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 PFIRRP, 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 Pine Flat planning area. The proposed actions are described as the maximum treatment considered for the area.

- **Manage Forest and Woodland Ecosystems:** To continue species restoration of the longleaf pine damaged by the April 2011 tornadoes and subsequently salvaged and planted to longleaf seedlings, or identified as natural regeneration, by **treating 301 acres with herbicide** to reduce the competition from light seeded and coppiced hardwood species. The proposed herbicides are Triclopyr and Imazapyr. (**Reference Figure 1.A.2-4** below)

Figure 1.A.2-4: Tornado Salvage Area and Restoration

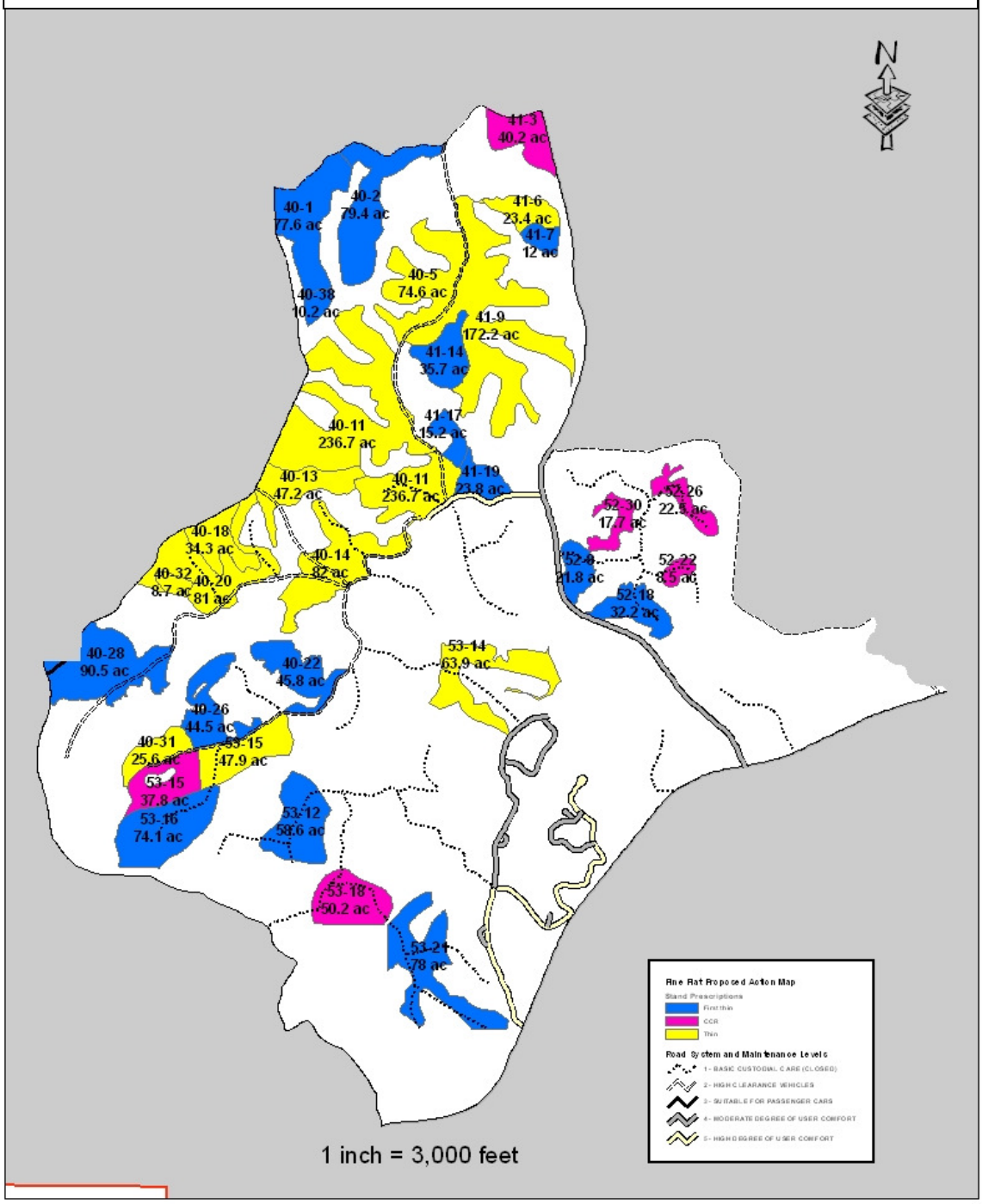


- **Manage Forest and Woodland Ecosystems:** To restore longleaf pine species (using **clear-cut with reserve harvest**) on approximately **203 acres** currently stocked with loblolly and/or shortleaf pine currently exhibiting signs of decline. These are areas predominately located on primary and/or 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 0.5 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. (**Reference Figure 3.K.1** (**Clearcut Reserve**)).

- **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine on approximately **951 acres** over age 40 to establish open park-like forest conditions by commercially thinning including construction and restoration of 1.6 miles of temporary haul roads and a follow-up midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching. **(Reference Figure 3.K.1 (Intermediate Thin))**
- **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine to establish open park-like forest conditions by either commercially thinning or cut and leave thinning approximately **620 acres** of planted longleaf 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 2.0 miles of temporary haul roads. **(Reference Figure 3.K.1 (First Thin) below)**

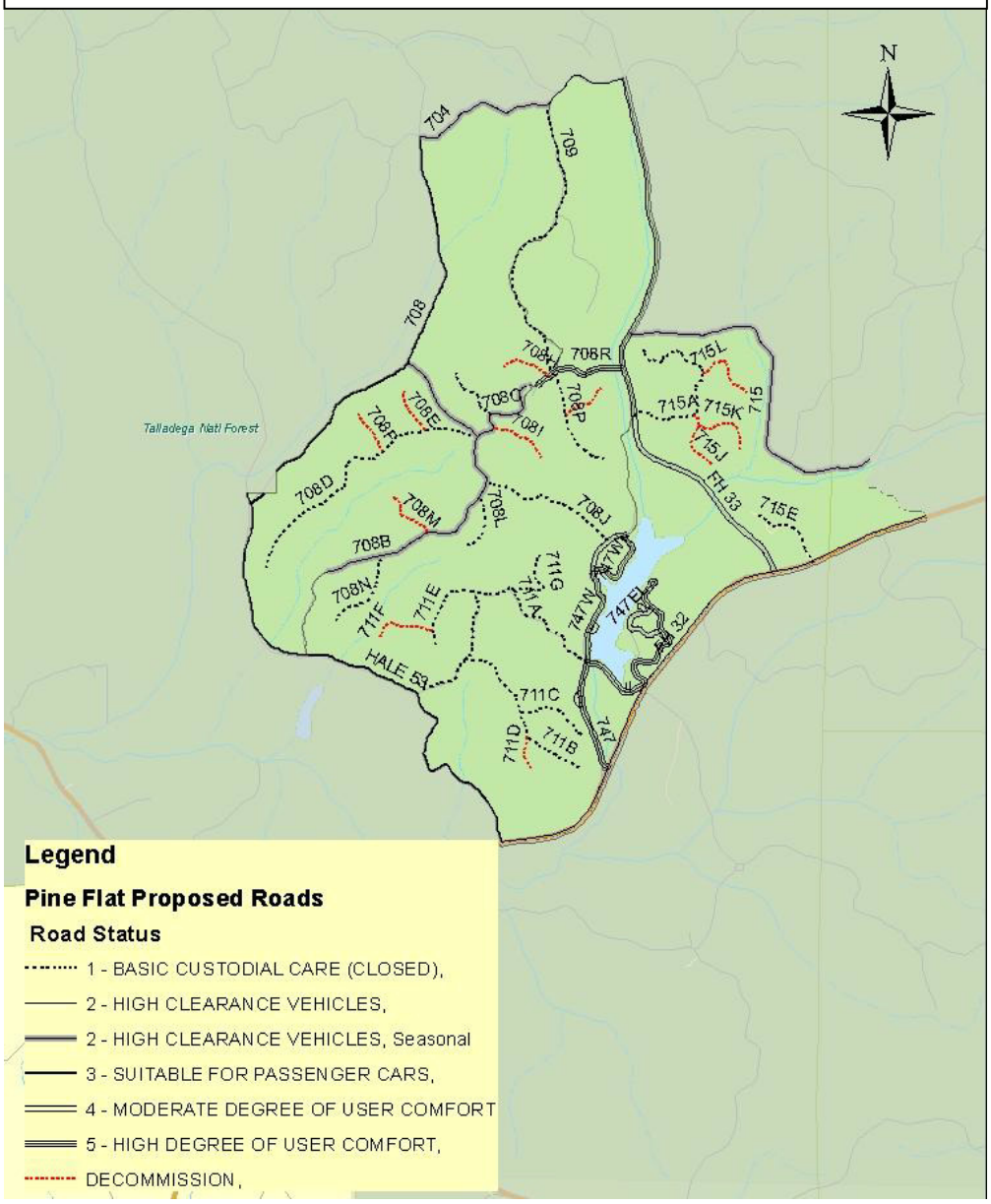
Figure 3.K.1: Map of Proposed Timber Actions – Forest and Woodland Ecosystems



- **Manage Forest and Woodland Ecosystems:** To perform follow-up midstory treatment of cut and leave and/or herbicide application (Triclopyr), and/or mechanical mulching on **2,342 acres**. *Note: Commercial harvest of these areas has been addressed in prior decision documents.*

- **Manage Forest and Woodland Ecosystems:** Add mechanical mulching as a potential treatment for site preparation on **839 acres** prior to hand planting longleaf seedlings. *Note: Commercial harvest of some of these areas have been addressed in prior decision documents*.
- **Recovery of Federally listed Threatened and Endangered Species:** Restore and maintain Good Quality Foraging Habitat (GQFH) for the six currently active RCW clusters by maintaining 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.
- **Recovery of Federally listed Threatened and Endangered Species:** Establish and maintain suitable habitat to recruit five new RCW clusters by establishing recruitment nesting habitat with a minimum of four suitable cavities, as defined by the RCW Recovery Plan, per cluster. Actual cluster locations will be designated (within the project planning area) after harvest activities are completed. This includes annual maintenance and replacement of artificial cavities and annual maintenance of natural cavities.
- **Support Desirable Levels of Selected Species:** Maintain permanent early seral stage habitat to support wildlife habitat and hunter success by annual mowing, disking, fertilizing, liming and seeding of **6.4 acres** of existing linear strips.
- **Nature-based Recreation/Safe and Efficient Access:** Enact opportunities for increased efficiency documented in the *Transportation Analysis Report V 1.0 Oakmulgee Ranger District, National Forests in Alabama October 2011* by decommissioning **3.7 miles** of roads currently listed as permanently closed by removing them from inventory, thus eliminating the need for future maintenance and use. Roads proposed for decommissioning include 708E, 708F, 708H, 708I, 708M, 708Q, 711D, 711F, 715J, 715K, 715L, see **Figure 1.C.4: Pine Flat Planning Area – Proposed Road Status Changes**.
- **Nature-based Recreation/Safe and Efficient Access:** Maintain and enhance proposed Forest Service maintained roads by treating the **26.4 miles** of roadsides, (**Reference Figure 1.C.2-1**) 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 NNIPS, and reduce the frequency of roadside mowing. Treatment area would extend 10 feet from road edges, totaling 64 acres. Roads would be treated on a 1-2 year rotation. Roadside mowing would occur as needed.
- **Nature-based Recreation/Safe and Efficient Access:** Enact opportunities for increased efficiency documented in the *Transportation Analysis Report V 1.0 Oakmulgee Ranger District, National Forests in Alabama October 2011* by changing status of FSR 708D from seasonal (open 10/16 – 04/30) to **closed on 1.8 miles**. (**Reference Figure 1.C.4: Pine Flat Planning Area – Proposed Road Status Changes**).

Figure 1.C.4: Pine Flat Planning Area - Proposed Road Status Changes & Maintenance



- **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 (when and wherever infestations are found within the Pine Flat Planning Area). *Note: This activity would include site-specific PETS analysis prior to treatment.*

Species Considered and Evaluated: The most recent list of species from the USFWS, the FEIS for the Revised Land and Resource Plan (NF in Alabama, January 2004; RLRMP) and databases maintained by the Forest Service were reviewed to develop a list of federally listed species that were concerned with this planning area. This list was refined by examination of distribution and habitat data for the species. Refer to **Table 1** below for PETC 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. No listed fish or aquatic mussels or snails are known from, or immediately downstream of, the planning

area and no critical habitat occurs within, or immediately downstream of, the planning area. Therefore the fish and other aquatic species listed below are excluded from further analysis. Tennessee yellow-eyed grass, Mohr's Barbara's buttons, Georgia rockcress, and Alabama canebrake pitcher plant are not known from within the planning area and the planning area does not contain ideal habitat for those plant species. Therefore they are also excluded from further analysis. Red-cockaded woodpecker, wood stork (seasonally), and Mitchell's satyr are known from or near the planning area will be analyzed in detail.

Table 1: Proposed, Endangered, Threatened and Candidate Species Considered and Included/Excluded from Analysis –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, 2013).

Summary: PETC species	Habitat	Occurrence on Talladega NF, Oakmulgee RD	Considered but Excluded from Analysis	Considered in BE
Endangered: Red-cockaded woodpecker (*Picoides borealis*)	Open pine forests with large, old trees.	Many active cluster sites		✓
Wood stork (*Mycteria americana*)	Shallow freshwater and estuarine wetlands	Infrequent sightings		✓
Alabama canebrake pitcher plant (*Sarracenia rubra var al*)	Acidic, highly saturated deep, peaty sands or clay.	One known occurrence on private land within proclamation boundary of Oakmulgee	✓2	
Tennessee yellow-eyed grass (*Xyris tennesseensis*)	Thinly wooded, moist to wet calcareous soils along streams.	Just below fall line in Bibb County. No known occurrences	✓1,2	
Mitchell's satyr (*Neonympha mitchellii*)	Rush-sedge marshes, forest swamps, and beaver ponds.	All known occurrences are on the western portion of the Oakmulgee		✓
Cahaba shiner (*Notropis cahabae*)	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 (*Scaphirhynchus suttkusi*)	Endemic to Mobile River Basin. Free-flowing rivers over stable gravel and sand substrates.	Recent reported captured on the lower Cahaba River in July 2000.	✓1,2	
Ovate clubshell mussel (*Pleurobema perovatum*)	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 (*Pleurobema decisum*)	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 (*Ptychobranchus foremanianus*)	Endemic to the 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 known from the Cahaba River near Oakmulgee	✓1,2	

Flat pebbesnail (*Lepyrium showalteri*)	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 (*Lioplax cyclostomaformis*)	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 of the Cahaba above the fall line.	✓1,2	
Threatened: Fine-lined pocketbook (*Hamiota altilis)*	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 (Leptoxis ampla)	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 (*Potamilus inflatus*)	Black Warrior River, Big Sandy Creek and Elliott's Creek, are tributaries which is occupied by the Inflated heelspliter. Clean gravel riffles with some current.	No known occurrences	✓1,2	
Alabama moccasinshell (*Medionidus acutissimus*)	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 (*Cyprinella caerulea*)	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 Oak. Mgmt actions.	✓1,2	
Goldline darter (*Percina aurolineata*)	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 (*Marshallia mohrii*)	Shale-bedded streams in a grass sedge community.	No known occurrences	✓2	
Candidate Georgia rockcress (*Arabis georgiana*)	Rocky limestone bluffs and slopes along water courses.	One known occurrence within proclamation boundary off NF lands.	✓2	
White-fringeless orchid *(Platanthera integrilabia)*	Wetland areas	No known occurrences	✓2	
Critical Habitat: Alabama sturgeon (Scaphirhynchus suttkusi)		Portions of the Cahaba River, that runs through the proclamation boundary of Oakmulgee.	✓2	

Notes:
[1] Planning areas are not within the species' range.
[2] Planning areas or their access routes are not appropriate nor potentially appropriate habitat for the species, or surveys have indicated the species is not present.
.

Survey and Consultation History: Various surveys and inventories targeting the endangered Mitchell's satyr and red-cockaded woodpecker, as well as the delisted bald eagle, have been conducted within the PFIRR planning area and known breeding populations for all three species exist within the planning area boundary.

Multiple surveys have been conducted within the planning area within the past decade for other rare plants and animals as well. All stands associated with the 2005 Oakmulgee Longleaf Restoration EIS (including Cmpt. 40/Stands 3, 9, 17, 21, 25, 27, and 29, Cmpt. 41/Stands 1, 3, 5, 10, 13, 15, and 16, Cmpt. 52/Stands 1, 2, 10, 19, 22, and 26, and Cmpt. 53/Stands 1, 6, 13, and 18, within the PFIRR Planning Area) were surveyed for rare plants by various botanists. On May 10 and 24, 2011, I surveyed (roadside and walking meander) a sample of the upland and riparian areas affected by the April 2011 tornado (shown in Figure 1.A.2-4) prior to the associated timber salvage operations performed by the District in 2011-12. A walking meander survey of the riparian areas affected by the April 2011 tornados was conducted by Al Schotz, Alabama Natural Heritage Program botanist, during the period of September 17-20, 2012. I surveyed (walking meander on March 18, 2013) Stand 18 of Compartment 53, Stand 30 of Compartment 52 and Stand 3 of Compartment 41, of the stands currently proposed for clearcut with reserve harvest/herbicide site prep in the PFIRR project, as well as all roadsides (driving roadside survey) currently proposed for vegetation maintenance via herbicide application. I also re-surveyed a portion of the tornado areas proposed for herbicide release in Compartment 40 on the same day. No other (besides RCW, Mitchell's satyr, or bald eagle) federally listed or Candidate plant or animal species were found during any of the above surveys.

I also queried the District GIS rare species/rare community database for existing PETC plant Element of Occurrence Records and found no Listed or Candidate plant species in the vicinity of the proposed project. Based on this information and the results of the surveys described above I eliminated all species in Table 1, except Red-cockaded woodpecker, Wood stork, and Mitchell's satyr.

John Moran, NFsAL Fisheries Biologist, was consulted (3-26-2013) to confirm that there were no new locations (based on any recent surveys) for aquatic species and critical habitats within the planning area.

Effects of Proposed Actions on Species Evaluated:

Red-cockaded Woodpecker (Endangered)

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.

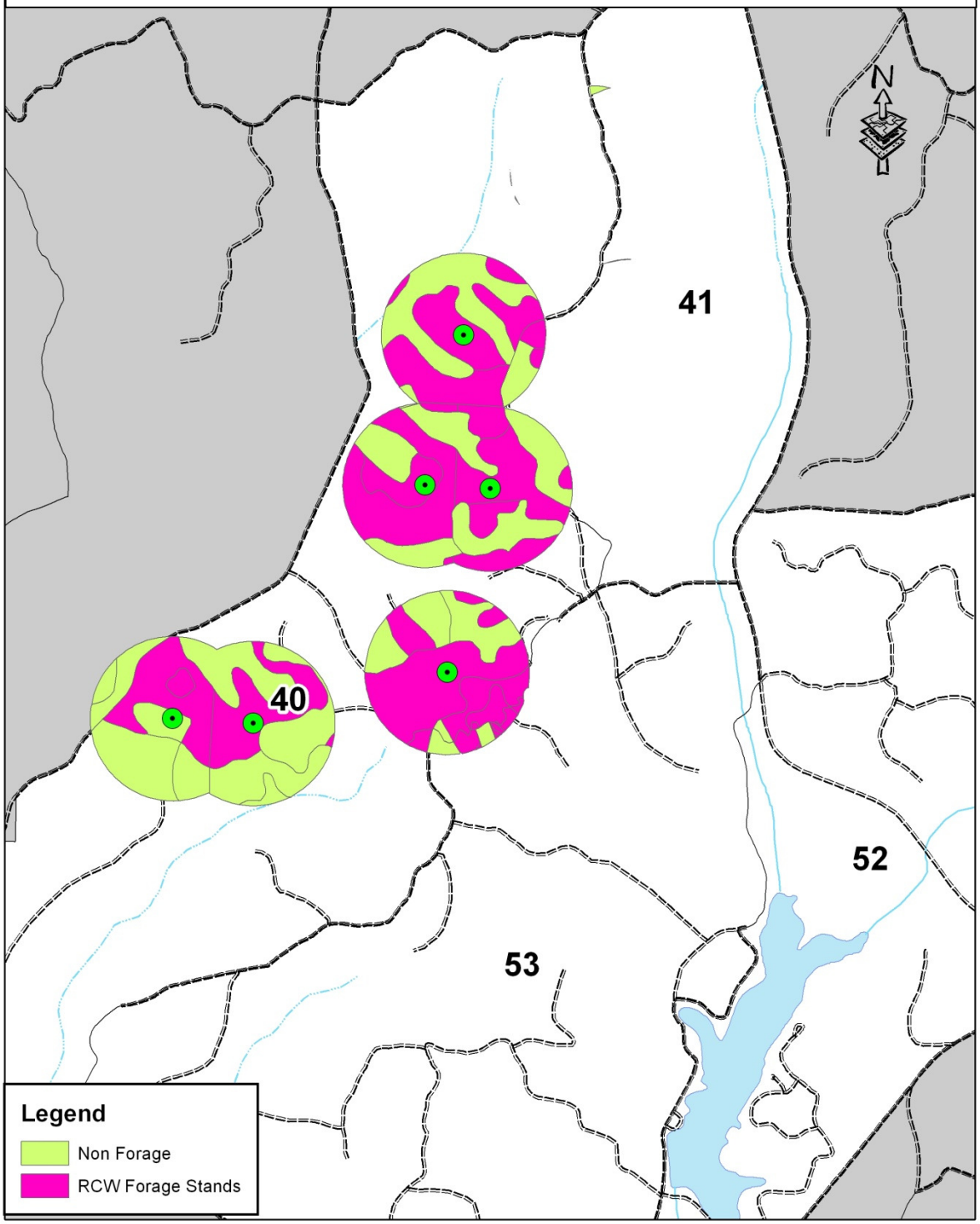
The Oakmulgee currently has approximately 116 active RCW clusters, with almost all of these occurring on the western half of the District. There are six active RCW clusters (family units) within the Pine Flat planning area. Currently, none of the stands containing active cluster trees meet the definition of Good Quality Foraging Habitat (GQFH) as defined by the RCW Recovery Plan. Monitoring conducted during the 2012 nesting season documented that each of the six 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 BA and midstory density levels are outside the GQFH criteria. Current conditions within the 0.25 mile foraging radius are illustrated in **Figure 1.A.3-4: RCW Habitat Conditions**.

Timber thinnings and midstory treatments are proposed for the stands containing all 6 of the existing active RCW clusters 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. Approximate acres within the .25 mile foraging partitions that will be moved towards GQFH by the proposed actions are as follows: Cluster 223; 67 acres, Cluster 224; 70.4 acres, Cluster 225; 55 acres, Cluster 226; 51 acres, Cluster228; 62 acres, and Cluster 439; 57 acres (See **Figure 3.K.2**). Additional thinning and midstory treatment in adjacent stands will add acreage of GQFH to each cluster. In this particular proposed project , no clearcut (restoration) harvest is proposed within the 0.5 mile foraging partition of any of the 6 active RCW clusters.

Figure 1.A.3-4: RCW Habitat Conditions within 0.25 mile foraging partitions

Cluster #	Total Stand Density (BA)	Longleaf Composition within stand (BA)	Average Pine DBH	Midstory Ranking	Midstory Species	Partition Acres	Potential Foraging Acres	.25 mi. Acres Improved By PFIRR
223	90	87	15”	Moderate 7’-15’	Hardwood	121	81	67
224	105	86	17”	Moderate 7’-15’	Hardwood/Pine	92	82	70
225	97	83	16”	Moderate 7’-15’	Hardwood	101	89	55
226	97	83	16”	Moderate 7’-15’	Hardwood/Pine	100	92	51
228	108	88	16”	Moderate 7’-15’	Hardwood	126	94	62
439	105	86	17”	Moderate	Hardwood/Pine	96	78	57

Figure 3.K.2: Proposed thinnings within the 0.25 mile foraging partitions (active clusters shown with red boundaries) that will improve habitat for the six active RCW clusters within the Planning Area



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 BE (and concurrence from FWS) would be required.

No other proposed activity (including site prep., planting, herbicide application, road closures/decommissioning, 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 .5 mile partitions) will increase the acreage moving towards GQFH and is expected to increase fitness in all six Potential Breeding Groups (PBGs) over the next few years. Herbaceous understory response is also expected to be higher and therefore more consistent with GQFH requirements, with the reduction of the current BA of the existing longleaf stands.

Approximately 203 acres of clear-cut with reserve treatments are proposed within the Planning Area (see **Figure 3.K.1**), however none of these areas are within the .5 mile foraging partitions of any active clusters and any potential negative short-term effects would be negligible. I surveyed a sample of these stands and none are 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. Decommissioning/closure of the 7 road segments associated with FSR 708 may reduce some traffic by the public into foraging and nesting areas, thus reducing disturbance during some times of the year, but these potential benefits would be minor. SPB infestations would be analyzed on a case-by-case basis and risks to RCWs would be analyzed prior to treatment. If indirect effects (outside the scope of the non-SPB harvest activities discussed in this BE) are determined in the analysis, a new BE (and concurrence from FWS) would be required for SPB activities.

Hardwood midstory and rootstock sprouts treatments (with herbicide) would promote a more herbaceous understory, and thus would likely increase cluster fitness . No measurable indirect effects from the proposed selective herbicides (regarding residues upon prey items) are expected. None of the other proposed silvicultural or administrative activities will have indirect effects on RCWs.

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.

Ongoing activities in the area include prescribed burning and recreation-related activities at Payne Lake. Recent timber treatments under previous decisions (including the Longleaf EIS-Payne Lake

timber sale, and the Pine Flat and Clary Hill tornado salvage projects) have occurred in the area and reforestation activities are planned for 2013 and 2014 for some of these areas. When combined with the past and ongoing activities, the proposed project should result in beneficial cumulative effects on the RCW.

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

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.

Several local Mitchell's satyr populations were located in 2004 in beaver impoundments along the stream that feeds Payne Lake, and a few individuals have been seen near the lake. There are also recorded occurrences in Sections 9 and 16 of T. 22 N., R. 6 E.

Direct Effects: Satyrs are present within the Planning Area. However, no timber harvest, midstory treatments, planting, or herbicide use is proposed in drains or wet areas (satyr habitat) within the planning 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. Decommissioning/closure of the 7 road segments associated with FSR 708 would have no measurable indirect effects on the butterfly.

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.

Ongoing activities in the area include prescribed burning and recreation-related activities at Payne Lake. Recent timber treatments under previous decisions (including the Longleaf EIS-Payne Lake timber sale, and the Pine Flat and Clary Hill tornado salvage projects) have occurred in the area and reforestation activities are planned for 2013 and 2014 for some of these areas. However these areas are focused on uplands and not in satyr habitat. When combined with the past and ongoing activities, the proposed project should result in no cumulative effects on Mitchell's satyr.

Determination: Based on the above analysis, it is my determination that the proposed project is **"not likely to adversely affect"** Mitchell's satyr populations.

Wood stork (Endangered)

The United States breeding population of wood storks is listed as an endangered species. This species may have formerly bred in all the coastal Southeastern United States from Texas to South Carolina. Currently, they breed throughout Florida, Georgia, and coastal South Carolina Post-breeding storks from Florida, Georgia, and South Carolina occasionally disperse as far north as North Carolina and as far west as Mississippi and Alabama. The estimated total population of nesting storks throughout the southeastern United States declined from 15,000 to 20,000 pairs during the 1930's to a low of between 4,500 and 5,700 pairs for most years between 1977 and 1980. Since 1983, the U.S. population has ranged between 5,500 and 6,500 pairs. Factors contributing to the decline include loss of feeding habitat, water level manipulations affecting drainage, predation and/or lack of nest tree regeneration, and human disturbance (U. S. Fish and Wildlife Service 1996).

Wood storks use a variety of freshwater and estuarine wetlands for nesting, feeding, and roosting. Freshwater colony sites must remain inundated throughout the nesting cycle to protect against predation and abandonment. Foraging sites occur in shallow, open water where prey concentrations are high enough to ensure successful feeding. Good feeding conditions usually occur where the water column is uncluttered by dense patches of aquatic vegetation. Typical foraging sites throughout the

species range include freshwater marshes and stock ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, managed impoundments and depressions in cypress heads and swamp sloughs. Almost any shallow wetland depression where fish become concentrated, either through local reproduction or the consequences of area drying may be used as feeding habitat (U. S. Fish and Wildlife Service 1996).

The wood stork is fairly common but irregular in the coastal plain of Alabama in the summer and fall, and farther north it is rare to uncommon. I have observed small groups of transient storks as far north as Coosa and Talladega counties but this is very uncommon. Wood storks are not known to be present during breeding or wintering seasons on the TNF, Oakmulgee District. Occasional transients may exploit seasonal wetlands on the Oakmulgee as post-breeding storks disperse in the late summer and fall.

Direct Effects: No measurable direct effects are expected to wood storks since they are not believed to reside or breed in the planning area.

Indirect Effects: No measurable indirect effects are expected as the proposed activities are focused on upland ecosystems and no manipulation of wetlands or swamps is proposed. No direct or indirect effects are expected from herbicide applications (including silvicultural, maintenance, or wildlife stand improvement applications).

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 storks.

Ongoing activities in the area include prescribed burning and recreation-related activities at Payne Lake. Recent timber treatments under previous decisions (including the Longleaf EIS-Payne Lake timber sale, and the Pine Flat and Clary Hill tornado salvage projects) have occurred in the area and reforestation activities are planned for 2013 and 2014 for some of these areas. However these areas are focused on uplands and not in habitats used by wading birds. When combined with past and ongoing activities, the proposed project should result in no cumulative effects on Wood stork.

Determination: Based on the above analysis, it is my determination that the proposed project will have **"no effect"** on Wood stork populations.

Summary of Determinations for Species Evaluated:

Summary: PETC species	No Effect	Not likely to adversely affect	Likely to adversely affect
▪ Red-cockaded woodpecker		**X**	
▪ Mitchell's satyr		**X**	
▪ Wood stork	**X**		

L. Regional Forester's Sensitive Species –

This section is written as a Biological Evaluation for internal consideration. It will not be sent to U.S. Fish and Wildlife Service for review (informal consultation).

This Biological Evaluation (BE) summarizes and documents the process and makes determinations regarding the effects on the Regional Forester's Sensitive Species of the Oakmulgee Ranger District for management activities as proposed within the Pine Flat Integrated Resource Restoration (PFIRR) Project. The affected areas are within Compartments 40, 41, 52, and 53, and are shown on the maps in Sections II and III of the BE and in the PFIRR EA. The proposed project will restore and maintain resiliency in native ecosystems within the Pine Flat planning area of the Oakmulgee Ranger District on the Talladega National Forest.

All U.S. Forest Service planned, funded, executed, and or permitted program and activities require a biological evaluation (BE) as outlined in Forest Manual (FSM) Section 2672.41.

Affected Area: The PFIRR Planning area consists of 5,750 acres of NFS lands located in the west central portion of the TNF, Oakmulgee District in Bibb and Hale Counties, Ala. The area is inventoried as Oakmulgee Compartments 40, 41, 52, and 53. The planning area lies 12 miles south of Tuscaloosa, Ala., and 14 miles northeast of Greensboro, Ala. It extends from Hale County Highway #53 (Clary Hill Road) on the west, to Hale County Highway #49 and Forest Service Road (FSR) 715 on the east, and Alabama Highway #25 on the south to FSR 704 and 708 on the north. **Reference Figure 1.A.1-1: Pine Flat Planning Area Vicinity Map** below. *Note: Figures in this BE are labeled in the same manner as the respective figures found in the project EA for consistency between the documents.*

Figure 1.A.1-1: Pine Flat Planning Area Vicinity Map

The Pine Flat planning area has been inventoried and mapped within three forest communities using the definitions outlined in the Forest Plan. These forest communities are described as existing conditions on the landscape. Current conditions were determined using satellite imagery and on-the-ground stand examinations. Acreages within each community type are displayed in **Figure 1.A.3-1** (see below).

Figure: 1.A.3-1: Forest and Non-forest Communities within Pine Flat Planning Area

Forest Communities	**Acres**	**Percentages**
Upland Longleaf Pine Forest & Woodland	2,546	44%
Dry and Dry-Mesic Oak-Pine Forest	2,280	40%
Mesic Deciduous Forest	757	13%
Sub-Total	**5,583**	**97%**
Non-Forest Communities	**Acres**	**Percentages**
Wetlands	114	2%
Wildlife Openings	14	<1%
Roads	37	<1%
Sub-Total	**165**	**<4%**
TOTAL	**5,750**	

On the Oakmulgee District, xeric woodland types are situated on the top of the ridges and are generally very narrow, rocky and run the length of the ridge, one to 35 acres in size. Oakmulgee soils associated with this biome include Maubila flaggy loam, Maubila-Smithdale, and Maubila-Smithdale-Boykin Complex. The dry soil conditions slow the growth of longleaf competitors. In the Pine Flat planning area, there are 39 ridgetops of xeric pine and pine oak forest type containing approximately 670 acres along with smaller inclusions on soils and vegetative conditions of this forest type. The xeric pine forest community is at the center of each of the six active RCW clusters found in the Pine Flat planning area.

The dry and dry-mesic oak-pine forest community type is comprised of shortleaf and loblolly pine with mixed southern red oak, white oak, black oak, and northern red oak on the Oakmulgee District. Native conditions for this community occurs mid-slope as the site transitions from upland pine into moist hardwood drains. Non-native conditions exist from off-site conversions and afforestation efforts. As inventoried, 2,053 acres of loblolly and shortleaf exist on sites that are suited for longleaf and woodland communities.

The mesic deciduous forests include the River Floodplain, Dry Mesic Oak and Mixed Mesophytic communities and are found on more moist soils. Below the upper ridges and positions on the landscape where longleaf primary and secondary soils reside, a “transition” occurs where soil moisture and fertility from organic matter combined with less intense fire activity create stands of mixed hardwoods and pine species.

Non-forested areas within the planning area include seven permanent wildlife openings and 7 linear strips (14 acres total), Payne Lake (110 acres), and various Rights of Way (37 acres) including those along Hale County Road 49 and Alabama Highway 25.

In the 5,750 acre Pine Flat planning area, 3,379 (59%) acres are soils mapped as primary longleaf soils; 1,314 (23%) acres, located on ridges and south facing slopes are mapped as secondary longleaf soils for a total of 4,693 acres. Of those 4,693 acres 2,546 (54%) are currently stocked with longleaf. As a result of the 2011 tornadoes, 301 acres were planted or determined to have sufficient natural regeneration; 121 acres were recently thinned and now have an open canopy; and the remaining 1,269 acres have a dominant longleaf overstory but are heavily stocked averaging 120-140 ft2 Basal Area (BA). In many cases longleaf in the 11-20 year age class has heavy loblolly stocking.

2,053 (36%) acres are currently stocked with loblolly pine, shortleaf pine and mixed 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 include thinning crowns, chlorotic crowns and excessive cone production. These stressors lower the resilience of these stands to natural events. Younger loblolly stands on longleaf sites are generally more susceptible to insect infestation, especially when in over stocked conditions.

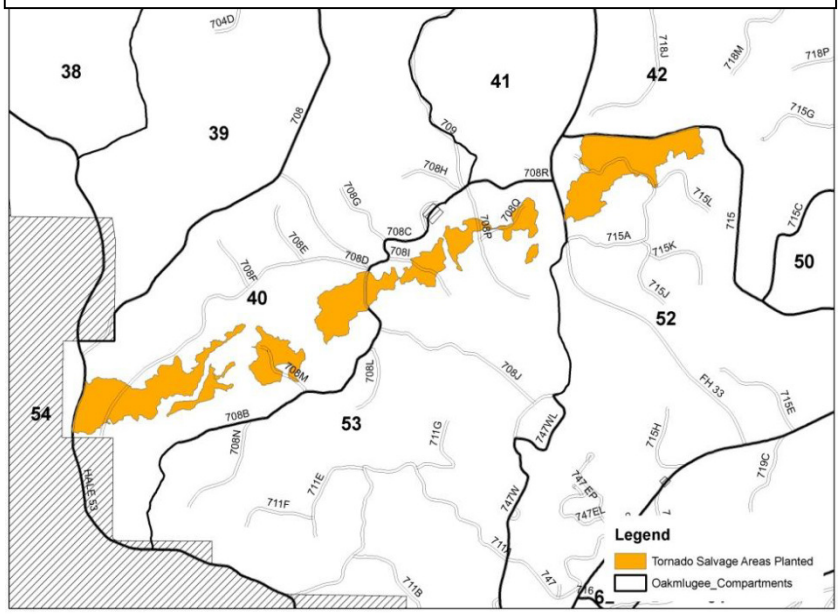
There are six active RCW clusters within the Pine Flat planning area. Currently, none of the stands containing active cluster trees provide Good Quality Foraging Habitat, as defined by the RCW Recovery Plan. Existing conditions related to RCW's and other relevant federally listed species are further discussed in their respective parts of Section IV (Species Considered and Evaluated) of this BE.

Proposed Management Actions: The goals of the PFIRRP 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.). 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 PFIRRP, 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 Pine Flat planning area. The proposed actions are described as the maximum treatment considered for the area.

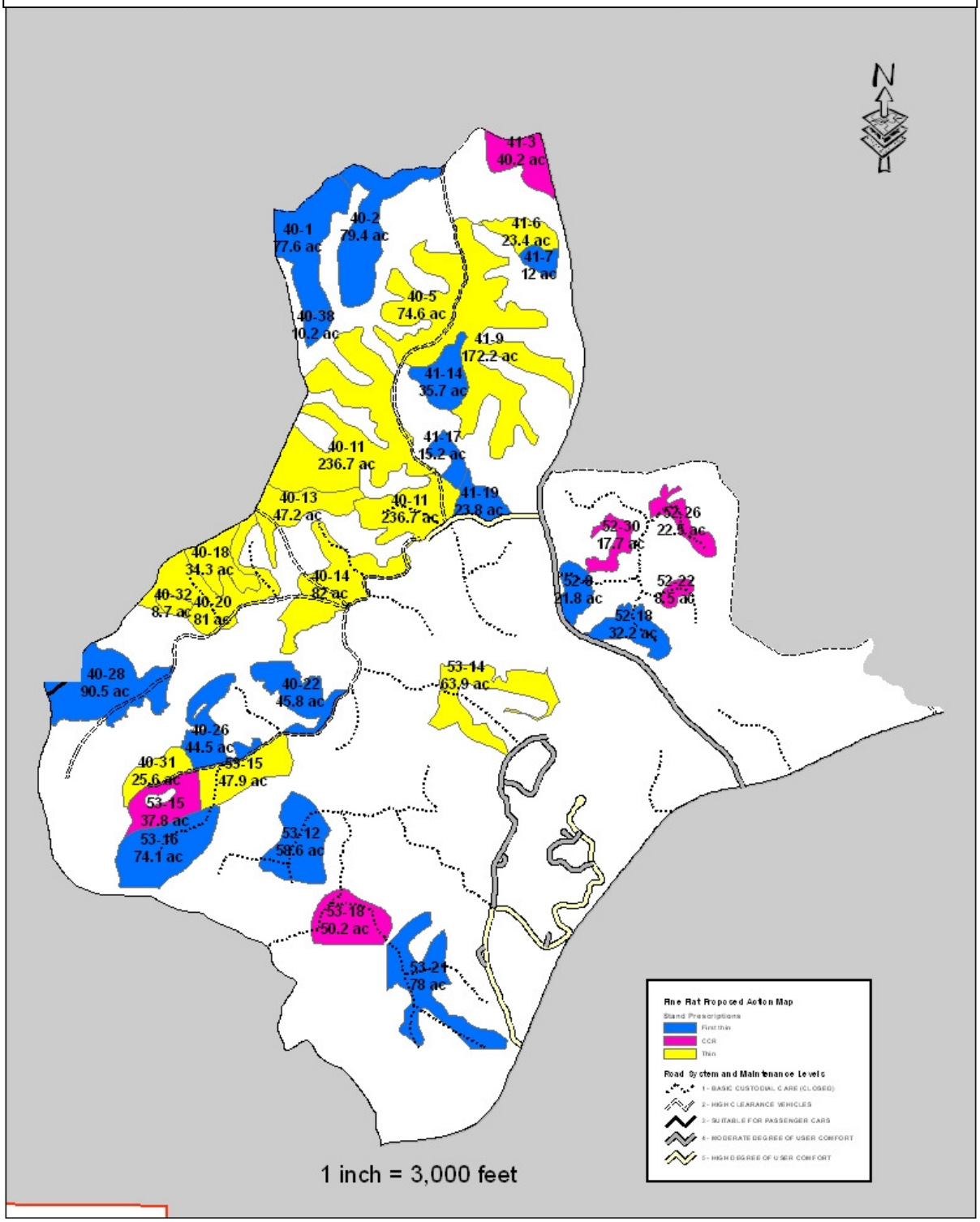
- **Manage Forest and Woodland Ecosystems:** To continue species restoration of the longleaf pine damaged by the April 2011 tornadoes and subsequently salvaged and planted to longleaf seedlings, or identified as natural regeneration, by **treating 301 acres with herbicide** to reduce the competition from light seeded and coppiced hardwood species. The proposed herbicides are Triclopyr and Imazapyr. (**Reference Figure 1.A.2-4** below)

Figure 1.A.2-4: Tornado Salvage Area and Restoration



- **Manage Forest and Woodland Ecosystems:** To restore longleaf pine species (using **clear-cut with reserve harvest**) on approximately **203 acres** currently stocked with loblolly and/or shortleaf 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 0.5 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. (**Reference Figure 3.K.1** (**Clearcut Reserve**)).
- **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine on approximately **951 acres** over age 40 to establish open park-like forest conditions by commercially thinning including construction and restoration of 2.5 miles of temporary haul roads and a follow-up midstory treatment of cut and leave, and/or herbicide application (Triclopyr), and/or mechanical mulching. **(Reference Figure 3.K.1 (Intermediate Thin))**
- **Manage Forest and Woodland Ecosystems:** To restore structure of longleaf pine to establish open park-like forest conditions by either commercially thinning or cut and leave thinning approximately **620 acres** of planted longleaf 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 2.0 miles of temporary haul roads. **(Reference Figure 3.K.1 (First Thin)** below.

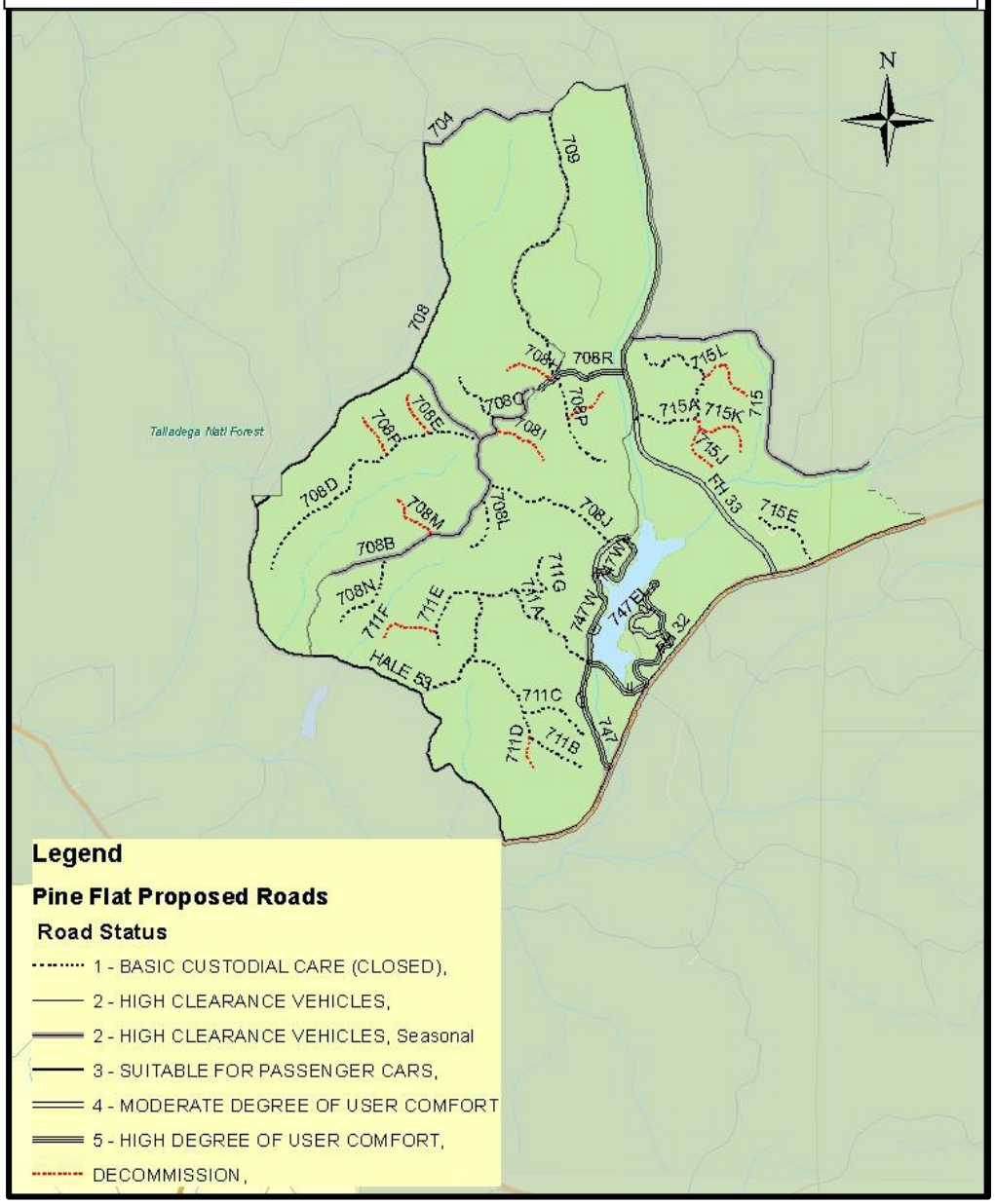
Figure 3.K.1: Map of Proposed Timber Actions – Forest and Woodland Ecosystems



- **Manage Forest and Woodland Ecosystems:** To perform follow-up midstory treatment of cut and leave and/or herbicide application (Triclopyr), and/or mechanical mulching on **2,342 acres**. *Note: Commercial harvest of these areas has been addressed in prior decision documents.*

- **Manage Forest and Woodland Ecosystems:** Add mechanical mulching as a potential treatment for site preparation on **839 acres** prior to hand planting longleaf seedlings. *Note: Commercial harvest of these areas has been addressed in prior decision documents*.
- **Recovery of Federally listed Threatened and Endangered Species:** Restore and maintain Good Quality Foraging Habitat (GQFH) for the six currently active RCW clusters by maintaining 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.
- **Recovery of Federally listed Threatened and Endangered Species:** Establish and maintain suitable habitat to recruit five new RCW clusters by establishing recruitment nesting habitat with a minimum of four suitable cavities, as defined by the RCW Recovery Plan, per cluster. Do we know the specific area we want to install or will we say, "Actual cluster locations will be designated (within the project planning area) after harvest activities are completed." This includes annual maintenance and replacement of artificial cavities and annual maintenance of natural cavities.
- **Support Desirable Levels of Selected Species:** Maintain permanent early seral stage habitat to support wildlife habitat and hunter success by annual mowing, disking, fertilizing, liming and seeding of **6.4 acres** of existing linear strips.
- **Nature-based Recreation/Safe and Efficient Access:** Enact opportunities for increased efficiency documented in the *Transportation Analysis Report V 1.0 Oakmulgee Ranger District, National Forests in Alabama October 2011* by decommissioning **3.7 miles** of roads currently listed as permanently closed by removing them from inventory, thus eliminating the need for future maintenance and use. Roads proposed for decommissioning include 708E, 708F, 708H, 708I, 708M, 708Q, 711D, 711F, 715J, 715K, 715L, see **Figure 1.C.1-3: Pine Flat Planning Area – Proposed Road Status Changes**.
- **Nature-based Recreation/Safe and Efficient Access:** Maintain and enhance proposed Forest Service maintained roads by treating the **26.4 miles** of roadsides, (**Reference Figure 1.C.1-2**) 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 NNIPS, and reduce the frequency of roadside mowing. Treatment area would extend 10 feet from road edges, totaling 64 acres. Roads would be treated on a 1-2 year rotation. Roadside mowing would occur as needed.
- **Nature-based Recreation/Safe and Efficient Access:** Enact opportunities for increased efficiency documented in the *Transportation Analysis Report V 1.0 Oakmulgee Ranger District, National Forests in Alabama October 2011* by changing status of FSR 708D from seasonal (open 10/16 – 04/30) to **closed on 1.8 miles**. (**Reference Figure 1.C.4: Pine Flat Planning Area – Proposed Road Status Changes**).

Figure 1.C.4: Pine Flat Planning Area - Proposed Road Status Changes & Maintenance



- **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 (when and wherever infestations are found within the Pine Flat Planning Area). *Note: This activity would include site-specific PETS analysis prior to treatment.*

Survey and Consultation History: Multiple surveys have been conducted within the planning area within the past decade for rare plants and animals. All stands associated with the 2005 Oakmulgee Longleaf Restoration EIS (including Cmpt. 40/Stands 3, 9, 17, 21, 25, 27, and 29, Cmpt. 41/Stands 1, 3, 5, 10, 13, 15, and 16, Cmpt. 52/Stands 1, 2, 10, 19, 22, and 26, and Cmpt. 53/Stands 1, 6, 13, and 18, within the PFIRR Planning Area) were surveyed for rare plants by various botanists. In On May 10 and 24, 2011, I surveyed (roadside and walking meander) a sample of the upland and riparian areas affected by the April 2011 tornado (shown in **Figure 1.A.2-4**) prior to the associated timber salvage

operations performed by the District in 2011-12. A more thorough walking meander survey of the riparian areas affected by the April 2011 tornados was conducted by Al Schotz, Alabama Natural Heritage Program botanist, during the period of September 17-20, 2012. I surveyed (walking meander) the stands (Cmpt. 53/Stand 18, Cmpt. 52/Stand 30, and Cmpt. 53/Stand 18) proposed for clearcut with reserve harvest/herbicide site prep in the current PFIRR project, as well as all roadsides (driving roadside survey) proposed for vegetation maintenance via herbicide application on March 18, 2013 I also surveyed a portion of the tornado areas proposed for herbicide release in Compartment 40 on the same day. No RFSS species were found during any of the above surveys within the PFIRR Planning Area.

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

Sensitive Species and Determination of Effects: 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
Procambarus marthae	A crayfish	G3
Alosa alabamae	Alabama shad	G3
Crystallaria asprella	Crystal darter	G3
Etheostoma parvapinne	Goldstripe darter	G1
Etheostoma ramseyi	Alabama darter	G2
Etheostoma zonifer	Blackwater darter	G3
Notropis uranoscopus	Skygazer shiner	G2
Noturus munitus	Frecklebelly madtom	G3
Percina brevicauda	Coal darter	G2
Percina lenticula	Freckled darter	G2
Cheumatopsyche bibbensis	A caddisfly	G1
Gomphus hybridus	Cocoa clubtail	G3
Hydropsyche hageni	A caddisfly	G2
Hydroptila paralatosa	A caddisfly	G2
Oecetis morsei	A caddisfly	G2
Somatochlora provacans	Treetop emerald dragonfly	G3
Stylurus laurae	Laura's clubtail	G3

Anodontoides radiatus	Rayed creekshell	G3
Lasmigona complanta alabamensis	Alabama heelsplitter	G5T2
Obovaria jacksoniana	Southern hickorynut	G2G3
Quadrula rumphiana	Ridged mapleleaf	G3
Aesculus parviflora	Small-flowered buckeye	G2G3
Arabis georgiana	Georgia rockcress	G2
Baptisia megacarpa	Apalachicola wild indigo	G2
Carex decomposita	Cypress-knee sedge	G3
Carex impressinervia	Ravine sedge	G1G2
Castilleja sp. nov. "kraliana"	Kral's Indian paintbrush	G2
Croton alabamensis	Alabama croton	G3
Cypripedium kentuckiense	Northern Lady's slipper	G3
Fothergilla major	Large witchalder	G3
Helianthus longifolius	Longleaf sunflower	G3
Hexastylis speciosa	Harper's heartleaf	G2
Hymenocallis caroliniana (=H. coronaria)	Carolina spider lily	G2Q
Jamesianthus alabamensis	Alabama jamesianthus	G3
Neviusia alabamensis	Alabama snow-wreath	G2
Onosmodium sp. nov. "decipiens"	A false gromwell	G1G2
Rhynchospora thornei	Thorne's beaksedge	G1G2
Rudbeckia auriculata	Eared coneflower	G1
Schisandra glabra	Bay starvine	G3
Silene regia	Royal catchfly	G3
Silphium sp. nov. "glutinosum"	A rosinweed	G2
Trillium lancifolium	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.

Direct Effects: No (Category A) Sensitive plant or animal species or rare communities are known from the planning areas. I queried the Oakmulgee GIS rare plant/rare community database and no documented Sensitive Element of Occurrence Records (EORs) inside the planning area. It is possible that one or more of the above species do occur within the PFIRR Planning Area in riparian or aquatic habitats, however the proposed activities will focus on upland areas. Considering the trends for rare species occurrences within the PFIIR 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.

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. Road closure/decommissioning or RCW maintenance would have no indirect effects. Past surveys have not indicated Sensitive plants are 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 species.

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.

Ongoing activities in the area include prescribed burning and recreation-related activities at Payne Lake. Recent timber treatments under previous decisions (including the Longleaf EIS-Payne Lake timber sale, and the Pine Flat and Clary Hill tornado salvage projects) have occurred in the area and reforestation activities are planned for 2013 and 2014 for some of these areas.

When combined with the proposed project, these activities should not have any negative cumulative impacts on Category A species viability.

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
Corynorhinus rafinesquii	Rafinesque's big-eared bat	G3G4
Aimophila aestivalis	Bachman's sparrow	G3
Helianthus longifolius	Longleaf sunflower	G3
Neviusia alabamensis	Alabama snow-wreath	G2
Quercus arkansana	Arkansas oak	G3
Arabis georgiana	Georgia rockcress	G2
Silene regia	Royal catchfly	G3
Castilleja sp. nov. "kraliana"	Kral's Indian paintbrush	G2
Fothergilla major	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.

Direct Effects: No (Category B) Sensitive species are known from the planning 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 planning area. It is possible that one or more of the above species do occur within the PFIRR Planning Area in upland pine habitats, however considering the trends for rare species occurrences within the PFIIR area based on the various past surveys, I do not expect any measurable direct impacts to any of these species from the proposed activities. Road closure/decommissioning or RCW maintenance would have no direct or indirect effects.

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 planning 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 species are expected to be discountable.

Indirect Effects: The proposed activities will help to restore the structure and functionality of upland pine habitats, and will be beneficial to Category B 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 pyrophityc ecosystem. The herbicide site prep areas surveyed indicated no evidence of or ideal habitat for RFSS. Roadsides to be maintained with mowing/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 species are expected.

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.

Ongoing activities in the area include prescribed burning and recreation-related activities at Payne Lake. Recent timber treatments under previous decisions (including the Longleaf EIS-Payne Lake timber sale, and the Pine Flat and Clary Hill tornado salvage projects) have occurred in the area and reforestation activities are planned for 2013 and 2014 for some of these areas.

When combined with the proposed project, these activities should not have any negative cumulative negative impacts on Category B species viability.

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 Pine Flat Project Area has been completed. Cultural Resource sites were identified and those needing protection during proposed treatments have been documented and the appropriate mitigation measures selected for use in potential contracts and/or force account work. 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. (Cultural resource sites relevant to the No Action Alternative – Prior Decisions have documented and appropriate mitigation measures incorporated into planned work).

N. Other Environmental Effects Relative to FONSI Significant Factors –

Environmental Justice: Though low-income and minority populations exists 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 comment 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 implemented 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 Pine Flat Project area are highly to moderately selective of the plant species that will be controlled. The current array (Triclopyr, Imazapyr, Glyphosate, and Metasulfuron methyl) 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 prep 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 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 PFIRRP 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 to risks to humans, wildlife, fish and the environment. Due to the thoroughness and length of the assessment documents, they incorporate by reference into this EA, and are made available on request, at the Oakmulgee Ranger District Office rather than included in the environmental assessment.

- **Forest User Safety:** The Pine Flat planning area is adjacent to the Payne Lake recreation area, a hub for dispersed recreation activities. Recreation use increases during hunting seasons (generally deer and turkey) with hunters often preferring to walk from their camp site to their hunting area. To provide hunters with current information on the progress of implementation, signage, public notices, and campground host will be used to insure up-to-date information for necessary precautions for activities such as harvesting and prescribed fire. Contractors and their equipment will have limited access through the Recreation area.

- **Additional 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 cooperator road maintenance requirements. In addition a Cooperative Road Maintenance agreement has been developed with Hale County to provide the ability for Forest Service to maintain county roads affected by the implementation of the proposed actions. 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 with 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 planning area currently has an average of eight tons/acre of fine fuel loading. A wildfire in certain conditions could increase in smoke and smoke management issues involving public health (**Reference Figure 3.N.1**). The map shows current levels of particulate matter causing health issues on the largest populations north of the planning area. However, implementation of the proposed action would result in a drop in the fine fuel loading to an estimated three to five tons/acre. **Figure 3.N.2** shows post project implementation levels of particulate matter on the same population area.

Figure 3.N.1: Potential Health Impacts (Current Conditions)

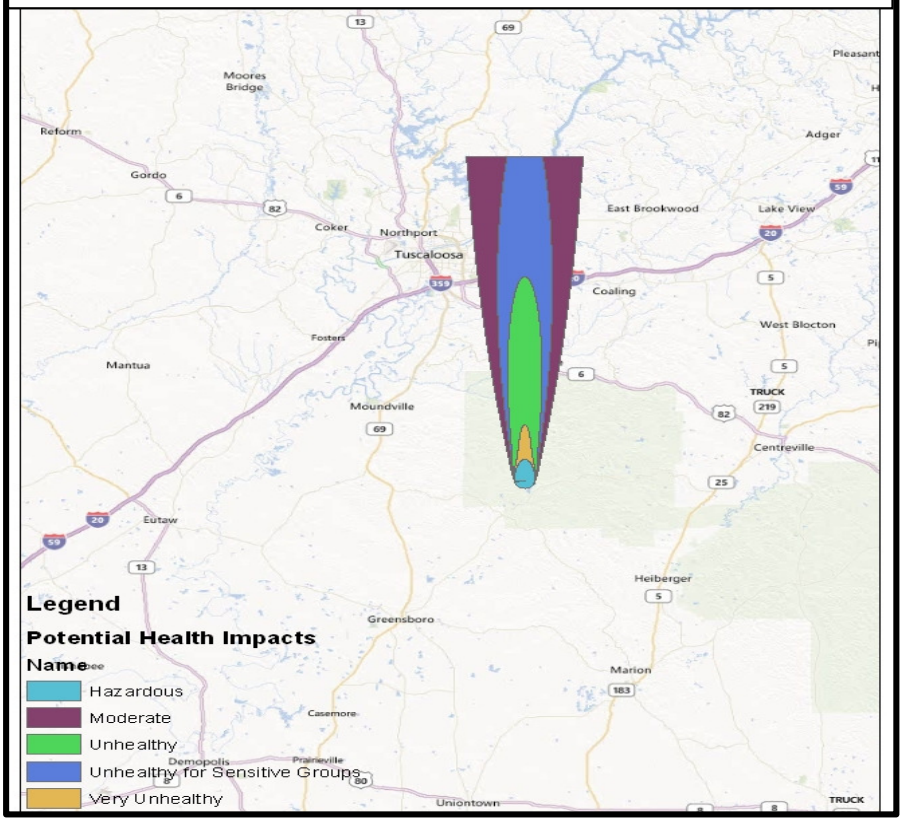
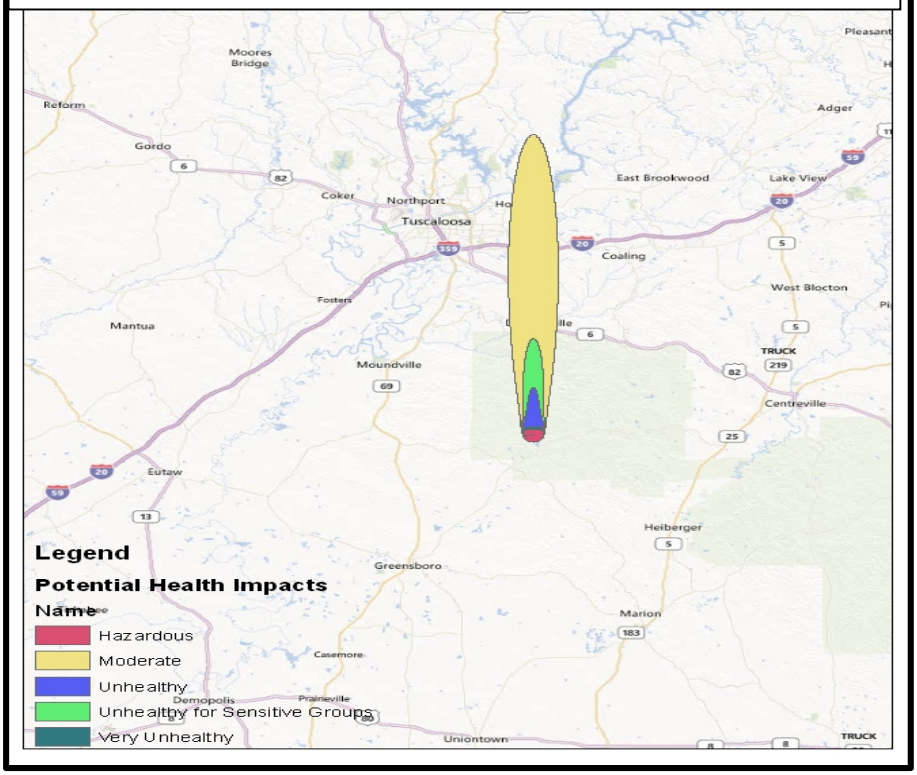


Figure 3.N.2: Potential Health Impacts (After Implementation of Proposed Action



- **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts:** The Pine Flat Integrated Resource Restoration Project 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, 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
Joe Koloski Natural Resource Specialist Oakmulgee Ranger District	B.S. Wildlife and Fisheries Biology and Management, M.S. in Zoology and Physiology, 10+ years experience as Certified Wildlife Biologist, USDA Forest Service Certified Pesticide Applicator
Jake Thelen Fire Management Officer Oakmulgee Ranger District	A.A. Natural Resource Management, 13+ years experience in Fire Management
Sheila Holifield Resource Assistant Oakmulgee Ranger District	B.S. Journalism, 10+ years experience as Writer/Editor/Public Affairs Specialist
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
Roger Menard Plant Pathologist Southern Research Station	M.S. Plant Health, 15 years experience with Forest Service, member of the Society of American Foresters and American Phytopathological Society
Marcus Ridley Assistant Forest Archaeologist Forest Supervisor's Office	
Tom Lane Timber Sale Administrator Trainee Oakmulgee Ranger District	B.S. Forest Management, WV Registered Forester, USFS Certified Cruiser, Advanced Cruiser, Harvest Inspector for Regions 2, 4, Level 3 COR.

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

References:

Beasley, R. S.; Granillo, A. B.; Zilmer, V. 1986. Sediment loses from forest management; mechanical vs. chemical site preparation after clear cutting. J. Env. Qual. 15:413-416.

Belt, G.H., J. O'Laughlin and T. Meril. 1992. Design of Forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature. Idaho Forest, Wildlife and Range Policy Analysis Group. Report No. 8 Univ. of Idaho, Moscow, ID 35pp.

Birdsey, R.; Pregitzer, K; Lucier, A. 2006. Forest carbon management in the United States: 1600-2100. Jouranal of Environmental Quality 35: 1461-1469.

Birdsey, R. et. al. 2007. North American Forests. In King, A.W.; Dilling, L.; Zimmerman, G.P.; Fairman, D.M.; Houghton, R.A.; Marland, G.; Rose, A.Z.; Wilbanks, T.J.; eds. The First State of the Carbon Cycle Report (SOCCR): The North American carbon budget and implications for the global carbon cycle, a report by the US Climate Change Science Program and the Subcommittee on Global Change Research, National Oceanic and Atmospheric Administration, Asheville, NC; National Climatic Data Center: 117-126.

Billings, Ronald F., 2012. Southern Pine Beetle South-wind Trend Predictions for 2012.

Boerner, R. E. J., J. Huang, et al. (2008). "Fire, thinning, and the carbon economy: effects of fire and fire surrogate treatments on estimated carbon storage and sequestration rate." Forest Ecology and Management 255: 3081-3097.

Brennan, L.A. 1999. Northern Bobwhite (Colinus virginianus). In: A The Birds of North America, No. 397, . Poole and F. Gill, Editors. The Birds of North America, Inc. Philadelphia, Pennsylvania. 28 pp.

Brown, Charles J. and D. Brinkley. 1994. Effect of Management on Water Quality in North American Forests. USDA For. Serv. En. Tech. Report RM-248.

Cason, J. D., D. L. Grebner, et al. (2006). Current knowledge on effects of forest silvicultural operations on carbon sequestration in southern forests. 13th Biennial Southern Silvicultural Research Conference. Gen. Tech. Rep. SRS-92. K. F. Connor. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station 57-60.

Conner, R. N., and D. C. Rudolph. 1989. Red-cockaded woodpecker colony status and trends on the Angelina, Davy Crockett, and Sabine National Forests. USDA Forest Service Research Paper SO-250.

Depro, B. M., B. C. Murray, et al. (2008). "Public land, timber harvests, and climate mitigation: Quantifying carbon sequestration potential on U.S. public timberlands." Forest Ecology and Management 255(3-4): 1122-1134.

DeVos, T. D. and B. S. Mueller. 1993. Reproductive ecology of northern bobwhite in north Florida. Pages 83-90 in K. E. Church and T. V. Dailey, eds. Quail III: national quail symposium. Kan. Dep. Wildl. Parks, Pratt.

Douglas, J. E.; Van Lear, D. H. 1983. Prescribed burning and water quality of ephemeral streams in the piedmont of South Carolina. For. Sci. 29:181-189.

Douglas, J. E. and W. T. Swank. 1975. Effects of Management Practices on Water Quality and Quantity: Coweeta Hydrologic Laboratory, North Carolina. USDA For. Ser. Gen. Tech. Rep. NE13.

Eckhardt, Lori G., Hess, Nolan J., Menard, Roger D., Goddard, Art J., 2004. Assessment of Loblolly Pine Decline on the Oakmulgee Ranger District, Talladega National Forest, Alabama. USDA Forest Service, Forest Health Protection, Alexandria Field Office, Pineville, L.A. Report No. 2004-02-001.

Eckhardt, Lori G. and Menard, Roger D. 2009. Declining loblolly pine stands: symptoms, causes, and management options. Alabama's Treasured Forests.

Eckhardt, Lori G., Sayer, Mary A., Imm, Donald W. 2008. What is pine decline in the southeastern United States and how widespread is it? Forest Health. Ecological Society of America. 27 p.

Fernandes, P. M. and H. S. Botelho (2003). "A review of prescribed burning effectiveness in fire hazard reduction." International Journal of Wildland Fire 12(2): 117-128.

Fletcher, K. and Friedman, B. 1986. Effects of the herbicide glyphosphate, 2-4-5-T, and 2-4-D on forest litter composition. Can. J. For. Res. 16:6-9.

Fontaine, S., S. Barot, et al. (2007). "Stability of organic carbon in deep soil layers controlled by fresh carbon supply." Nature 459: 277-280.

Golden, M. S., C. L. Tuttle, J.S. Hush and J. M. Bradley, III. 1984. Forest Activities and Water Quality in Alabama. AL Agric. Exp. Stn. Bulletin No. 555. 87p.

Grier, Charles C., Katherine M. Lee, Nalini M. Nadkarni, , Glen O. Klock, and Paul J. Edgerton. 1989. Productivity of forests of the United States and its relation to soil site factors and management practices; a review. U.S.D.A. Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-222 51p.

Hardy, C. C., R. Ottmar, D, et al. (2001). Smoke Management Guide for Prescribed and Wildland Fire, National Wildfire Coordination Group**:** 226.

Healy, S. M., and E. S. Nenno. 1983. Minimum maintenance versus intensive management of clearings for wild turkeys. Wildl. Soc. Bull. 11:113-120.

Heath, L.S. and J.E. Smith, 2004: Criterion 5, indicator 26: total forest ecosystem biomass and carbon pool, and if appropriate, by forest type, age class and successional change. In: Data Report: A Supplement to the National Report on Sustainable Forests – 2003 [Darr, D.R. (coord)]. FS-766A, U.S. Department of Agriculture, Washington, DC 14 pp.

Hess, N.J., Eckhardt, L.G., Menard, R.D., and Goddard, A.J. 2004a. Assessment of loblolly pine decline on the Oakmulgee Ranger District, Talladega National Forest, Alabama (Revised). Report No. 2005-02-04. Pineville, LA: Alexandria Field Office, USDA Forest Service, Forest Health Protection. 31 p.

Hess, N.J., Otrosina, W.J., Jones, J.P., Goddard, A.J., and Walkinshaw, C.H. 1999. Reassessment of loblolly pine decline on the Oakmulgee Ranger District, Talladega National Forest, Alabama General Technical Report SRS-50. Ashville, NC: USDA Forest Service, SRS. 618 p.

Hubbard, R. M., J. M. Vose, et al. (2004). "Stand restoration burning in oak-pine forests in the southern Appalachians: effects on aboveground biomass and carbon and nitrogen cycling." Forest Ecology and Management 190: 311-321.

Hurst, G.A. 1978. Effects of controlled burning on wild turkey poult food habits. Proc. Ann. Conf. Southeast. Assoc. Fish and Wildl. Agencies. 32:30-37.

Johnson, D. W. and P. S. Curtis (2001). "Effects of forest management on soil C and N storage: Meta-analysis." Forest Ecology and Management 140(2-3): 227-238.

Jorgensen, J.R. and C.S. Hodges, Jr. 1971. Effects of prescribed burning on the microbial characteristics of soil. In: Proceedings of a Symposium; 1971 April 14-16; Charleston, S.C. USDA For. Ser. Southeastern Forest Experiment Station, Asheville, N.C. 1971: 68-76.

Knoepp, Jennifer D., Vose, James M., Swank, Wayne D., August 2004. Long-Term Soil Response to Site Preparation Burning in the Southern Appalachians. Forest Science. Vol. 50. No. 4. pages. 540-550.

Kocis, S.M. et. al., 2004. National Visitor Use Monitoring Results. USDA Forest Service. National Forests in Alabama.

Kral, R. 1983. A Report on Some Rare, Threatened, or Endangered Forest-related Vascular Plants of the South. USDA. Forest Service Tech. Pub. R8-TP2. 13O5 pp.

Li, Q., J. Chen, et al. (2007). "Effects of timber harvest on carbon pools in Ozark forests." Canadian Journal of Forest Research 37: 2337-2348.

Liechty, H. O., K. R. Luckow, et al. (2005). "Soil chemistry and nutrient regimes following 17–21 years of shortleaf pine-bluestem restoration in the Ouachita Mountains of Arkansas." Forest Ecology and Management 204: 345-357.

Mayack, D. T.; Bush, P. B.; Neary, D. G.; Douglas, J. E. 1982. Impact of hexazinone on invertebrates after application to forested watersheds. Arch. Environm. Contam. Toxical. 11:209-217.

McCarty, K. (2002). Fire management for Missouri savannahs and woodlands. Society for Range Management‟s Savannah/Woodland Symposium. G. Hartman, S. Holst and B. Palmer. Kansas City, MO, USA**:** 40-55.

McGregor, Stuart W. 1992. A mussel survey of the streams draining Bankhead National Forest and the Oakmulgee Division of the Talladega National Forest, Alabama. 29 p.

Menard, R.D., Eckhardt, L.G., and Hess, N.J. 2006. Assessment of loblolly pine decline on Fort Benning Military Reservation, Fort Benning, Georgia. Report No. 2006-02-01. Pineville, LA: Alexandria Field Office, USDA Forest Service, Forest Health Protection. 21 p.

Mettee, M.F., P.E. O'Neil, and J.M. Pierson. 1996. Fishes of Alabama and the Mobile Basi*n.* State of Alabama. Oxmoor House, Birmingham, AL.

Michael, J. L. 1986. Fate of arsenal in forested watersheds after aerial application for forest weed control. Final Rep. Auburn, AL: U. S. Dep. Agric., For. Serv., South. For. Exp. Stn.

Michael, J.L. and D.G. Neary. 1993. Herbicide Dissipation Studies in Southern Forest Ecosystems. Enviro. Toxi. Chem. 12:405-410.

Miller, James A. 1990. Ground Water Atlas of the United States. Segment 6. Hydrologic Investigations Atlas 730-G. U.S. Geological Survey.

Miller, J.H. 2003. Non-native invasive plants of Southern forests. A field guide for identification and control. United States Department of Agriculture, Forest Service, Southern Research Station, General Technical Report SRS-62.

Mirarchi, R.E. (editor), J.T. Garner, M.F. Mettee, and P.E. O'Neil. 2004b. Alabama Wildlife, Volume Two. Imperiled Aquatic Mollusks and Fishes. The University of Alabama Press, Tuscaloosa. 255 pages.

Mount, R.H. 1975. The reptiles and amphibians of Alabama. Agricultural Experimental Station, Auburn University, Auburn, AL.

Neary, D.G., P.B. Bush and J.L. Michael. 1993. Fate, Dissipation and Environmental Effects of Pesticides in Southern Forests: A Review of a Decade of Research Progress. Enviro. Toxi. Chem. 12: 411-428.

Neary, D. G.; Bush, P. B. Douglass, J. E. 1983. Offsite movement of hezazinone in stormflow and baseflow from forested watersheds. Weed Sci. 31:543-551.

Neary, D. G.; Bush, P. B.; and Grant M. A. 1986. Water quality of ephemeral forest streams after site preparation with herbicide hexazinone. For. Ecol. Manage. 14:23-40.

Nenno, E. S. and J. S. Lindzev. l979. Wild turkey poult feeding activity in old field, agricultural clearing, and forest communities. Trans. Northeast Sec. The Wildl. Soc. 36:97-109.

Nie, Martin A., Schultz, Courtney A. 2012. Decision-Making Triggers in Adaptive Management. *Conservation Biology*. Volume 00, No. 00, 1-8.

Nunery, J. S. and W. S. Keeton (2010). "Forest carbon storage in the northeastern United States: Net effects of harvesting frequency, post-harvest retention, and wood products." Forest Ecology and Management 259: 1363-1375.

Pacala, R. et. al. 2007. The North American carbon budget past and present. In King, A.W.; Dilling, L.; Zimmerman, G.P.; Fairman, d.M.; Houghton, R.A.; Marland, G.; Rose, A.Z.; Wilbanks, T.J.; eds. The First State of the Carbon Cycle Report (SOCCR): The North American carbon budget and implications for the global carbon cycle, a report by the US Climate Change Science Program and the Subcommittee on Global Change Research, National Oceanic and Atmospheric Administration, Asheville, NC; national Climatic Data Center: 117-126.

Pack, J.C, W. K. Igo, and C. I. Taylor. 1988. Use of prescribed burning in conjunction with thinning to increase wild turkey brood range habitat in oak-hickory forests. Trans. Northeast. Sec. Wildl. Soc. 45:37-48.

Ponder, F., Jr. (2007). Biomass removal and its effect on productivity of an artificially regenerated forest stand in the Missouri Ozarks. Proceedings: 15th Central Hardwood Forest Conference, General Technical Report SRS-101. D. S. Buckley and W. K. Clatterbuck. Knoxville, TN, U.S. Department of Agriculture, Forest Service, Southern Research Station**:** 135-143.

Pregitzer, K.S. and Euskirchen, E.S. 2004. Carbon cycling and storage in world forests: biome patterns related to forest age. Global Change Biology 10: 2052-2077.

Pritchett W. L. and Richard E. Fisher. 1987. Properties and Management of Forest Soils. John Wiley and Sons. 500p.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2012. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2011. Version 12.13.2011 USGS Patuxent Wildlife Research Center, Laurel, MD*

Schroeder, R. L. 1985. Habitat suitability index models: Eastern Wild Turkey. Biological Report 82(10.106). U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C., USA.

Shalaee, A. K., W. L. Nutter, E. R. Burroughs, Jr. and L. A. Morris. 1991. Runoff and Sediment Production from Burned Forests Sites in the Georgia Piedmont. Water Resources Bulletin. 27(3):485-493.

Stone, Jr., Earl L. 1971. Effects of prescribed burning on long-term productivity of coastal plain soils. In: Proceedings of a Symposium; 1971 April 14-16; Charleston, S.C. USDA For. Ser. Southeastern Experiment Station, Asheville, N.C. 1971: 115-127.

Swank, W.T., Vose, J.M., and Elliot, K.J. Long-Term Hydrologic and Water Quality Responses Following Commercial Clearcutting of Mixed Hardwoods on a Southern Appalachian Catchment. Forest Ecology and Management 143, pages 163-178, 2001.

Syracuse Environmental Research Associates, Inc. 2011. Glyphosate Human Health and Ecological Risk Assessments, Final Report. Available at http://www.fs.fed.us/foresthealth/pesticide/risk.shtml.

Syracuse Environmental Research Associates, Inc. 2011. Imazapyr Human Health and Ecological Risk Assessments, Final Reports. Available at http://www.fs.fed.us/foresthealth/pesticide/risk.shtml.

Syracuse Environmental Research Associates, Inc. 2011. Triclopyr Human Health and Ecological Risk Assessments, Final Report. Available at http://www.fs.fed.us/foresthealth/pesticide/risk.shtml.

The National Bobwhite Technical Committee. 2011. Palmer, W.E., T.M. Terhune, and D.F. McKenzie (eds). The National Bobwhite Conservation Initiative: A range-wide plan for recovering bobwhites. National Bobwhite Technical Committee Technical Publication, ver. 2.0 , Knoxville, TN.

Ursic, S. J. 1986. Sediment and Forestry Practices in the South. IN: Proceedings, Fourth Federal Interagency Sedimentation Conference. p28-37. Las Vegas, NV.

USDA Forest Service. 2012. Environmental Assessment: Enhanced Invasive Plant Control. National Forests in Alabama.

USDA Forest Service. 2011. Travel Analysis Report. National Forests in Alabama, Oakmulgee Ranger District.

USDA Forest Service. 2008. Environmental Assessment: Non-native Invasive Plant Species Advanced Control. Talladega National Forest, Oakmulgee Ranger District.

USDA Forest Service. 2008. National Forests in Alabama Non-native Invasive Plant Species (NNIPS) Strategy. Unpublished documentation.

USDA Forest Service. 2006. Environmental Assessment: Non-native Invasive Plants Control Project. Talladega National Forest, Oakmulgee Ranger District.

USDA Forest Service. 2005. Final environmental impact statement. Longleaf Ecosystem Restoration Project, National Forests in Alabama, Talladega National Forest, Oakmulgee District.

USDA Forest Service. 2004. Final environmental impact statement. Revised Land and Resource Management Plan, National Forests in Alabama. Management Bulletin R8-MB 112B – January 2004. p 3-11, 3-15 and Chapter 2, pg. 14-27.

USDA Forest Service. 2004. Final Environmental Impact Statement, Forest Health and RCW Initiative. Management Bulletin R8-MB 118A.

USDA Forest Service. 2004. Revised Land and Resource Management Plan for the National Forest in Alabama.

USDA Forest Service. 1989. Final environmental impact statement vegetation management in the Appalachian Mountains. Volume 1. 89-91.

USDA Forest Service. 1973. Impact of soil compaction on the long term productivity of piedmont and atlantic coastal plain soils. Report FS-6200-7. 26p.

USDA Forest Service. Hewlett, Lull, Reinhart, et al. 1977. The impact of timber harvest on soils and water. Reprinted from the Report of the President's Advisory on Timber and the Environment – April 1973. 40p.

USDA National Forests in Alabama. 1988, 1993, 1994, 2004, 2005, 2006, 2007 Watershed monitoring reports on file at Supervisor's Office.

USDA, NRCS. 2008. Bibb and Hale County Soil Survey. Retreived from http://websoilsurvey.nrcs.usda.gov/app/

US Environmental Protection Agency, Inventory of US Greenhouse Gas Emissions and Sinks: 1990 2007, March 2008 Public Review Draft

U.S. Fish and Wildlife Service. 2013. Bald Eagle Management Guidelines & Conservation Measures Bald Eagle Natural History and Sensitivity to Human Activity Information. Ecological Services Online http://www.fws.gov/southeast/es/baldeagle/baea_nhstry_snstvty.html

U.S. Fish and Wildlife Service. 2003. Recovery plan for the red-cockaded woodpecker *(Picoides borealis*): second revision. U.S. Fish and Wildlife Service, Atlanta, GA. 296 pp.

U.S. Fish and Wildlife Service. 1996. Revised recovery plan for the U.S. breeding population of the wood stork. U.S. Fish and Wildlife Service. Atlanta, Georgia. 41p.

US Global Change Research Programs, National Assessments Syntheis Team. 2001. Climate change impacts on the United States – the potential consequences of climate variability and change. United Kingdom: Cambridge University Press, 612 pp.

Wells, C.G. 1971. Effects of prescribed burning on soil chemical properties and nutrient availability. In: Proceedings of a Symposium; 1971 April 14-16; Charleston, S.C. USDA For. Ser. Southeastern Experiment Station, Asheville, N.C. 1971: 86-89