DECISION NOTICE

Southern Pine Beetle Abatement Project

USDA, Forest Service
National Forests in Alabama
Talladega National Forest – Oakmulgee District
Bibb, Chilton, Dallas, and Perry Counties, Alabama

Background

Many of the native longleaf sites on the Talladega National Forest – Oakmulgee District currently exists as over-stocked plantations of loblolly pines. This shift in the natural balance is producing symptoms of stress, both within these stands and within the larger ecosystem. These altered sites are considered to be pathologically unstable arising from adaphic and environmental changes brought about by past land use and/or current management practices. The instability resulting from the weakened or stressed conditions makes these stands highly susceptible to insect and disease infestation, especially Southern Pine Beetles (SPBs). Once SPB populations build up and become epidemic then otherwise healthy trees or stable ecosystems are at risk.

The Oakmulgee District hosts Alabama's largest red-cockaded woodpecker (RCW) population and is listed in the Revised RCW Recovery Plan (Red-cockaded Woodpecker, *Picoides borealis*, Recovery Plan, Second Revision, U.S. Fish and Wildlife Service, 2003) as a secondary support population, which has a target population of 250 breeding clusters. The project area contains ten known active clusters, encompassing what is currently the entire RCW population for the National Forest lands on the eastern portion of the Oakmulgee District. Seven of these ten clusters are within close proximity to over-stocked loblolly pine stands, presenting a potential risk to the RCW habitat given the possibility of an SPB epidemic. These seven cluster sites are paramount for future population stability and expansion on the Oakmulgee's east side. This project addresses habitat enhancement to buffer these cluster sites against potential SPB infestations.

This project targets abatement of SPB infestations through restoration of healthy forest conditions. The project area is located on the eastern portion of the Oakmulgee District in Bibb, Dallas, Chilton, and Perry counties south of Centerville, north of Selma, and west of Maplesville, Alabama. This project complements the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Longleaf Ecosystem Restoration Project on the Talladega National Forest – Oakmulgee District. The FEIS and ROD, signed February 2, 2005, made strategic first steps, on the western portion of the District, to balance longleaf restoration needs with forest health risks associated with non-native conditions and the need to provide a flow and distribution of longleaf habitat within various age classes and conditions. This project continues those strategic steps for the east side of the District, focusing specifically on upland pine stands in non-native conditions and those areas affected by SPB outbreaks. The project also addresses the treatment of active SPB infestations as they occur.

This project, authorized under the Healthy Forest Restoration Act (HFRA), provides protection to Threatened and Endangered Species habitat from the potential insect and disease epidemics, associated risk from fuels buildups, and subsequent destructive wildfires.

An EA (environmental assessment) has been completed documenting the analysis of the proposed action to address impacts of the treatment of active SPB infestations as they occur, and preventive treatments targeting stands at high risk for future SPB activity as well as the no-action alternative.

Decision

Based upon my review of the proposed action and no action, I have decided to implement the proposed action, which will:

- **Restore (up to 3,900 acres) of non-native loblolly stands to native longleaf conditions, through the final harvest of loblolly pines and re-establishing longleaf seedlings.**
- **Improve resistance of (up to 1,920 acres) non-native loblolly stands to SPB infestations, through the selected harvest of approximately half of the existing loblolly pines (50-60 sq ft/ac BA).**
- **Improve resistance to SPB infestations of (up to 878 acres) native longleaf currently providing habitat for active RCW clusters, through the selected harvest of a third to a half of the existing pines, retaining longleaf where possible. (50-60 sq ft/ac BA).**
- **Suppress active SPB infestations meeting design criteria listed in the EA (page 7) by *cutting and removing*, or *cutting and leaving* infested trees along with additional trees to serve as a buffer.**
- **Better delineate mixed stands, transitions zones, and hardwood drains where past practices have resulted in non-native conditions. This will likely result in 20% to 25% of the 3,900 acres targeted for restoration to actually be remapped as mixed stands. (approx. 780 acres). In these areas there would be no treatment under this decision.**

To inact this decision the following concurrent and contemporaneous actions will occur:

Concurrent & Contemporaneous Actions	Upper Thresholds (units)
Temporary Haul Roads, includes re-vegetation (Miles)	46
Rights of Way to be obtained (Miles)	18
Site Preparation - Herbicide and Burn (Acres)	3,900
Site Preparation – Mechanical (Acres)	500
Planting longleaf seedlings (Acres)	3,900
Release of seedlings – Herbicide (Acres)	3,900
Understory enhancement – Herbicide (Acres)	1,920
Treatment of midstory – Chainsaw and Herbicide (Acres)	878

Implementation of this decision is to comply with the standards of the Revised Land and Resource Management Plan for the National Forests in Alabama (2004).

When compared to the no action alternative, the proposed action meets the purpose of and need for action because it takes a strategic approach to addressing non-native, unhealthy forest conditions that serve as habitat for SPBs. Specifically it,

- Addresses those loblolly stands with the greatest percentage of native longleaf habitat conditions and presenting the highest risk to future SPB infestations by immediately beginning restoration to longleaf. (EA, pages 5 & 6).
- Recognizes those loblolly stands with less risk to SPB infestation and begins a slower approach to restoration through a selected harvesting approach. (EA, pages 5 & 6).

- Provides preventative measures to native longleaf stands within ½ mile radii of active RCW cluster to improve their resistance to SPB infestation and moving them closer to good quality habitat. (EA, page 5).
- Provides criteria for addressing active SPB infestations that respects the role of insects as natural disturbances while acknowledging significant forest health concerns that could cause SPB infestations to exceed natural fluctuations and become epidemic causing significant losses of habitat. (EA, page 7).
- Begins a landscape level process that matches the species composition to the site through better inventory and mapping, allowing managers to better understand the forest. (EA, Appendix C).

My decision to implement the proposed action is based on its potential for effectiveness in reducing risk for insect damage, advancement toward the desired future condition of longleaf pine ecosystem restoration, and red-cockaded woodpecker recovery. This action will also reduce public and worker safety concerns due to the buildup of hazardous fuels. Effectiveness in wildland fire suppression will be increased and it will better increase our ability to prescribe-burn these areas (EA, Appendix G).

I considered the need to take action and the issues and concerns identified (internally, from collaboration, and from the public comment period) in making my decision. I weighed the short- and long-term effects of restoring high risk loblolly stands and thinning on the environment against the short- and long-term effects of taking no action (EA, pages 9-17). I find the proposed action would have minor effects on the environment, provide benefits of reducing insect threats while making advancements in longleaf ecosystem restoration and red-cockaded woodpecker recovery.

My conclusion is based on the review of the record that shows a thorough review of relevant scientific information, a consideration of responsible opposing reviews, and the acknowledgement of incomplete or unavailable information, scientific uncertainity, and risk. I find that the specialist reports within the EA appendices have well documented references and provide a full description of the expected risks. This decision accepts that the scientific information is constantly changing and a certain amount of adaptive management will be necessary as the process of restoration unfolds.

Specifically, the uncertainity in achieving positive results with this project depends on the extent to which we can restore native burning regimes to the longleaf system. The challenges involve, 1). the very complex relationship of root-feeding insects, their associated habitat, and predator insects; 2). the extent to which the surrounding community and its Clean Air Act attainment issues will support a prescibed burning progrom – specifically the resulting smoke; 3). a fragmented ownership pattern that increases complexities and cost of burning; and 4). the coordination needed to support the restoration contracts such as timber harvesting which generally allow 2-3 years to complete work. In addition to the concerns regarding the application of fire, there is debate in the conservation community regarding the stocking density of longleaf seedlings to achieve grassy and herbaceous understoried indicative of native systems. Again, the success of more open planting rates often depends on the history of the area relative to fire and the pre-restoration conditions.

Other Alternatives Considered

In addition to the selected alternative, I also considered the no action alternative. Taking no

action will not meet the purpose and need of this project (EA, page 3). If no action is taken, insect damage is likely to increase and spread to surrounding healthy trees, and habitat for the red-cockaded woodpecker would be further reduced. Hazardous conditions would persist and worsen for workers engaged in fire suppression and prescribed burning. I am not willing to accept the risks associated with no action.

Public Involvement (Reference Appendix M – Public Involvement Report of the Environmental Assessment.

Findings Required by Other Laws

National Forest Management Act: This decision is consistent with the Forest Plan (Revised Land and Resource Management Plan for the National Forests in Alabama, 2004) as required by the National Forest Management Act. The project was designed in conformance with Forest Plan goals, objectives, and standards. Specifically, this project meets Forest Plan goals for reducing risks from insects and disease (Goal 3), improving the desired composition, structure,and function of forest ecosystems (Goal 1), contributing to the recovery of federally listed endangered species (Goal 11) and specifically, contributing to the recovery of the red-cockaded woodpecker (Goal 12).

Clean Water Act: The Forest Plan contains direction to ensure all projects comply with the requirements of the Clean Water Act. Therefore by following that direction, this project is in compliance with the Clean Water Act.

Endangered Species Act: The Forest Plan was developed with the benefit of extensive consultation with the U.S. Fish and Wildlife Service (USFWS). The USFWS concurred with the Forest Service's determination that the implementation of the Forest Plan is "not likely to adversely affect" federally-listed endangered or threatened species or their habitats.

The District Biologist has conducted a site-specific evaluation of the potential effects of this project regarding federally-listed endangered or threatened species or their habitats, and sensitive species or their habitats. The Biological Evaluation documents this action will have *"not likely to affect"* on endangered or threatened species or designated critical habitat and *"beneficial impacts"* or *"may impact individuals, but not likely to cause a trend toward listing or loss of viability"* to sensitive species.

The District is in compliance with the Alternative Consultation Agreement prepared pursuant to the Joint Counterpart Endangered Species Act, Section 7 Consultation Regulations issued on December 8, 2003 (Federal Register, pages 68254 - 68265).

National Historic Preservation Act: This project was designed to have no effect on scientific, cultural, or historical resources. All sites listed in or potentially eligible for listing in the National Register of Historic Places will be excluded from the project area and measures to protect and monitor these sites will be incorporated.

The Multiple-Use Sustainted-Yield Act of 1960 calls for the development of resource management guidelines. Two of these guidelines are of issue regarding the Southern Pine Beetle Abatement Project.

1). Establish suitable classifications for the miximum size limits for areas to be cut in one harvest operation. Thus even-aged regeneration harvest may not exceed 80 acres for southern yellow pine types. Exceptions include natural catastrophic conditons such as fire,

insect and diseases, windstorm, etc. Within this project there are 6 identified AOC 2 stands that are currently inventoried as greater than 80 acres (EA, Appendix A). As these are AOC 2 stands they are assessed as high risk to SPB infestations and have a history of prior infestations. Experience on the District indicates that once proper stand delineation is applied the actual area needing treatment will be less than 80 acres. In any case, we will not exceed the 80 acre limit unless it can be well documented that the particular area meets the exception of catastrophic conditions.

2). Establish standards to insure stands of trees shall generally reach the culmination of mean annual increment of growth prior to harvest. Exceptions include multiple-use objectives other than timber production. The 3,900 acres selected as AOC 2 stands, while stressed and previously infested by SPBs, have likely not reached the culmination of mean annual increment of growth. The goals of the Southern Pine Beetle Abatement Project (EA, page 3) are to restore native longleaf conditions, reduce risk of SPB infestations, and improve habitat for red-cockaded woodpeckers. Thus the AOC 2 stands are exempt from that standard.

Appeal Rights

This decision is not subject to appeal. Pursuant to Forest Service regulations at 36 CFR 218, subpart A, this project was subject to a pre-decisional objection process. Notice of the objection period was published in the Tuscaloosa News on May 15, 2007. No objections were filed for this project.

Implementation

Implementation of this decision may begin immediately and could continue for five to seven years.

Contact Person:

For additional information concerning this decision contact Joe Fowler, Talladega National Forest, Oakmulgee District, 9901Highway 5, Brent, Alabama (telephone: 205.926.9765 ext 202)

/s/ Cynthia Ragland 6 July 2007

Cynthia O. Ragland **Date**
District Ranger (Responsible Official)

FINDING OF NO SIGNIFICANT IMPACT
Southern Pine Beetle Abatement Project

USDA, Forest Service
National Forests in Alabama
Talladega National Forest-Oakmulgee District
Bibb, Chilton, Dallas, and Perry Counties, Alabama

Upon consideration and review of the environmental and social effects described in the Environmental Assessment (EA), I have determined that these actions will not have a significant effect on the quality of the human environment considering the context and intensity of impacts (40 CFR 1508.27). Thus, an environmental impact statement will not be prepared.

/s/ Cynthia Ragland — 6 July 2007

Cynthia O. Ragland — **Date**
District Ranger (Responsible Official)

I base my finding on the following:

Context

After considering affected interests and the locality along with the short- and long-term effects and improvements, I find this project carries forward the ongoing restoration commitment occurring on the Oakmulgee District. The effects are generally site-specific. The proposed actions implement the goals of the scope of the Final Environmental Impact Statement for the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan) and the adherence to Forest Plan standards will protect and enhance resources.

Intensity

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

1. *Impacts that may be both beneficial and adverse. A significant effect may exist even if Federal agency believes that on balance the effect will be beneficial.*

   My finding of no significant environmental effects is not biased by the beneficial effects of this action. Both beneficial and adverse effects have been taken into consideration. While there may be beneficial effects, this action does not rely on those effects to balance any potential negative effects.

2. *The degree to which the proposed action affects public health or safety.*

   There will be no significant effects on public health and safety and actions will provide safer conditions for forest visitors and workers. This project will increase our efficiency in fire suppression and prescribed burning. By removing heavy fuels, residual smoke concerns will be lessened on public roads and nearby private residents. This project will reduce risks to firefighters and workers, local residents and the public, and natural resources (EA, pages 4-5). Risks to public health from herbicide treatments have been analyzed in the Environmental Impact Statement for Vegetation Management in the Coastal Plain/Piedmont, Appendix A (Risk Assessment for the use of herbicides in the Southern Region, USDA Forest Service) and supplemented by the analysis in the Syracuse Environmental Research Associates Documentation. Negative effects will be mitigated below any level of significance through the implementation of Forest Plan guidelines.

3. *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*

   There will be no significant effects on unique characteristics of the area because heritage sites and wetlands will be protected. This project will enhance and restore components of the longleaf pine ecosystem. There are no park lands, prime farmlands, or wild and scenic rivers to be affected (EA, pages 9-11).

4. *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*

   The effects on the quality of the human environment are not likely to be highly controversial because there is no known scientific controversy over the impacts of the project (EA, pages 4-11).

5. *The degree to which the possible effects on the human environment is highly uncertain or involves unique or unknown risks.*

   We have considerable experience with the types of activities to be implemented. Based on my review of this project's analysis, I find that the effects are not uncertain, and do not involve unique or unknown risk (EA, pages 4-11).

6. *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.*

   This project is not likely to establish a precedent for future actions with significant effects because any future proposal must be evaluated on its own merits and effects. The actions in this project are in accordance with the best available science we have to manage fuels, fire behavior, wood boring insect threats, and enhance habitat for the red-cockaded woodpecker and restore the longleaf ecosystem (EA pages 4-11).

7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.*

   The analysis of this EA considered connected actions as well as the proposed action. The cumulative impacts were found not to be significant. Based on the analysis and disclosure of effects in the EA and specialist reports in the project file, the project does not represent potential cumulative adverse impacts when considered in combination with other past actions or reasonably foreseeable future actions (EA pages 4-11).

8. *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) or may cause loss or destruction of significant scientific, cultural, or historical resources.*

   The proposed action would have no adverse effect on districts, highways, structures, or objects listed in or eligible for listing in the NRHP. Prior to ground disturbing treatments, the area will be evaluated and sites, if discovered, will be excluded from proposed actions and measures to protect and monitor these sites will be taken. Appropriate language will be included in all contract specifications regarding the discovery and protection of heritage

resources. This project was designed to have no effect on scientific, cultural, or historical resources (EA, page 11).

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*

   The proposed action has undergone a Biological Evaluation to determine the potential adverse effects on any endangered or threatened species or its habitat that has been determined critical under the Endangered Species Act of 1973. No threatened or endangered species or designated critical habitat will be adversely affected by my decision (EA pages 7-8, Biological Evaluation).

10. *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*

    The action will not violate Federal, State, and local laws or requirements for the protection of the environment. Applicable laws and regulations were considered in this analysis (EA pages 4-11). The action is consistent with the Revised Land and Resource Management Plan for National Forests in Alabama, 2004.

United States Department of Agriculture

Forest Service

July

2007

Environmental Assessment

Healthy Forest Restoration

Southern Pine Beetle Abatement Project

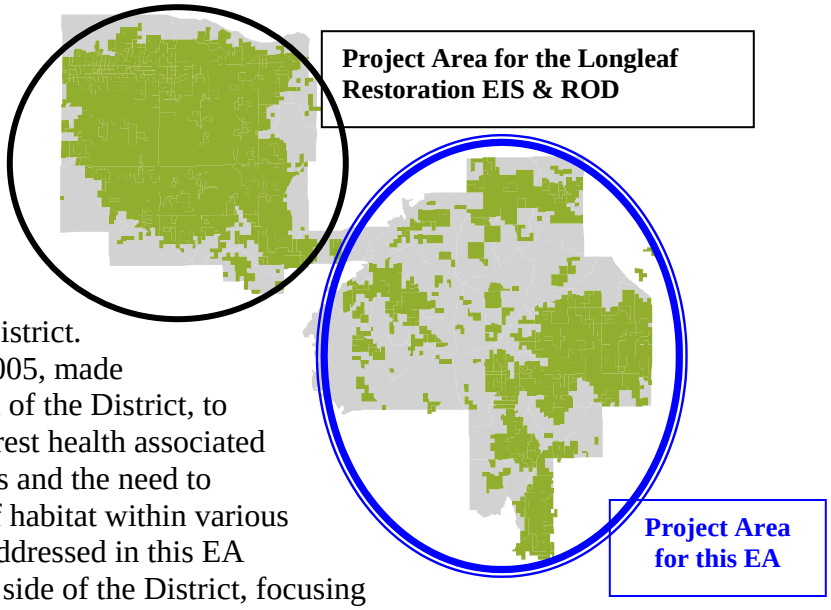
Talladega National Forest – Oakmulgee District
Bibb, Chilton, Dallas, and Perry Counties, Alabama

Responsible Official:
Cynthia O. Ragland
District Ranger
9901 Alabama Highway 5
Brent, AL 35034
205-926-9765

INTRODUCTION

The USDA Forest Service prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act and other relevant Federal and State laws and regulations, including the Healthy Forests Restoration Act of 2003 (HFRA). This EA discloses the reasonably foreseeable environmental impacts of this project to determine whether to prepare an Environmental Impact Statement or a Finding of No Significant Impact. The Oakmulgee District Office in Brent, Alabama has file copies of the reports cited in this EA as well as additional project documentation.

The project addressed by this EA targets abatement of southern pine beetle (SPB) infestations through restoration of healthy forest conditions. The project area is located on the eastern portion of the Oakmulgee District in Bibb, Dallas, Chilton, and Perry counties south of Centerville, east of Selma, and west of Maplesville, Alabama. This project complements the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Longleaf Ecosystem Restoration Project on the Talladega National Forest – Oakmulgee District. The FEIS and ROD, signed February 2, 2005, made strategic first steps, on the western portion of the District, to balance longleaf restoration needs with forest health associated risks associated with non-native conditions and the need to provide a flow and distribution of longleaf habitat within various age classes and conditions. This project addressed in this EA continues those strategic steps for the east side of the District, focusing specifically on upland pine stands in non-native conditions and those areas affected by SPB outbreaks. This EA also proposes preventative measures to reduce the susceptibility of red-cockaded woodpecker habitat to SPB infestations.



This project meets the requirements for authorization under the HFRA, specifically those relevant to Insect and Disease, and Threatened and Endangered Species. The Revised Land and Resource Management Plan for National Forests in Alabama (Forest Plan) lists two management prescriptions for the project area; Red-cockaded Woodpecker Management and Restoration of Coastal Plain Longleaf Forest. The desired future condition for these prescription areas is mature pines with an open park-like understory. Longleaf pine forest communities with open herbaceous understories dominate the areas. The pine communities are structurally simple shaped primarily by the use of frequent fires.

In tiering to the Forest Plan this document also incorporates the relevant portions of the Record of Decision, Final Environmental Impact Statement for Suppression of Southern Pine Beetle (R8-SPB) (USDA Forest Service – Southern Region, April 1987; Record of Decision, Final Environmental Impact Statement – Vegetation Management in the Coastal Plain/Piedmont (VMCP) (USDA Forest Service – Southern Region, January 1989); and the 2003 Recovery Plan for the Red-cockaded Woodpecker: second revision (RCW Recovery Plan), U.S. Fish and Wildlife Service.

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PURPOSE OF AND NEED FOR ACTION

The purpose of and need for this action is to address certain non-native, unhealthy forest conditions currently providing a suitable habitat for SPB. The proposed action addresses five needs: 1). Restoration of certain non-native loblolly stands to native longleaf; 2). Improved resistance of certain non-native loblolly stands to SPB infestations while concurrently providing interim wildlife habitat; 3). Improved resistance to SPB infestations of native longleaf currently providing habitat for active RCW clusters; 4). Suppression criteria to address active SPB infestations; and 5). Better delineation of mixed stands, transitions zones, and hardwood drains where past practices have resulted in non-native conditions.

The Talladega National Forest - Oakmulgee District (District) lands lie on the northern limits of the range of Alabama's native longleaf. The topography is rolling allowing a mosaic of forest types to exist intermingled with upland sites that were historically stands of open park-like longleaf forest. Today, for a variety of reasons, many of these native longleaf sites exist as over-stocked plantations of loblolly pines. This shift in the natural balance is producing symptoms of stress, both within these stands and within the larger ecosystem. These altered sites are considered to be exotic ecosystems (Ostrosina 2005) defined as pathologically unstable arising from edaphic and environmental changes brought about by past land use or current management practices. The instability resulting from the weakened or stressed conditions makes these stands highly susceptible to insect and disease infestation, specifically SPBs. Once SPB populations build up and become epidemic then otherwise, healthy trees, or stable ecosystems, are at risk. At the epidemic level SPB, infestations pose a threat to mature longleaf pine trees and RCW habitat. Left unchecked, SPB infestations can result in the loss of entire pine stands and subsequent build up of hazardous fuels.

The most recent SPB epidemic years for the Oakmulgee District were 2000-2001. During this period, the Oakmulgee had 615 spots within 119,000 acres of suitable host type (pine and pine-hardwood), thus meeting the criteria for epidemic status ($\geq$ 1 active spot/thousand acres of host type). Since that time, the SPB population on District lands has remained relatively low, with 2004 providing a moderate increase of 98 spots. Surrounding private lands were far less fortunate with five of the six neighboring counties sustaining epidemic status in 2004 and 2005.

Figure 1: SPB Status of Surrounding Private Lands by County (2003-2005)
Source: Alabama Forestry Commission

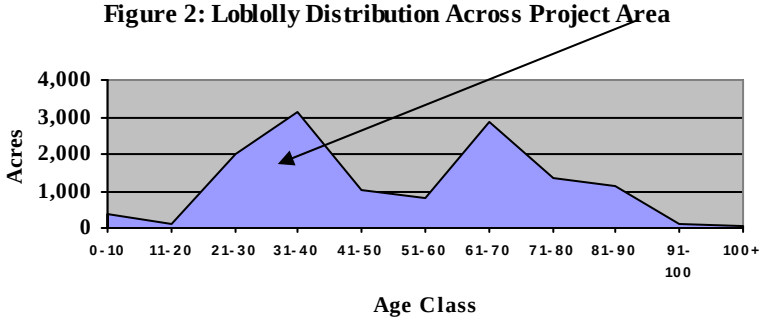
County	2003	2004	2005
Bibb	No	Epidemic	Epidemic
Chilton	No	Epidemic	Epidemic
Dallas	No	Epidemic	Epidemic
Hale	No	Epidemic	Epidemic
Perry	No	Epidemic	Epidemic
Tuscaloosa	No	No – 11 Spots	No – 18 Spots

Since the epidemic years of 2000-2001, no preventative treatments were implemented on the national forest lands in the project area. In addition, while the EIS ROD allows preventative treatments on the at-risk areas on the west side of the Oakmulgee District, there have been limited treatments actually implemented. Thus, the unhealthy forest conditions that existed during epidemic years remain today and have likely increased over the years. The District has experienced wind stress from hurricanes during the falls of 2004 and 2005. The U.S Drought Monitor currently lists west-central Alabama as being in a severe drought.

The purpose of this EA is to provide the analysis and decision tools to enable a proactive site-specific program to address non-native conditions of certain loblolly pine plantations existing in areas of high SPB infestation risks. It provides a means to bolster native longleaf conditions adjacent to active RCW clusters to retard potential SPB infestations in epidemic conditions. This Project addresses the scenarios under which treatments would be applied for immediate control and suppression in the event that SPB outbreaks occur prior to preventative treatments or before forest-conditions could respond to treatments and become resistant. This project does not include other forest health concerns such as the older declining loblolly stands. While these concerns are serious, these stands do not present as great a risk to future SPB infestations now that many of them have degraded to mixed pine-hardwood conditions.

Represents areas of over stocked loblolly pine with high susceptibility to SPB

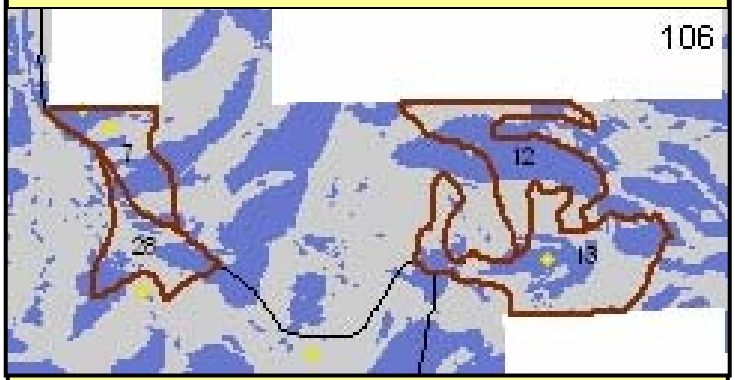
Figure 2: Loblolly Distribution Across Project Area



To determine the Proposed Actions for this Project Area, the District utilized stand data and age class distribution to identify areas of high susceptibility to SPB infestations **(Reference Figure 2: Age Class Distribution of Loblolly Pine within the Project Area).** Inventory data indicates that the loblolly pine plantations established from the mid-1960s through the late 1980's have a high likelihood of being off-site or otherwise existing in non-native conditions. The data query used to base the proposed actions for loblolly pine stands consist of 141 stands planted between 1965 and 1988, with a combined mapped acreage of 5,820 acres.

To define the Proposed Actions for these 141 stands the District utilized the Loblolly Decline Risk Map (LDRM) to depict several site indicators relative to risk associated with loblollies on what is more appropriately described as native longleaf sites. While the LDRM was designed to predict the on-set of decline in loblolly stands over the age of 40, in this scenario it is used to weigh the risks associated with younger loblolly stands, and serve as decision support to select those stands best suited for immediate restoration back to native longleaf.

Figure 3: LDRM and Selected Loblolly Pine Stands



Reflected in blue are the areas at high risk for stresses associated with loblolly decline. The areas outlines in red are those stands selected for treatment. Approximately 50% of Stand 12 is mapped to be high risk; however, the stand does not have a history of SPB infestations. To the contrary, 50% of Stand 7 is mapped as high risk, and it has a history of SPB infestation (yellow dots), therefore it is placed as a higher priority for restoration than Stand12.

Using the coarse filter, "high" and "low" risk LDRM criteria, the percentage of the stand considered "high risk" for stresses associated with loblolly pine decline was determined for each of the identified 141 stands. Prior SPB infestations were mapped to identify the previously infested stands. **(Reference Figure 3: LDRM and Selected Loblolly Pine Stands)** The District also documented those stands adjacent to private lands. To prioritize these stands for possible action, a decision matrix was developed. The matrix examined six levels of risk relative to SPB infestation and the need to restore to longleaf.

Through this process, 51 stands were identified to have a history of SPB infestation, and a greater than 50% of the stand acreage meeting the LDRM criteria for "high" risk. It was also determined that 29 of these high-risk stands were adjacent to private lands **(Reference Figure 4: Decision Support Matrix Summary Table).** From this decision support matrix the 51 stands with greatest risk for future SPB infestation are proposed for immediate restoration to longleaf.

Figure 4: Decision Support Matrix Summary Table

Relative Risk of SPB Infestation	No. of Stands
No SPB history; < 50% high risk LD	27
No SPB history; ≥50% high risk LD	13
No SPB History, ≥50% high risk LD, & adjacent to PVT lands	16
SPB history, <50% high risk LD	34
SPB history, ≥50% high risk LD	22
SPB history, ≥50% high risk LD, & adjacent to PVT lands	29
	141

The 34 stands identified in Figure 4 as having a SPB history, but <50% of the stand meeting the LDRM criteria for high risk were examined using current aerial photography to determine how much of the stand was still intact relative to past SPB infestations. Thirty of the 34 stands were determined to have sustained significant fragmentation from SPB associated activities. The integrity of these stands is compromised and they are proposed for restoration treatments.

The remaining 60 stands had no history of SPB activity and are on sites with lower risk for loblolly decline. However, they exist in an over-crowded condition and are at risk for SPB infestation. By reducing the tree density, the risk for SPB infestation decreases. Thus, these stands are proposed for a thinning to obtain a 50-60 sq ft of basal area (BA) condition. (Note: A retained BA of 50 – 60 sq. ft. allows sunlight penetration to the forest floor in anticipation of stimulating desired understory conditions of grasses and herbaceous vegetation.)

There are seven active RCW clusters within the project area. To lessen the risk of SPB infestations within the nesting and foraging habitat for these clusters, generally in the event of epidemic conditions, thinning is proposed in longleaf stands greater than 17 years old within ½ mile of the active cluster center. The proposed thinning will constitute 36 stands of approximately 878 acres.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This proposed action, authorized under the Healthy Forest Restoration Act (HFRA), provides protection to Threatened and Endangered Species habitat from the potential insect and disease epidemics, associated risk from fuels buildups, and subsequent destructive wildfires. The project

area consists of National Forest System lands on the east side of the District. This project addresses BOTH the treatment of active SPB infestations as they occur, and preventive treatments targeting stands at high risk for future SPB activity.

No Action: Under the No Action Alternative, current plans with documented decisions complying with the NEPA process would continue to guide management of the Project Area. There would be no restoration of off-site or exotic loblolly stands. Management would be limited to those actions currently under decision such as prescribed burning on a 3-5 year rotation and custodial forest management and resource protection measures such as erosion control, wildfire suppression, and routine road maintenance. Preventative measures or restoration activities are not allowed under custodial forest management. SPB infestations would only be addressed by "cut and leave" treatments AFTER insect and disease infestations occurred.

The Proposed Action: The following proposed actions are in addition and complementary to the existing decision to implement a prescribed burning program across the project area on a 3-5 year rotation. To maintain consistency in terminology used to achieve restoration results the definitions used in the Longleaf Ecosystem Restoration Project are also applied to this project. Treatments proposed to meet the purpose of and need for action are to:

- **Areas of Concern 2:** Restore species composition on approximately 81 stands of loblolly pine (approximately 20-40 years old) existing on high-risk sites (LDRM), with previous SPBs infestations to the point the stands have become highly degraded. (Forty-five of the identified 81 stands are adjacent to private lands). Remove remaining loblolly pine stems and re-establish longleaf pine seedlings, along with native understory species such as bluestem grasses. Treatments include the herbicide applications to achieve the necessary site preparation and control of over-abundant woody stems. On an estimated 500 acres mechanical treatments may be used to address areas of SPB infestations where heavy debris now exist impeding planting success. (Approximate acres: 3,786)
- **Areas of Concern 3:** Reduce the risk of SPB infestations by modifying the structure of dense loblolly pine (approximately 20-40 years old) placing emphasis on approximately 60 stands existing on upland sites in an over-stocked condition. Thin these areas by removing 50% or more of the existing stems resulting in an open park-like stand. Residual tree selection will be achieved utilizing crown ranking criteria to achieve the most resilient stand practicable. The use of herbicides, along with prescribed fire, may be needed to establish and maintain desired grass and shrub component within the understory. (Approximate acres: 1,907)
- **Areas of Concern 4:** Reduce the risk of SPB infestations in 36 native longleaf stands currently providing foraging and nesting habitat to active RCW clusters by removing overstocked trees to achieve open park-like conditions as defined by the RCW Recovery Plan as Good Quality Foraging Habitat, and within this treatment, reduce the probability of SPB infestations. The use of herbicides, along with prescribed fire, may be needed to establish and maintain desired grass and shrub component within the understory. (Approximate acres: 878)
- **Suppression:** Address active SPB infestations meeting treatment design criteria by cutting and removing, or cutting and leaving infested trees along with buffer trees to serve as a buffer at the "head" of infestation. Prior to actual suppression activities SPB monitoring will take place during the spring emergence period (Mar-April) to help predict potential for outbreaks. Staffing tools such as the Incident Command System may be initiated based on monitoring to improve response time.

- **Proposed Action Design Criteria for Suppression of Active SPB Infestations:**
  - Active SPB infestations will be treated when 5-10 freshly attacked trees are present, and there is suitable host type (live pine trees) available for additional infestation.
  - 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.
  - Treating SPB spots threatening RCW clusters or critical RCW habitat and those likely to spread to adjacent private ownership with susceptible host type will be a priority.
  - 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.
  - 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.

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).

Connected actions are not a part of the decision process relative to this project. They are actions that are currently occurring or that the District has plans to implement within the Project Area. They include a continued prescribed burning regime (3-5 year rotation that includes both dormant and growing season burns) to mimic historic fires, artificial cavity construction and midstory control in RCW nest areas as needed, and intra-population translocation of RCW from other active clusters for "strategic" recruitment populations to augment the resident population. Connected Actions also include the Longleaf Ecosystem Restoration Project, although it is outside the project area for this project. The analysis within this EA will consider these connected actions.

Concurrent Actions Outside the Scope of the Decision:

- Prescribed burns following salvage, restoration, and thinning operations will be a priority. Timing of the prescribed burn will be contingent upon obtaining desirable parameters to meet burn plan objectives and the ability to conduct operations in a safe manner.
- In the unfortunate event of SPB infestations reaching a size greater than ten acres and the site is not addressed as an AOC 2 treatment site in this proposal, the affected area will be examined for potential restoration to longleaf. Given that the Oakmulgee has been relatively successful in suppressing SPB infestation before they reached ten acres, this possible restoration treatment is

not addressed within this proposal. Southern Pine Beetle infestation spots less than ten acres in size are considered part of a natural disturbance regime and will provide associated benefits until they can be examined as part of a larger restoration effort.

- Biomass Project: Stands selected for treatment in this project may become a part of an ongoing project testing the feasibility and outcomes of removing small diameter wood for use as biomass in energy production. The study will test various parameters of biomass harvesting including effects to residual stands.

- The next landscape-level analysis for the Oakmulgee will be the Perry Mountain Longleaf Restoration/RCW Expansion project. It is likely that this project will address the loblolly stands older than age 40 that are at risk for loblolly decline and thus not sustainable for RCW habitat. This project area is currently loosely defined as the national forest lands south of highway 183 and east of highway 219. As this project is not yet fully defined, it was not included in the site-specific cumulative effects analyses for this project.

Figure 5: Comparison of Proposed Action and No Action Alternatives, Healthy Forest Restoration – Southern Pine Beetle Abatement Project, Talladega National Forest – Oakmulgee District, 2007

	Proposed Action	**No Action**
SPB PREVENTION		
Restoration (Clear-cut with reserves) of Exotic Stands to Native Longleaf (Acres[1]) **– AOC 2**	3,900	0
Intermediate Treatment (Thinning) of Exotic Stands to reduce risk of SPB and begin understory restoration (Acres[1]) **– AOC 3**	1,920	0
Intermediate Treatment (Thinning) of Longleaf Stands to Prevent SPB Infestations within Active RCW Clusters. (Acres[1]) **– AOC 4**	878	0
Concurrent & Contemporaneous Actions		
Temporary Haul Roads, includes re-vegetation (Miles)	46	0
Rights of Way Needed (Miles)	18	0
Site Preparation - Herbicide and Burn (Acres[1])	3,900	0
Site Preparation[2] – Mechanical (Acres[1])	500	0
Planting longleaf seedlings (Acres[1])	3,900	0
Release of seedlings – Herbicide (Acres[1])	3,900	0
Understory enhancement – Herbicide (Acres[1])	1,920	0
Treatment of midstory – Chainsaw and Herbicide (Acres[1])	878	0
SPB SUPPRESSION	Unpredictable	Unpredictable

[1] Acres presented are approximations based on previous field surveys and mapping in GIS.

[2] Site preparations of BOTH Herbicide and Burn AND Mechanical is unlikely, however they are listed as additive to facilitate analysis relative to cumulative effects.

Note: There are six stands over 80 acres selected for restoration to longleaf. In accordance with Forest Plan guidelines FW- 51 & FW- 52, these stands will be assessed to determine the appropriate location to divide the stand to provide a minimum of 330 feet between the resulting openings.

DECISION TO BE MADE:

The decision to be made is whether to implement the proposed action or to continue without a strategy for Southern pine beetle abatement as outlined in the No Action Alternative.

PUBLIC INVOLVEMENT, COLLABORATION AND PARTNERSHIPS

The Oakmulgee District began formal public involvement for this project on May 18, 2005 by mailing a letter requesting comments to 246 recipients. This letter requested the recipients respond to two levels of analysis, (1) the immediate need to suppress existing SPB infestations, and (2) an Environmental Analysis, which evolved into this Proposed Action. This public involvement effort resulted in three responses. All three respondents provided comments regarding the Environmental Assessment (this project). No significant issues were raised relative to the immediate treatment of SPB infestations.

On April 13, 2007, with the Southern Pine Beetle Abatement EA nearing completion, letters were mailed to 229 recipients inviting them to a public meeting to be held on April 26, 2007. Press releases were also sent to local papers informing the public and inviting them to the meeting. The Bibb County Chamber of Commerce posted the notice on their web site.

During this meeting, the proposed actions were presented along with the methods used to arrive at those actions. There were six non-Forest Service individuals present. No specific comments were received only clarifications on points of interest.

(1) Legal notice of objection period is scheduled to be in the *Tuscaloosa News* (paper of record) on May 14, 2007 with opportunity to object to the proposed action to conclude 30 days following publication.

(2) Final copies of the Environmental Assessment were mailed on May 11, 2007 to those individuals and groups that expressed interest at the public meeting or in response to the invitation letter or newspaper articles. Instructions relative to the 36 CFR 218 Pre-decisional 30-Day Objection process were provided.

Reference Appendix M for a more detailed report on public involvement.

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This section summarizes the potential environmental impacts of the proposed action to provide the necessary information to make an adequate determination in the Finding of No Significant Impact. Resource specialist reports for this project contain further analyses and discussions and are available in the project file.

As outlined in the following sections the current conditions of crowded, off-site loblolly pine plantations pose a significant threat to RCW habitat through the build up of host conditions for SPB. The native longleaf ecosystem and its associated native fire regimes have been altered resulting in an array of unhealthy forest conditions some of which may manifest as insect epidemics and unstable fire conditions.

Proposed, Endangered, Threatened, and Sensitive Species

Five federally listed endangered species are considered in this project, however four are excluded from analysis as the specific treatment areas, or their access routes, are not currently appropriate or

potentially appropriate habitat for the species. The red-cockaded woodpecker is the only endangered species considered in this analysis and it was determined that the proposed action would not adversely affect this species.

Seven federally listed threatened species were considered in the project all of which were excluded from analysis due to the treatment areas, or their access routes, not being within the range of the species, or that the treatment areas, or their access routes not currently appropriate or potentially appropriate habitat for the species. There are no federally proposed species applicable to the project area.

There were 46 Regional Forester's Sensitive Species considered in this project. Two species, Bachman's sparrow and Arkansas oak were considered in detail, with the remaining species excluded due to project area not being within the species' range and/or the project areas not currently appropriate or potentially appropriate habitat for the species. The proposed action was found to possibly impact individual Bachman sparrows but not likely to cause a trend toward listing or loss of viability. The proposed action was found to have beneficial impacts to the Arkansas oak.

Red-cockaded Woodpecker (RCW): The Oakmulgee District hosts Alabama's largest red-cockaded woodpecker (RCW) population and is listed in the Revised RCW Recovery Plan (Red-cockaded Woodpecker, *Picoides borealis*, Recovery Plan, Second Revision, U.S. Fish and Wildlife Service, 2003) as a secondary support population, which has a target population of 250 breeding clusters. The project area contains ten known active clusters, encompassing what is currently the entire RCW population for the National Forest lands on the eastern portion of the Oakmulgee District. Seven of these ten clusters are within close proximity to AOC 2 and AOC 3 stands, presenting a potential risk to the RCW habitat given the possibility of an SPB epidemic.

Recognizing the importance of these seven cluster sites to future population stability and expansion on the Oakmulgee's east side, this project proposes habitat enhancement on approximately 878 acres in AOC 4. Designed to buffer these cluster sites against potential SPB infestations this project proposes to bring the cluster sites, and associated longleaf foraging habitat, into the best possible condition. While not possible to enhance all of these identified AOC 4 stands to meet the full criteria of Good Quality Foraging Habitat as defined by the Recovery Plan, the proposed treatments will move these stands forward achieving some of the criteria.

For the purposes of analysis, the seven active RCW clusters are aggregated into five cluster groups defined by plotting available habitat within ½ mile of the cluster centers. **Figure 6: RCW Habitat Availability** depicts each of the cluster analysis areas and the amount of pine and pine-hardwood available for foraging. In each analysis, the clusters have adequate foraging (greater than 120 acres) without having short-term negative effects due to the restoration treatments in AOC 2 stands. In actuality, the nine AOC 2 stands proposed for restoration are not currently serving as habitat due to damages suffered from prior SPB infestations and the over-stocked conditions. In their current condition, these AOC 2 stands are putting the adjacent RCW habitat at risk to SPB infestations. Therein the RCW are better served, both in the long and short term, by restoring these areas to native longleaf conditions. There are two AOC 3 stands within the ½-mile habitat radii of the known RCW clusters. Although, these stands may not be

long-term sustainable habitat, the proposed actions will allow these stands to become short-term improved habitat.

Figure 6: RCW Habitat Availability

Cluster Group	Cluster Numbers	Pine & Pine-Hwd Acres (not in AOC2)	Acres improved by proposed AOC 4 Treatment	AOC 2 Acres restored to longleaf
Cahaba	119, 149, 220	730	465	72
Perry Mt.	70	345	103	0
Vick's	126	373	81	65
Roy Martin	53	265	76	127
Oakmulgee Ck	388	256	153	0
		1,969	**878**	**264**

Bachman's sparrow: Impacts to individuals are expected as the proposed actions may cause mortality or habitat loss in the short term. However, these actions are necessary to provide the long-term benefits to the population. Improved population health is more critical than the loss of a few individuals, especially as these habitats are not generally maintained on private lands and public land management is increasing in importance.

Arkansas oak: Regular use of fire and canopy removal should have beneficial effects to restoring habitat for this species. Restoration activities may disturb individuals in the short-term, however overall conditions should improve in the long-term.

Fuels Management and Public Safety

The presence of heavy fuels resulting from SPB mortality will negatively affect the ability of the Oakmulgee District to implement a safe, effective, and cost-efficient prescribed burning program. Simultaneously addressing fuels mitigation and SPB risk, as outline in the proposed action, will reduce fuel bed contributors, encourage herbaceous and grass understory, and mitigate the hazards faced in these existing heavy, fuel-loaded stands.

Public Safety and Wildland Urban Interface: The highest priority established by the Federal Wildland Fire Management Policy is the health and safety of firefighters and the public. Human communities are high priorities for fuels management and fire protection. In SPB damaged areas, it is expected that needles and woody fuels will accumulate due to delayed mortality of the infested trees. The shrub component is expected to develop rapidly on some sites due to reduced over-story **(Reference Figure 7: Canopy loss from prior SPB infestation in overstocked pines).** Under normal conditions, fire behavior in SPB damaged stands is predicted to exhibit low rates of spread and flame lengths; although there is substantial increase from overstocked stands not infested by SPB. Under drier conditions with less favorable weather, moderate fire behavior is expected in SPB damaged areas. In these conditions, fires are potentially dangerous to personnel and equipment; hand-lines cannot be relied on to hold fire. Fire managers should expect more active fire behavior and should take extra precautions. These conditions can potentially result in serious smoke management problems, increased difficulty in control, and added risks to firefighter and public safety.

Fuels Management: High intensity or severity fires in the SPB damaged stands could have serious detrimental effects including increased mortality in the residual stand. This would include loss of RCW cavity trees. Resource damage is most evident in areas with heavy concentrations of downed trees and tops. The removal of the large diameter fuels, as proposed, will reduce these threats by decreasing the potential for high intensity or high severity fires during dry conditions. The proposed actions will be important in mitigating the threats of high severity wildfires that may occur during severe weather or drought conditions. The proposed actions will also help the District to achieve Fire Regime Condition Class 1, in which vegetation and fuel conditions approximate the natural conditions; and the threats to ecosystem components due to high intensity or severity wildfires are relatively low.

Figure 7: Canopy loss from prior SPB infestation in overstocked pines

Insects, Disease, and Forest Pathogens

Loblolly Pine Decline: Declining loblolly pine was first reported within the Talladega National Forest in 1959. Symptoms were expressed by short chlorotic needles, sparse crowns, and reduced radial growth. These symptoms occur primarily in trees about 40 years old. Mortality usually occurred two to three years after the first expressed symptoms. From the early 1960's to present, there have been multiple monitoring plots and investigations examining the causes of loblolly decline. Through this work, loblolly decline can best be defined as a complex of inter-related biotic and abiotic stressors. Decline sites are predominately upland sites with a history of previous agriculture and not well suited for long-term management of loblolly pine. On upland pine, sites on the Oakmulgee loblolly should be managed to a rotation age of 50 years. (Forest Health Report 2005-02-04, Assessment of Loblolly Pine Decline on the Oakmulgee Ranger District, Talladega National Forest)

Since a 50-year rotation does not provide for long-term sustainable habitat for RCW, the proposed actions of restoring stands classified as AOC 2 should have a long-term benefit to RCW. In addition, restoring these stands, located on high-risk sites, prior to age 50 should remove the risk of loblolly decline. What is still debated is the complex of conditions that may already be present in the soils within these stands and if those stressors will present concerns to the planted longleaf stands. These concerns hold true for both the AOC 2 and AOC 3 stands. If the loblolly decline stressors are currently present in the AOC 3 stands, then there is a possibility that the additional stress of the mechanical operations of thinning could worsen the effects of the decline. Whether the benefits of thinning the stand will offset the potential negative stresses is unknown. While outside the scope of this decision, study plots will be established within the AOC 2 and AOC 3 treatment areas to assess and examine the affects of treatments to the loblolly decline stressors.

The AOC 4 stands are native longleaf sites that at this time are not documented to have the complex of stressors associated with loblolly decline. Thus, the treatments with AOC 4 stands should not have an effect.

Southern Pine Beetle: Southern pine beetles are native to southern pine forests and at low population (endemic) levels infestations are generally confined to stressed or dying trees. On the Oakmulgee District, the availability of stressed, over-stocked, loblolly plantations is providing suitable conditions for SPB population expansion. Within the Project Area approximately 5,800 acres of loblolly pines, roughly 20 – 40 years old, exist in an over-stocked, non-native condition. These stands represent areas where improved loblolly seedlings were planted during 1965 through 1988.

The proposed action of treating AOC 2 stands by harvesting and restoring longleaf pine should remove the threat of SPB infestations, especially in the short-term. Long-term risk should be abated as well, as longleaf are less susceptible to SPB than loblolly and given the more open planting regimes, it is unlikely these stands will become overly dense. The proposed thinning treatments for the AOC 3 should also reduce the risk to SPB infestations. The increase in spacing between trees serves as a physical limitation to emerging beetles finding suitable host trees. The question exists as to whether the proposed treatments can be implemented prior to SPB infestations occurring. In that situation, the design criteria will provide the best possible scenario for treating active infestations. While not as affective as prevention, suppression treatments have short-term benefits by curtailing further damage to adjacent pines.

The preventative treatments in AOC 4 provide the best possible measures against future SPB infestations in RCW habitat. While potentially even more longleaf stands could be treated to bolster their resistance against SPB, the proposed areas address the specific threats from AOC 2 and AOC 3 stands within ½ mile of an active cluster.

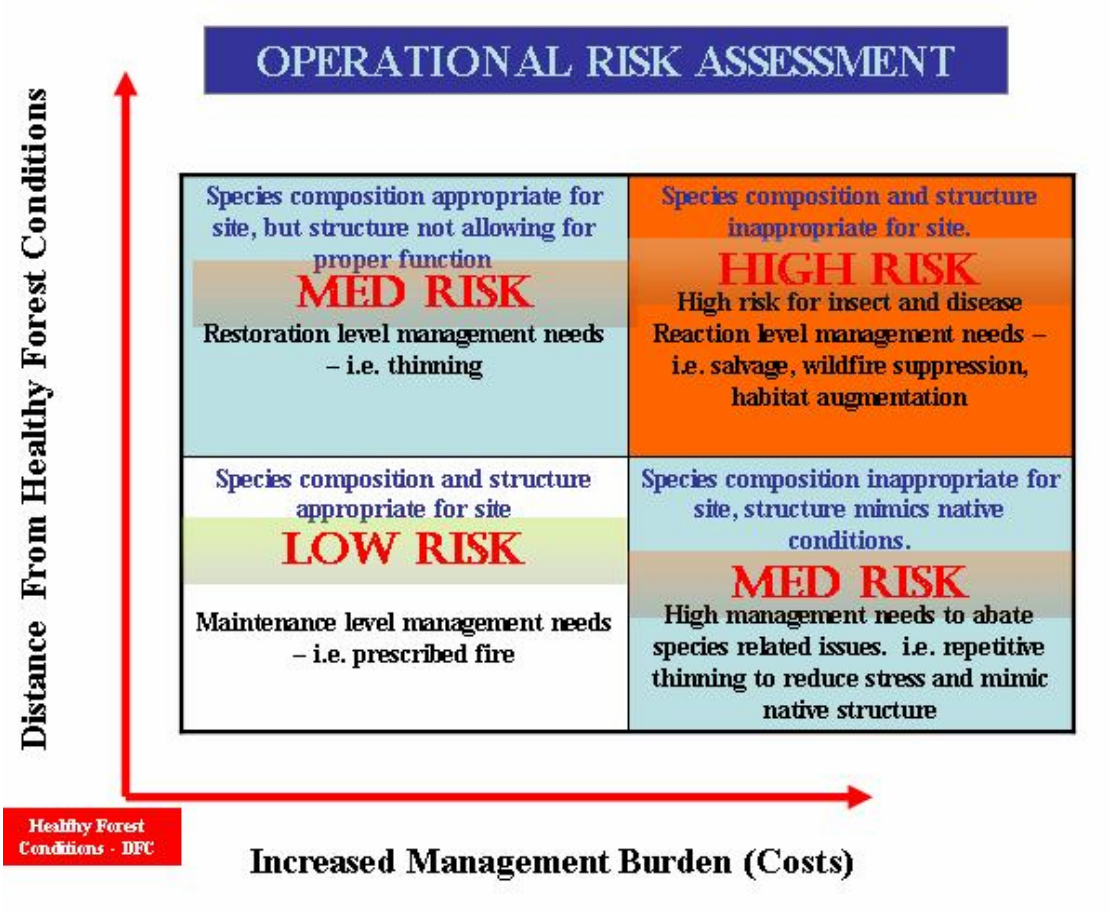
Economics

The proposed actions address a range of concerns resulting from past actions and the subsequent unhealthy forest conditions. It is unlikely that these unhealthy conditions could have been predicted when they were initiated 20 to 40 years ago. None-the-less these unhealthy conditions must be addressed. The cost of restoration is high; however, the cost of an unhealthy forest is higher.

There is an array of unknown factors contributing to or detracting from the economic feasibility of the proposed action. The total volume estimated from the proposed action is 111,343 CCF. Current markets indicate the volume to have an estimated value of $3.7 million. The re-establishment of longleaf seedlings in AOC 2 areas is likely to cost $2.7 million and the required deposit of 35% of receipts into the National Forest Fund equals an estimated $1 million. Under this scenario, the remaining restoration needs of an estimated $1.6 million would have to be secured from sources beyond timber receipts. There is also another potential cost that cannot be adequately analyzed and that is the cost of suppression in the event that prevention measures cannot be enacted in a timely manner. With a locally depressed pulpwood market it is likely that a cut and leave operation would have to be implemented to suppress active spots. In an epidemic year, this could be as high as $50,000 for contract costs.

The economic effects of the no action alternative are potentially devastating and very difficult to quantify. Most of what would be at risk are the intangibles such as biodiversity and a healthy forest. There would likely be a cost to suppress active SPB infestation and fire suppression would increase. It is almost certain that the effects would not be contained on National Forest lands and that costs would be incurred by the private landowner.

In summary, a healthy forest is more cost effective to manage. Reference the operational risk assessment model for cost increases relative to unhealthy forest conditions.



Soil and Water Resources

Water Resources: Management activities are proposed in nine 6th level watersheds located in the project area. All of the affected watersheds are predominately forested with a significant wetland component. Ownership within these watersheds is varied, ranging from 38% to 1% National Forest System lands. The proposed management activities in AOCs 2, 3, & 4 as well as suppression activities in both the Proposed Alternative and the No Action Alternative are known to potentially affect water quality, water quantity, channel morphology, and downstream designated uses. Potential direct effects from these activities are erosion, changes in ground cover conditions, and changes in stand composition of streamside forest communities. Indirect effects could include sedimentation, changes in stream nutrient levels, increases in water yield and changes in stream flow behavior.

Silvicultural activities associated with AOC 2 sites will have the highest potential for effects. Activities associated with AOC 3 and AOC 4 sites would have much lower potential for effects. The temporary roads associated with the proposed Silvicultural activities are also known to potentially affect water quality, water quantity, channel morphology, and downstream designated uses. While considerable precautions are mandated, water pollution by the application of herbicides can occur during storage, transport, application, clean up and/or container disposal. Direct effects of herbicide application are potential chemical contamination of surface and ground water yield. Slight increases in stream nutrients, particularly nitrates may also occur as an indirect effect. The mechanical site preparation proposed on an estimated 500 acres have the potential direct effects of changes in ground cover, increased soil exposure, surface soil compaction, and exposure of subsurface soil layers.

The cumulative effects based on the Clingenpeel Model indicate that the implementation of the proposed action would result in minimal increases in sediment yield but only on a very short temporal scale, less than seven years.

Soil Resources: Soils with the boundaries of the proposed project are located primarily in the Gordo Formation Landtype Associated (LTA) of the Upper Clay Hills Subsection and the Coker Formation LTA of the Middle Coastal Plain. Land surface form is characterized as moderately dissected uplands with either low relief or moderate relief.

Disturbance of soils from proposed acres 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. Nutrient removal can be expected to be greatest for AOC 2 resulting from the removal of pine stems from the site. AOC 3 proposed treatments are expected to have greater nutrient removal than AOC 4 treatments. Temporary roads to access proposed treatment stands as well as the associated skid trails are known to affect the soil resource primarily through the nutrient removal, soil compactions and soil erosions. Nutrient loss is greatest on temporary roads since the surface organic layer and surface soil in removed in the process of construction. Full recovery can take as long as 20 years. Skid trails within thinning operations generally do not remove organic or soil surface layers. Skid trails within the restoration areas can be expected to remove some organic material and have exposed soils as high as 50 percent.

Herbicide use has no known direct or indirect effects on the soil physical and chemical properties. Herbicides may affect soil productivity through biotic impacts, soil erosion, and nutrient leaching. Prescribed burning 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. The potential for negative effects increases with the severity of the burn. A high risk from soil erosion occurs on constructed fire lines where soil exposure is necessary to maintain control of the fire. Mechanical treatment of 500 acres in AOC sites is not expected to disturb the surface soils as it generally runs over the large woody debris left by prior SPB infestations. Compaction of the soil will occur where equipment runs over the ground as opposed to on top of the debris.

Cumulative effects to the soil resource from the proposed actions are expected to peak in 2009 and continue through 2013. No long-term loss of soil productivity is expected. Short-term soil loss is expected on temporary roads and fire lines.

Forest Composition and Structure:

Understory Vegetation: Restoring forest structure and function addresses the full suite of flora and fauna within the project ecosystem. The proposed action attempts to restore several key components. The most radical change will be in species composition of the future dominate over-story species, i.e. converting the loblolly plantations to open, park-like stands of longleaf pine. The restoration of the understory species will likely depend on the current condition of the stands relative to soil productivity and history of fire. In many cases, fire may have been excluded for a period and has allowed a build up of undesirable rootstocks such as sweet gum. In these cases, the use of herbicide is desirable to reduce the competition of more adaptive plant species allowing the longleaf and associated grasses to become established. As discussed in the proposed action, the use of herbicide in preparation of longleaf establishment and as a means to allow grass development will be used as an adaptive management tool in the situation where fire does not, or can not be applied to, achieve the desired results.

The proposed action includes using the following EPA approved herbicides:

Imazapyr: For both aquatic and terrestrial animals, the weight of evidence suggests that no adverse effects are plausible using typical or even very conservative worst-case exposure assumptions. This characterization of risk must be qualified. Imazapyr has been tested in only a limited number of animal species and under conditions that may not well-represent populations of free-ranging target animals. Notwithstanding this limitation, the available data are sufficient to assert that no adverse effects associated with the toxicity of imazapyr can be anticipated in terrestrial or aquatic animals from the use of this compound in Forest Service programs (SERA, 1999).

Triclopyr: This herbicide is listed as low to moderate toxicity to wildlife. The amine formulations of this chemical are relatively nontoxic to fish, but the ester formulation is highly toxic to fish because the oil coats the gills of the fish and make it difficult for them to breathe. Therefore, the locations where this herbicide is used will be important and the proper formulation will vary depending on the site of application. In the risk assessments completed by SERA (2003b) there was a concern that lethal doses could be achieved through consumption of contaminated vegetation at the maximum application rates.

Management Indicator Species (MIS): The Forest Plan selected 12 MIS because their population changes are believed to indicate the effects of management activities. Relative to this project four species were selected from the Forest Plan list that are indictative of the management activities within the proposed action. **Figure 8: Predicted Population Effects to Management Indicator Species** lists the predicted long and short-term effects to each of the four species. Of the four species listed, only the white-tailed deer is not predicted to have short-term population decreases from the No Action alternative. This is due largely to the adaptive nature of deer. It would be unlikely that deer would show a decrease at the population level from increased SPB infestations or the continuation of over-stocked stands. However, all species are likely to respond with population increases over both the long and short term once the proposed action is implemented.

Figure 8: Predicted Populations Effects to Management Indicator Species

	No Action	Proposed Action
Red-cockaded Woodpecker		
Short-term	--	+
Long-term	--	++
Eastern Wild Turkey		
Short-term	-	+
Long-term	--	++
Northern Bobwhite Quail		
Short-term	-	+
Long-term	--	++
White-tailed Deer		
Short-term	-	+
Long-term	-	++

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

APPENDICES

Appendix A: Decision Matrix – Risk Assessment
Appendix B: Treatment Areas
Appendix C: Forest Structure and Composition
Appendix D: Biological Evaluation – Threatened and Endangered Species
Appendix E: Biological Evaluation – Regional Forester's Sensitive Species
Appendix F: Specialist Report, M. Thorning_Wildlife Management Indicator Species
Appendix G: Specialist Report, S. Gantt_ Fuels Management
Appendix H: Specialist Report, J. Fowler_Economic Considerations
Appendix I: Specialist Report, J. Edwards_Water Resources
Appendix J: Specialist Report, A. Goddard_Soil Resources
Appendix K: Specialist Report, W. Dunk_Access Considerations
Appendix L: Specialist Report, S. Mizelle_Cultural Resources
Appendix M: Public Involvement Report

DECISION MATRIX
(SPBIS DATA and TM STAFF)

Comp	Stand	Gis_acres	For_type	Condition	Age_year	Land_class	Inc_acres	Mgt_type	SPB # History	% LD High Risk	Adj to Pvt
101	1	18.41	31	11	1980	500	0	31	0	40	Y
101	2	18.75	31	11	1979	500	0	31	0	40	Y
101	7	30.47	31	11	1980	500	0	23	0	25	Y
101	6	36.15	31	11	1980	500	0	53	1	15	Y
102	4	190.86	31	11	1965	500	0	21	4	60	Y
102	5	69.06	31	12	1966	500	3	21	2	20	N
102	12	46.67	31	12	1965	500	4	21	0	50	Y
103	13	10.33	31	12	1970	510	2	31	0	40	Y
103	15	28.00	31	11	1965	500	2	21	2	40	Y
103	14	24.87	31	11	1970	500	0	21	0	20	N
103	16	122.86	31	11	1970	500	2	21	0	50	Y
103	18	39.00	31	11	1965	500	7	21	0	60	N
103	23	25.00	31	11	1968	500	2	21	2	80	Y
104	1	11.83	31	11	1970	500	0	21	1	30	N
104	4	16.03	31	11	1973	500	0	21	2	20	Y
104	34	23.46	31	11	1973	500	0	21	1	10	N
104	13	61.06	31	11	1970	500	0	21	3	70	N
104	12	32.64	31	12	1970	592	0	21	1	40	N
104	9	38.97	31	11	1973	592	0	21	0	50	N
104	16	31.55	31	11	1970	592	0	21	1	25	Y
105	3	56.91	31	11	1972	500	0	21	2	50	Y
105	5	50.54	31	11	1972	500	4	21	4	60	Y
105	22	40.23	31	11	1972	500	2	21	3	50	N
105	28	29.50	31	13	1972	500	2	21	0	60	N
106	1	37.70	31	11	1970	500	9	21	3	50	Y
106	12	38.76	31	11	1975	500	0	21	0	50	Y
106	7	22.14	31	11	1970	500	0	21	2	60	Y
106	13	55.16	31	2	1975	500	0	21	0	40	Y
106	32	29.33	31	11	1970	500	6	21	0	80	N
107	33	24.95	31	13	1972	500	0	31	1	75	N
107	28	22.54	31	13	1970	500	0	31	1	50	N
107	32	19.75	31	13	1972	500	0	31	1	50	N
107	20	11.54	31	13	1972	500	0	21	0	25	N
107	24	42.09	31	13	1978	500	0	31	2	25	Y
108	1	7.69	31	13	1979	500	0	21	1	10	N

DECISION MATRIX
(SPBIS DATA and TM STAFF)

Comp	Stand	Gis_acres	For_type	Condition	Age_year	Land_class	Inc_acres	Mgt_type	SPB # History	% LD High Risk	Adj to Pvt
108	11	17.07	31	13	1979	500	0	21	0	30	N
108	17	30.17	31	13	1972	500	0	21	1	50	Y
109	16	13.53	31	13	1980	500	0	21	0	10	Y
109	3	150.02	31	13	1973	500	0	21	0	80	Y
109	20	19.78	31	13	1980	500	0	21	0	70	Y
109	24	20.22	31	13	1980	500	0	21	0	80	N
111	4	36.90	31	11	1979	500	0	21	3	30	Y
111	5	6.74	31	11	1979	500	0	21	0	70	Y
111	9	36.79	31	11	1973	500	0	21	0	20	Y
111	23	48.25	31	11	1979	500	0	21	0	50	Y
111	33	13.90	31	11	1979	500	0	21	0	95	Y
112	26	27.48	31	13	1984	500	0	31	0	50	N
112	22	30.65	31	13	1984	500	0	31	0	60	N
112	6	48.52	31	13	1976	500	0	31	3	90	Y
112	7	61.55	31	13	1974	500	0	31	2	90	Y
112	13	23.91	31	13	1974	500	0	31	1	40	Y
113	9	36.92	31	11	1966	500	0	21	2	15	N
113	14	35.33	31	11	1967	500	0	21	5	50	Y
114	42	16.52	31	11	1967	500	0	21	0	75	Y
115	13	70.26	31	13	1967	500	0	53	3	80	Y
115	29	15.71	31	13	1979	500	0	31	0	60	N
116	14	76.20	31	13	1973	500	0	21	3	70	Y
116	38	7.95	31	13	1979	500	0	21	0	40	Y
116	27	50.86	31	13	1979	500	0	21	1	75	Y
120	17	33.36	31	13	1971	500	0	58	1	50	Y
122	20	32.40	31	13	1982	500	0	21	2	80	Y
122	16	63.64	31	13	1978	500	2	21	1	70	Y
122	24	28.13	31	13	1974	500	0	21	0	50	Y
123	25	25.97	31	13	1981	500	0	21	0	40	Y
124	14	10.81	31	13	1970	500	0	53	0	95	N
124	10	75.11	31	13	1978	500	0	31	0	40	Y
124	13	22.04	31	13	1970	500	0	31	0	80	Y
124	17	21.19	31	13	1978	500	0	31	0	25	Y
124	20	30.69	31	13	1970	500	0	31	0	85	Y
125	21	30.29	31	11	1979	500	9	21	0	80	Y

DECISION MATRIX
(SPBIS DATA and TM STAFF)

Comp	Stand	Gis_acres	For_type	Condition	Age_year	Land_class	Inc_acres	Mgt_type	SPB # History	% LD High Risk	Adj to Pvt
125	4	13.03	31	11	1969	500	0	21	1	85	Y
125	20	37.77	31	11	1979	500	0	21	1	75	Y
126	20	71.00	31	11	1974	500	0	21	2	30	N
126	23	50.00	31	12	1983	592	0	21	1	30	Y
126	24	24.00	31	11	1984	500	0	21	0	5	Y
127	3	14.00	31	11	1985	500	0	21	0	0	N
127	6	35.00	31	11	1988	500	0	21	0	30	N
127	11	66.00	31	11	1983	510	2	53	0	30	Y
129	61	35.48	31	11	1966	500	0	21	4	50	Y
131	40	26.29	31	2	1965	500	0	21	0	50	N
132	16	30.78	31	11	1967	500	0	21	2	80	N
132	44	197.56	31	11	1981	500	0	21	5	50	N
133	2	25.88	31	11	1971	550	0	21	1	70	Y
133	6	31.06	31	11	1968	500	0	21	3	70	Y
133	14	130.07	31	11	1975	500	0	21	3	80	N
133	9	45.90	31	11	1968	500	0	21	1	60	Y
133	28	30.61	31	13	1977	500	0	21	2	40	N
133	38	66.88	31	11	1965	500	0	21	3	40	Y
133	40	17.54	31	11	1968	500	0	21	1	80	Y
134	10	37.52	31	13	1976	500	2	21	1	40	Y
134	37	94.73	31	13	1981	500	4	21	1	80	N
134	19	26.59	31	13	1976	500	5	21	0	30	Y
134	45	20.64	31	13	1981	500	0	21	1	90	N
134	27	21.82	31	13	1987	500	0	21	0	20	Y
134	25	17.46	31	11	1975	500	2	21	1	30	N
134	29	37.94	31	11	1970	500	2	21	0	15	Y
135	17	8.32	31	13	1981	500	2	13	0	60	N
135	29	19.61	31	13	1981	500	8	21	2	5	N
136	13	162.98	31	11	1969	500	0	21	4	50	N
136	30	7.60	31	13	1981	500	0	21	0	90	N
136	23	40.23	31	13	1974	500	0	21	2	50	N
136	29	30.16	31	13	1974	500	0	21	4	50	N
137	27	78.75	31	11	1973	500	0	21	1	40	N
137	10	9.62	31	11	1979	500	0	21	1	80	N
137	13	104.11	31	11	1975	500	5	21	2	40	Y

DECISION MATRIX
(SPBIS DATA and TM STAFF)

Comp	Stand	Gis_acres	For_type	Condition	Age_year	Land_class	Inc_acres	Mgt_type	SPB # History	% LD High Risk	Adj to Pvt
138	19	48.00	31	11	1984	500	0	21	3	80	Y
138	27	61.00	31	11	1975	500	0	21	3	50	N
138	33	71.02	31	11	1978	500	0	21	2	50	N
138	37	45.00	31	11	1974	500	4	21	0	40	Y
139	26	51.31	31	13	1985	500	0	21	1	20	Y
139	27	76.93	31	13	1985	500	0	21	1	80	Y
140	2	24.22	31	11	1980	500	0	21	1	30	Y
140	8	20.12	31	13	1980	500	0	21	0	10	Y
140	3	79.43	31	13	1981	500	5	21	0	80	Y
140	38	63.50	31	11	1973	511	0	21	1	40	Y
140	20	53.94	31	11	1973	500	0	21	1	70	N
140	31	54.58	31	11	1973	500	0	21	2	40	Y
140	29	22.61	31	11	1967	500	3	21	0	40	Y
141	17	26.00	31	11	1974	500	0	21	2	50	N
141	26	32.00	31	11	1974	824	0	31	0	70	Y
141	1	6.50	31	11	1978	500	0	21	1	90	Y
141	29	44.00	31	11	1979	500	0	21	2	60	N
142	3	41.24	31	13	1970	500	0	21	3	10	Y
142	7	13.99	31	13	1979	500	0	21	1	15	Y
142	20	48.14	31	13	1970	500	0	21	3	70	Y
142	22	12.62	31	13	1979	500	0	21	0	50	Y
142	43	43.27	31	13	1970	500	0	21	3	40	Y
142	45	14.55	31	13	1970	500	0	21	0	40	Y
142	32	48.77	31	13	1970	500	0	21	4	40	Y
142	42	29.98	31	13	1970	500	0	21	2	70	Y
143	4	55.54	31	11	1970	540	0	53	3	20	N
144	12	30.57	31	11	1968	500	0	21	2	70	Y
144	2	10.82	31	11	1968	540	0	21	0	70	N
144	1	5.17	31	11	1968	500	0	21	0	90	Y
144	34	9.73	31	11	1974	500	0	21	0	40	N
144	41	17.41	31	11	1979	500	0	21	1	90	N
144	49	32.35	31	11	1979	500	0	21	2	60	N
146	20	73.20	31	13	1981	500	0	21	2	60	N
146	22	64.06	31	13	1980	500	0	21	2	10	N
146	8	19.89	31	13	1970	500	0	31	1	30	N

DECISION MATRIX
(SPBIS DATA and TM STAFF)

Comp	Stand	Gis_acres	For_type	Condition	Age_year	Land_class	Inc_acres	Mgt_type	SPB # History	% LD High Risk	Adj to Pvt
147	3	41.73	31	13	1982	500	9	21	0	30	Y
		5693.75							**167**		

Legend

Legend color	Description
White	No SPB history; < 50% high risk LD
Grey hatched	No SPB history; >50% high risk LD
Brown hatched	No SPB History, >50% high risk LD, AND adjacent to PVT lands
Orange	SPB history, <50% high risk LD
Dark red hatched	SPB history, >50% high risk LD
Red	SPB history, >50% high risk LD, AND adjacent to PVT lands

Summary Data - 141 stands

Legend color	# of stands
White	27
Grey hatched	13
Brown hatched	16
	56
Orange	34
Dark red hatched	22
Red	29
	85

Appendix A_Figure 1: AOC 2 Treatment Areas

Comp	Stand	Acres	Age year	Forest Type
101	6	36	1980	Loblolly
102	4	191	1965	Loblolly
102	5	69	1966	Loblolly
103	23	39	1968	Loblolly
103	15	66	1965	Loblolly
104	13	61	1970	Loblolly
104	1	12	1970	Loblolly
104	34	23	1973	Loblolly
104	12	33	1970	Loblolly
104	16	32	1970	Loblolly
105	3	57	1972	Loblolly
105	5	51	1972	Loblolly
105	22	40	1972	Loblolly
105	28	29	1972	Loblolly
106	1	38	1970	Loblolly
106	7	22	1970	Loblolly
107	33	25	1972	Loblolly
107	28	23	1970	Loblolly
107	32	20	1972	Loblolly
107	24	42	1978	Loblolly
108	17	30	1972	Loblolly
108	1	8	1979	Loblolly
111	4	37	1979	Loblolly
112	6	48	1976	Loblolly
112	7	62	1974	Loblolly
112	13	24	1974	Loblolly
113	14	35	1967	Loblolly
113	9	37	1966	Loblolly
115	13	70	1967	Loblolly
116	14	76	1973	Loblolly
116	27	51	1979	Loblolly
120	17	33	1971	Loblolly
122	20	32	1982	Loblolly
122	16	64	1978	Loblolly
124	20	31	1970	Loblolly
125	4	13	1969	Loblolly
125	20	38	1979	Loblolly

126	23	57	1983	Loblolly
129	61	35	1966	Loblolly
132	44	197	1981	Loblolly
132	16	31	1967	Loblolly
133	2	26	1971	Loblolly
133	6	31	1968	Loblolly
133	14	130	1975	Loblolly
133	9	46	1968	Loblolly
133	40	18	1968	Loblolly
133	28	31	1977	Loblolly
133	38	67	1965	Loblolly
134	37	95	1981	Loblolly
134	45	21	1981	Loblolly
134	25	17	1975	Loblolly
135	29	20	1981	Loblolly
136	13	163	1969	Loblolly
136	23	40	1974	Loblolly
136	29	30	1974	Loblolly
137	10	10	1979	Loblolly
137	27	79	1973	Loblolly
137	13	104	1975	Loblolly
138	19	58	1984	Loblolly
138	27	80	1975	Loblolly
138	33	71	1978	Loblolly
139	27	77	1985	Loblolly
139	26	51	1985	Loblolly
140	20	54	1973	Loblolly
140	2	24	1980	Loblolly
140	38	63	1973	Loblolly
141	17	24	1974	Loblolly
141	1	7	1978	Loblolly
141	29	44	1979	Loblolly
142	20	48	1970	Loblolly
142	42	30	1970	Loblolly
142	3	41	1970	Loblolly
142	43	43	1970	Loblolly
142	32	49	1970	Loblolly
143	4	56	1970	Loblolly
144	12	31	1968	Loblolly
144	41	17	1979	Loblolly
144	49	32	1979	Loblolly

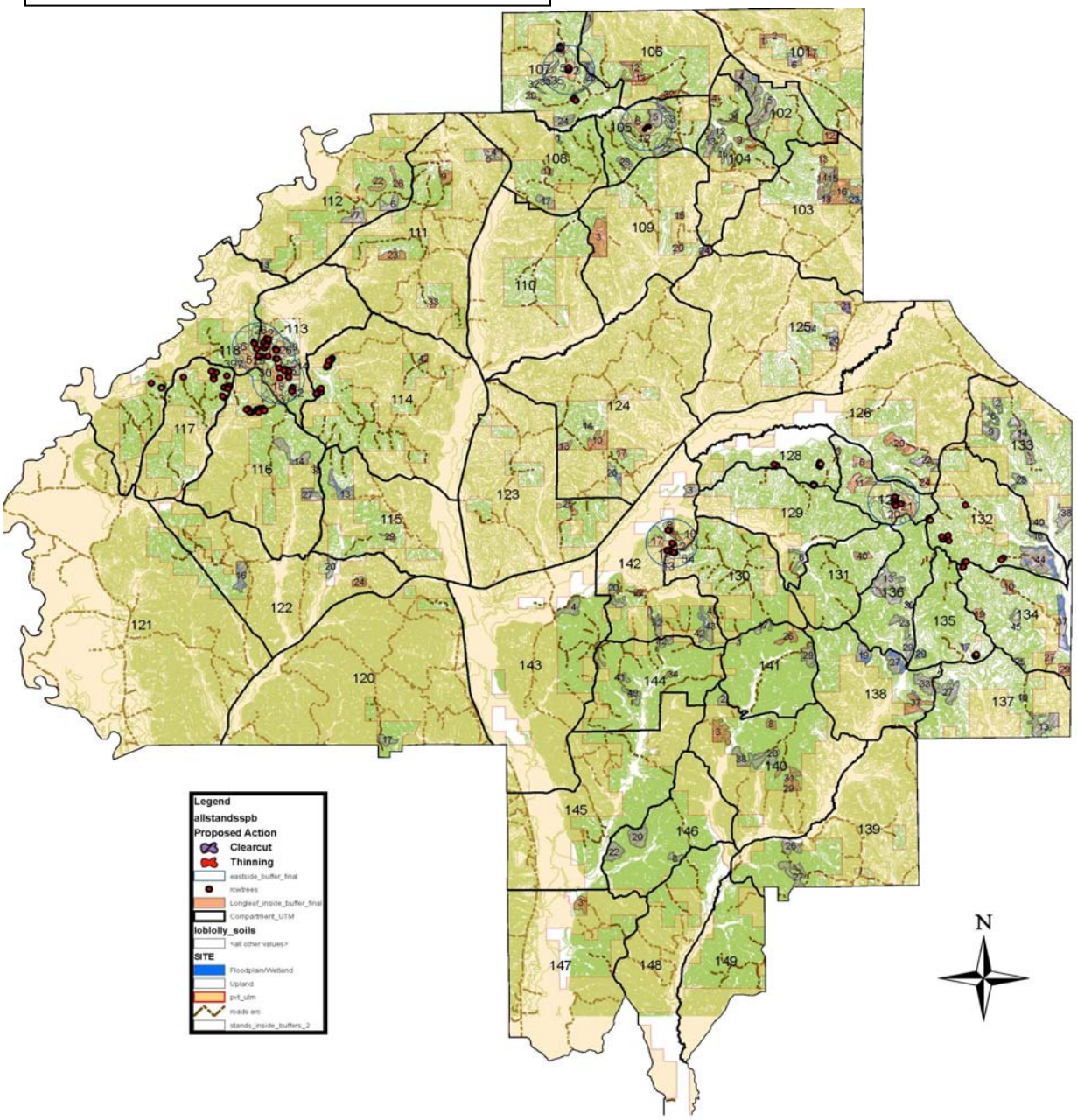
146	20	73	1981	Loblolly
146	22	64	1980	Loblolly
146	8	20	1970	Loblolly
# of Stds: 81		**Total Acres: 3,899**		

Appendix A_Figure 2: AOC 3 Treatment Areas				
Comp	**Stand**	**Acres**	**Age Year**	**Forest Type**
101	1	18	1980	Loblolly
101	2	19	1979	Loblolly
101	7	30	1980	Loblolly
102	12	47	1965	Loblolly
103	13	10	1970	Loblolly
103	14	25	1970	Loblolly
103	16	123	1970	Loblolly
103	18	45	1965	Loblolly
104	4	16	1973	Loblolly
104	9	39	1973	Loblolly
106	12	39	1975	Loblolly
106	13	55	1975	Loblolly
106	32	29	1970	Loblolly
107	20	12	1972	Loblolly
108	11	17	1979	Loblolly
109	16	14	1980	Loblolly
109	3	150	1973	Loblolly
109	20	20	1980	Loblolly
109	24	20	1980	Loblolly
111	5	7	1979	Loblolly
111	9	37	1973	Loblolly
111	23	48	1979	Loblolly
111	33	14	1979	Loblolly
112	26	27	1984	Loblolly
112	22	31	1984	Loblolly
114	42	17	1967	Loblolly
115	29	16	1979	Loblolly
116	38	8	1979	Loblolly
122	24	28	1974	Loblolly
123	25	26	1981	Loblolly
124	14	11	1970	Loblolly
124	10	75	1978	Loblolly

124	13	22	1970	Loblolly
124	17	21	1978	Loblolly
125	21	30	1979	Loblolly
126	20	85	1974	Loblolly
126	24	21	1984	Loblolly
127	3	10	1985	Loblolly
127	6	36	1988	Loblolly
127	11	60	1983	Loblolly
131	40	26	1965	Loblolly
134	10	37	1976	Loblolly
134	19	27	1976	Loblolly
134	27	22	1987	Loblolly
134	29	38	1970	Loblolly
135	17	8	1981	Loblolly
136	30	8	1981	Loblolly
138	37	79	1974	Loblolly
140	3	79	1981	Loblolly
140	8	20	1980	Loblolly
140	31	55	1973	Loblolly
140	29	23	1967	Loblolly
141	26	35	1974	Loblolly
142	7	14	1979	Loblolly
142	22	13	1979	Loblolly
142	45	15	1970	Loblolly
144	2	11	1968	Loblolly
144	1	5	1968	Loblolly
144	34	10	1974	Loblolly
147	3	42	1982	Loblolly
No # of Stds: 60		**Total acres: 1920**		

Appendix A_Figure 3: AOC 4 Treatment Areas				
Comp	**Stand**	**Acres**	**Age Year**	**Forest Type**
105	6	36	1935	Longleaf
105	12	39	1945	Longleaf
107	8	17	1906	Longleaf
107	12	43	1913	Longleaf
107	5	9	1910	Longleaf
107	35	11	1910	Longleaf
113	8	33	1925	Longleaf
113	10	57	1925	Longleaf
113	26	19	1974	Longleaf
113	11	29	1925	Longleaf
113	29	14	1925	Longleaf
113	15	27	1924	Longleaf
113	18	95	1924	Longleaf
113	30	11	1924	Longleaf
113	31	11	1924	Longleaf
113	32	13	1918	Longleaf
113	33	11	1924	Longleaf
113	2	21	1925	Longleaf
113	28	10	1925	Longleaf
113	22	6	1918	Longleaf
118	5	56	1918	Longleaf
118	39	8	1918	Longleaf
118	7	8	1917	Longleaf
118	6	25	1917	Longleaf
118	3	12	1919	Longleaf
127	21	75	1922	Longleaf
127	20	28	1988	Longleaf
130	54	3	1915	Longleaf
130	50	7	1904	Longleaf
130	13	19	1990	Longleaf
142	8	10	1911	Longleaf
142	10	10	1915	Longleaf
142	17	30	1915	Longleaf
142	12	50	1915	Longleaf
142	13	18	1990	Longleaf
142	11	6	1914	Longleaf
No # of Stds: 36		**Total Acres: 878**		

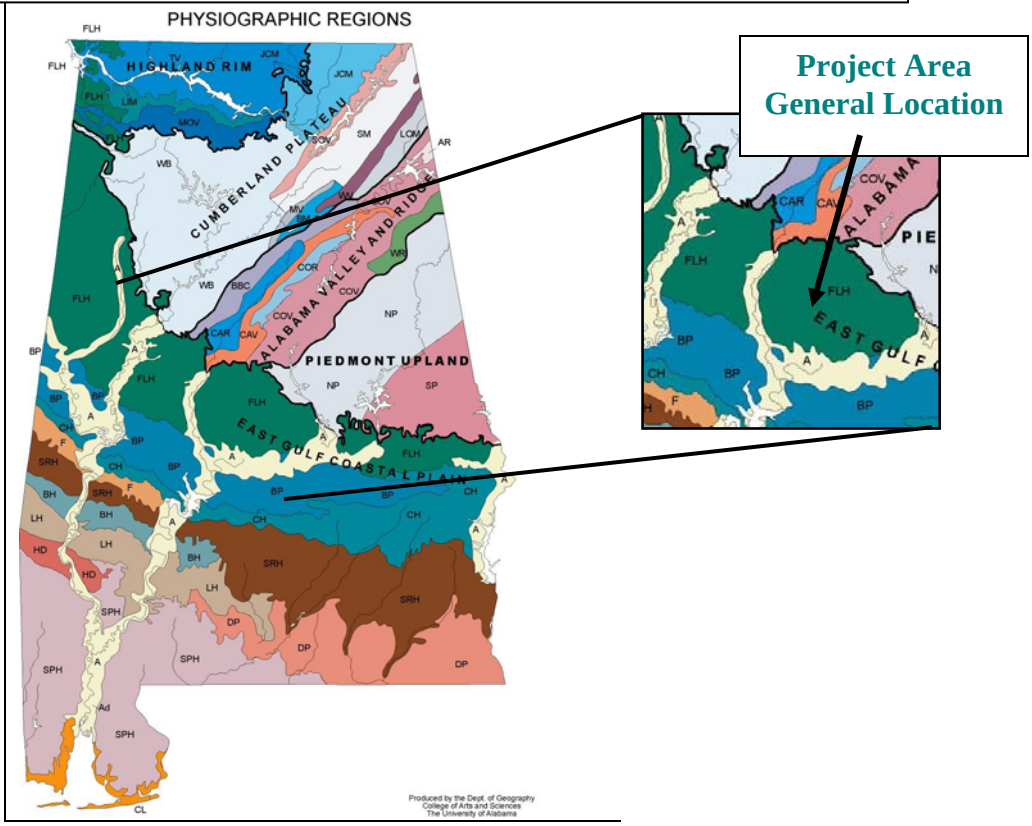
Appendix B_Figure 4: Treatment Areas Map



Review of Project Area
Forest Structure and Composition
for the
Southern Pine Beetle Abatement Project

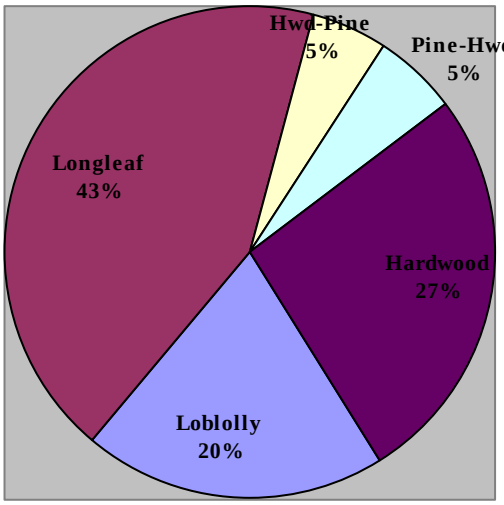
Project Area Description: The project area for the Southern Pine Beetle Abatement Project lies in the Fall Line Hills of the East Gulf Coastal Plain and encompasses approximately 64,583 acres of National Forest System lands. **Reference Figure 1: Project Area and Alabama Physiographic Regions,** for the relative location. The area is rolling hills framed to the west by the Cahaba River drainage, to the east by the Mulberry Creek drainage and dissected by the Oakmulgee Creek drainage. The ownership is highly fragmented with small farms and industry lands making up the greatest portion of private ownership.

Figure 1: Project Area and Alabama Physiographic Regions



According to District records (CISC database) the national forest lands in the project area currently are inventoried as approximately 43% longleaf, 20% loblolly, 5% pine-hardwood, and 32% hardwood or hardwood-pine **(Reference Figure 2: Project Area Forest Composition)**. Within the Southern Pine Beetle Abatement project it is the 20% existing loblolly pine that is in question. Inventory data indicates that approximately 80% of this loblolly (~ 10,000 acres)

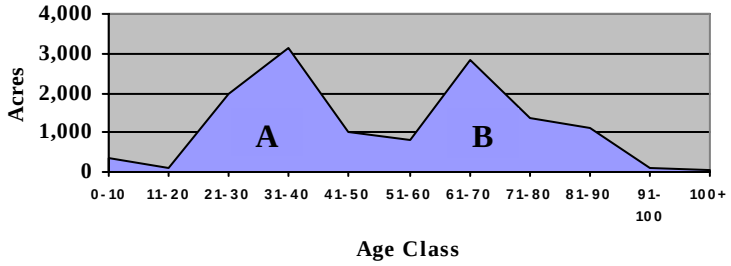
Figure 2: Project Area Forest Composition



currently exists on upland forms better suited and naturally supporting longleaf pine. Loblolly on upland land form is not generally sustainable beyond age 50, especially when in over-stocked conditions. **Figure 3: Loblolly Distribution across the Project Area** shows two distinct peaks of loblolly acreage. Peak "A" is the subject of the AOC 2 and AOC 3 treatments addressed in the Southern Pine Beetle Abatement Project. Peak "B" likely represents those lands planted to loblolly soon after they were purchased by the federal government. While there is a definite need to restore lands in Peak "B", they are not as great a risk to SPB infestations as those in Peak "A". In many cases lands in Peak "B" have already succumb to loblolly decline and have transitioned to a mixed pine-hardwood condition. While not the native conditions the Oakmulgee is charged with conserving, they do not meet the focus of this particular project.

The Proposed Action_Prevention: The treatments addressed as SPB Prevention serve to further Goal 1 of the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan). Goal 1 directs the management of forest and woodland ecosystems to restore and/or maintain nature communities to provide the desired composition, structure, and function. Emphasis is to be placed on maintaining the forest plant community types not abundant on private lands.

Figure 3: Loblolly Distribution Across Project Area

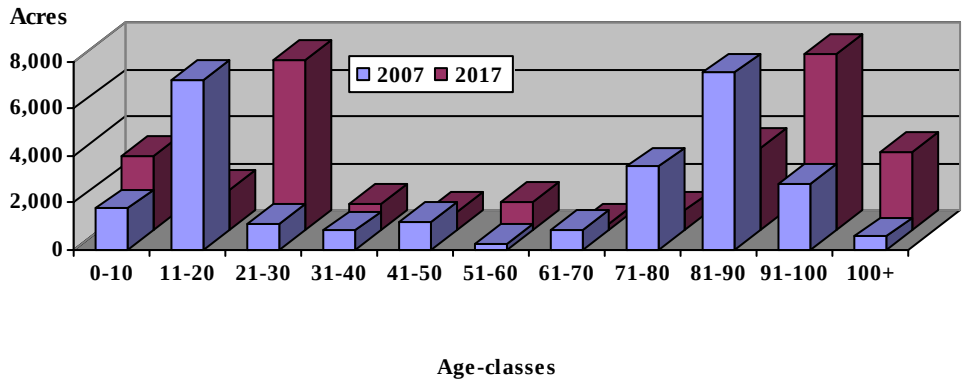


AOC 2: The proposed action lists treatment of 3,900 acres of overstocked loblolly pine stands generally between the ages of 20 and 40 years. The treatment entails site-specific delineation of the native longleaf area and removal of the loblolly pines on the upland land forms that are appropriate (Forest Plan standards) for treatment. The treatments are to follow Forest Plan guidelines relative to equipment use, snag and den tree retention, and size of opening. Soft mast producing species (dogwood, black gum, hawthorn, grapes, etc) are to be retained during harvesting treatments to the extent compatible with

meeting restoration objectives. In most situations on the Oakmulgee District there are adequate opportunities to provide for these species within drains and/or micro habitats in upland stands. RCW Recovery Plan guidelines allow for a maximum of 10% canopy hardwoods in stands managed as foraging habitat. These species will be selected based on fire-tolerance and suitability to upland land forms. There could likely be existing longleaf within these stands, in those situations they would be retained, and potentially thinned to obtain a desirable spacing. Approximately 80% of these acres (3,120) will actually be restored back to longleaf. The remaining 20% will be allowed to re-establish itself naturally as a mixed pine-hardwood component. Figure 4: Longleaf Age-class Distribution shows the change over time to the longleaf component after the initial restoration treatments are complete.

The proposed action includes a site preparation treatment to include a herbicide

Figure 4: Longleaf Age-class Distribution



application treatment followed by a prescribed burn. The herbicide treatment will follow Forest Plan standards and will be applied in late summer to early fall prior to the winter targeted for planting. No sooner than 30-days after the herbicide treatment the area will receive a prescribed burn. On approximately 500 acres there is the potential to utilize a mechanical site preparation to address the heavy debris left behind by past SPB infestations. Forest Plan standards will be followed regarding slope requirements and soil protections. Planting will take place in the winter with a planting rate of 500-600 seedlings per acre.

These young longleaf stands will be examined one year following planting to inventory and assess seedling survival. Within this assessment will be a determination of whether the surrounding vegetation is sufficient to suppress seedling growth relative to competition for nutrition and sunlight or conducive to disease prone environments such as brown-spot fungi. A second examination is conducted three years following planting and a determination is made of whether or not the stand meets the criteria of a stocked, free-to-grow condition. During the first and third year checks a determination will be made to whether or not to apply an herbicide treatment to release the longleaf seedlings from surrounding competition.

Direct and Indirect Effects: Given that these AOC 2 stands are in an exotic condition and many have been previously infested by SPB, the return to a functional longleaf ecosystem will require multiple treatments and many years. The first step of species restoration is essential. However, given the altered condition of these stands, the full suite of species may not immediately return to the sites. The past role of fire is important and in areas of prior SPB activity, disturbance species such as sweet-gum and maple have likely become established. The **direct effects** of re-establishing the longleaf component by planting should be immediate. The prescribed planting rate of 500-600 trees per acres should allow for a stocked stand of saplings within ten years of planting.

The associated effects resulting from a project area of broken ownership are that some treatment areas will be difficult and expensive to maintain a 3-5 year burning regime. There is also the distinct possibility that the contract provisions that allow for the harvest of the loblolly pines may preclude the immediate burning of some areas due to ongoing harvesting in nearby stands. All of these issues increase the importance of having the use of herbicides as a part of the proposed action. Without herbicide application it is unlikely that there will be desired early successional longleaf stands with a composite of longleaf seedlings with a grassy, herbaceous ground cover. Without herbicide use, it is likely that sweetgum and red-maples will dominate the stand resulting in suppressed seedling growth and risk of hotter prescribed burns from the increased woody component.

Cumulative Effects: As referenced in **Figure 5: Age Class Distribution by Forest Type,** the longleaf component in the project area increases by 6%. The percentage of early succession habitat created within the pine and pine-hardwood component in the project area is 7.1%, which is within the parameters set by the Forest Plan of 8.6%. The proposed action within AOC 2 stands has no effect to the mid to late successional forest and percentage of pine and pine-hardwood greater than age 50 remains at 59%.

The mixed pine-hardwood component should increase by 1.2% and within that improved stand delineation the potential habitat for Regional Forester's Sensitive Species will receive appropriate land allocations.

The **direct effects** to vegetation resources, as a result of the site-prep herbicide treatment, will include temporarily leaving dead brown vegetation on treatment sites which should increase the effectiveness of the prescribed fire on controlling over-abundant woody stems. The **indirect effects** should be positive resulting in free-to-grow longleaf pine seedlings and allowing the grassy under-story to better develop. During mechanical treatments the cut vegetation will be left on site to cure and turn brown prior to decomposing.

Indirect effects include the "release" of native plant species to compete and reestablish in the treatment areas through the native seed bank in the soil and seed deposits from surrounding vegetation. Biodiversity will be conserved and perhaps enhanced. In many situations the landscape will have a more open grassy understory and in other cases native trees, such as longleaf pines, will be allowed to naturally re-establish.

The **cumulative effects** of the proposed actions when added to the past, present, and reasonably foreseeable future actions will provide an integrated and proactive approach to restoring native ecosystems containing native plant communities.

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AOC 3: The proposed action of treatment of approximately 1,920 acres within 60 over stocked loblolly stands is designed to mimic the structure of a native longleaf system, while retaining the non-native species composition. The thinning operations will retain existing longleaf, if present, in appropriate densities for restoration. A maximum of 10% of canopy hardwoods will be retained by favoring trees in drains and fire-tolerant upland species. Soft mast producing species will be retained to the extent compatible with future longleaf restoration. While this does not meet the long term goal of restoring composition, structure, and function relative to site conditions, it does allow for some direct benefits. The **direct effects** include an open canopy allowing sunlight penetration to the forest floor. With prescribed fire, this should stimulate the growth of understory grasses. However, the direct effects of mechanical activities on the root systems of these pines could have negative effects. There is a complex relationship between the root feeding insects and the predator insects that feed on them. Research conducted on the Oakmulgee documented that additional stress on roots of already stressed trees results in the decline of predator insects thus allowing the build-up of root feeding insects. These root feeding insects ultimately destroy the fine root system of a pine tree and can cause eventual death. The **direct effects** to vegetation resources as a result of the herbicide treatment will include temporarily leaving dead brown vegetation on treatment sites.

The **indirect effects** from reducing the over-stocked conditions should increase the stamina of the residual loblolly pine; however; that could be negated by increase in root feeding insects and associated diseases. Further acerbating this situation would be the application of prescribed fire which, albeit a natural event, it is a short-term stressor on trees. Therefore, the proposed action to treat these AOC 3 stands with herbicide may be necessary to achieve the desirable understory conditions in the event that fire needs to be withheld until the root systems can recover. It is estimated that the habitat for the predator insects should recover within 2-3 years from mechanical treatment.

The **cumulative effects** are that less than 25% of the overstocked loblolly pines within the project area are likely brought into a condition mimicking the structure of native longleaf. This is only a short-term solution on limited acres; and the actual restoration of these areas will have to be addressed in the future.

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AOC 4: The proposed action lists treatment on approximately 878 acres in 36 stands to bring native longleaf areas closer to the standards that define Good Quality Foraging Habitat (GQFH) for the red-cockaded woodpecker (RCW Recovery Plan). The treatments include removal of over-stocked tress and mid-story to achieve an open park-like condition with approximately 60 sq. ft./ac basal area (BA). A maximum of 10% of canopy hardwood will be retained in appropriate locations. Soft mast producing species will be retained provided they do not constitute a mid-story component greater than 7 feet in height. This treatment may take place as a commercial timber sale followed by a cut and leave mid-story treatment, or a commercial treatment utilizing the smaller stems as biomass. Herbicide treatment is proposed as a follow-up action provided that fire does not restore or maintain the 40% grassy ground cover required to meet GQFH standards.

The **direct effects** to forest composition will be minor; however; some of the treatment stands contain scattered loblolly which will likely be removed resulting in a more homogenous longleaf stand. The direct effects to forest structure will be immediate in that the canopy will be opened and sunlight will be allowed to reach the forest floor. The GQFH requirements of pines greater than 14 inches DBH and pines between 10 – 14 inches DBH probably will not be met immediately as several of the stands are less than 65 years old (Reference Appendix A) and likely have not developed that diameter structure. The **direct effects** to vegetation resources, as a result of the herbicide treatment, will include temporarily leaving dead brown vegetation on treatment sites.

The **indirect effects** to forest composition should not differ much from those noted as direct effects. As the stands are likely more homogenous after the treatment, and the canopy is open allowing sunlight penetration, these changes should allow more natural regeneration of longleaf. Depending on fire intensity, two-age stands could develop and at some point the longleaf saplings could become an issue to RCW flight paths and concurrently the longleaf saplings will begin to shade out the grasses in the understory. The herbicide treatments should have a short-term positive effect in that woody species such as sweetgum and maple will be controlled allowing development of the grassy understory. Albeit short-lived the herbicide treatments may be necessary to reverse the effects of the lack of fire in some of these sites.

The **cumulative effects** of the proposed AOC 4 treatments should move the treatment areas toward a more naturally functioning longleaf ecosystem. The areas should be open enough to reduce the likelihood of SPB infestations or at least limit the outbreaks to individual trees and not large "spots". Thus the cumulative effects are likely to be positive increasing the number of areas on the Oakmulgee District that are suitable for management under a maintenance regime.

The Proposed Action_Suppression: In the event that suppression treatments are needed, the situation is already to the point that a negative **direct effect** is occurring. Suppressing those negative effects by the proposed *"cut and leave"* or *"cut and remove"* treatments serves to lessen certain negative effects albeit causing different negative effects. The negative effects of active SPB outbreaks are expressed as a loss of live trees at a rate often greater than expected in a healthy forest with a functioning natural disturbance regime. **Cumulatively,** the build-up of SPB populations often allows the massive loss of forest including those stands that are otherwise considered healthy. The direct effects of suppression are the potential control of the SPB infestation. The "cut and leave" treatment results in a build up of large woody debris in a concentrated area. While large woody debris has many positive benefits to wildlife, such as reptiles and amphibians, in large concentrations it does block sun penetration to the forest floor. This lessens the effects of fire and ultimately prevents the growth of the grassy understory. The "cut and remove" treatment results in a smaller amount of residual large woody debris. The **indirect effects** are that overtime both treatment methods fragment a forest at a rate that is already determined to be excessive of a natural disturbance regime. The suppression criteria of not treating active SPB infestations unless they are actively moving toward suitable pine habitat or reach a point where they have greater than 5-10 active trees in a particular infestation, should allow for the natural structure of dead and dying trees within a forest system. While in the case

of the exotic loblolly stands, this structure component of dead and dying would occur within a system that already lacks the appropriate forest composition and structure.

Figure 5: Age Class Distribution by Forest Type

*Age Class	Year	Longleaf	Loblolly	Pine-Hwd	Hwd-Pine	Hardwood	TOTAL	%
0-10	2007	1,727	379	0	0	0	2,106	3.3%
	2017	3,120	0	0	0	0	3,120	4.8%
11-20	2007	7,262	109	10	0	460	7,841	12.1%
	2017	1,727	379	0	0	0	2,106	3.3%
21-30	2007	1,101	1,998	247	0	837	4,183	6.5%
	2017	7,262	109	10	0	460	7,841	12.1%
31-40	2007	783	3,126	121	275	512	4,817	7.5%
	2017	1,101	774	492	0	837	3,204	5.0%
41-50	2007	1,191	1,009	211	217	547	3,175	4.9%
	2117	783	1,052	536	275	512	3,158	4.9%
51-60	2007	244	827	55	0	401	1,527	2.4%
	2117	1,191	407	331	217	547	2,693	4.2%
61-70	2007	801	2,850	875	309	2,069	6,904	10.8%
	2117	244	827	55	0	401	1,527	2.4%
71-80	2007	3,529	1,365	677	966	3,201	9,738	15.1%
	2117	801	2,850	875	309	2,069	6,904	10.8%
81-90	2007	7,540	1,122	725	1,097	4,886	15,370	23.8%
	2117	3,529	1,365	677	966	3,201	9,738	15.1%
91-100	2007	2,820	123	213	290	3,385	6,831	10.6%
	2117	7,540	1,122	725	1,097	4,886	15,370	23.8%
100+	2007	522	31	14	394	794	1,755	2.7%
	2117	3,342	154	227	684	4,179	8,586	13.3%

* Total project area acres are 64,583. There are 64,247 acres depicted above by age class and forest type. The remaining acres are represented by 276 acres that are not currently inventoried and 60 acres of Virginia Pine

Old Growth: Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulation of large wood material, number of canopy layers, species composition, and ecosystem function.

Figure 6: Potential for Old Growth Within the Project Area

Forest Type	Potential Age for Old Growth	Project Area Acres
Cypress Tupelo	120 years	59
Dry Mesic Oak	130 years	0
Mixed Mesophytic Hardwood	140 years	0
Dry & Dry-mesic Oak Pine	100 years	158
River Flood Plain	100 years	236
Upland Longleaf	110 years	522
		975

The age at which old growth develops and the specific structure attributes that characterize old growth will vary according to forest type, climate, site conditions, and disturbance regime. The possible old growth in the project area is depicted in **Figure 6: Potential for Old Growth Within the Project Area.** The proposed action does not affect these stands.

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Biological Evaluation
for
Proposed, Endangered, and Threatened Species
Southern Pine Beetle Abatement (SPB) – Environmental Assessment (EA)

Talladega National Forest - Oakmulgee District
Bibb, Chilton, Dallas, and Perry County, Alabama

I. Introduction

The Proposed Action addresses certain non-native, unhealthy forest conditions currently providing suitable conditions for SPB:

- Restoration of certain non-native loblolly stands to native longleaf.
- Improved resistance of certain non-native loblolly stands to SPB infestations while concurrently providing interim wildlife habitat.
- Improved resistance to SPB infestations of native longleaf currently providing habitat for active red-cockaded woodpecker (RCW) clusters.
- Suppression criteria to address active SPB infestation.
- Better delineation of mixed stands, transition zones, and hardwood drains where past practices have established non-native conditions.

This project complements the recently completed Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Longleaf Ecosystem Restoration Project on the Talladega National Forest – Oakmulgee District. The FEIS and ROD, signed February 2, 2005, made a strategic first step, on the western portion of the District, to balance longleaf restoration needs with forest health associated risks associated with non-native conditions and the need to provide a flow and distribution of longleaf habitat within various age classes and conditions.

The project addressed in this BE continues those strategic steps for the east side of the District, focusing specifically on upland pine stands in non-native conditions and those areas affected by SPB outbreaks. The project also proposes preventative measures that would reduce the susceptibility of RCW habitat to SPB infestations.

This Biological Evaluation (BE) is prepared in compliance with policy outlined in Forest Service Manual (FSM) 2670. A Biological Evaluation is required of all proposed Forest Service activities as to the potential effects on sensitive species. According to FSM 2670 the effects of all proposed actions must be analyzed for all regionally designated sensitive aquatic and terrestrial species. This policy is designed to avoid impacts that may cause a trend toward listing of a species under the Endangered Species Act, or loss of species viability.

The objectives of this biological evaluation (BE) are to:

1. Determine the effects of the proposed action on Federally proposed, threatened and endangered (PET) species and their habitats that may occur within the project areas.

2. Provide biological input to ensure that the USDA Forest Service is compliant with the FSM 2670.3, FSH 2609.13, and the Endangered Species Act (ESA).
3. Reiterate mitigations and management requirements utilized during project implementation to minimize or avoid potential effects to Federally-listed species or their habitats.
4. Adhere to the Forest Plan implementation requirement of a site-specific biological evaluation for a project area.

This BE was prepared in accordance with the Forest Service Handbook 2609.13 and regulations set forth in Section 7 (a) (2) of the Endangered Species Act.

A. Location

The project area is located on the eastern portion of the Oakmulgee District in Bibb, Dallas, Chilton, and Perry counties south of Centerville, east of Selma, and west of Maplesville, Alabama. Refer to Appendix A for Maps of the Proposed Treatment Areas.

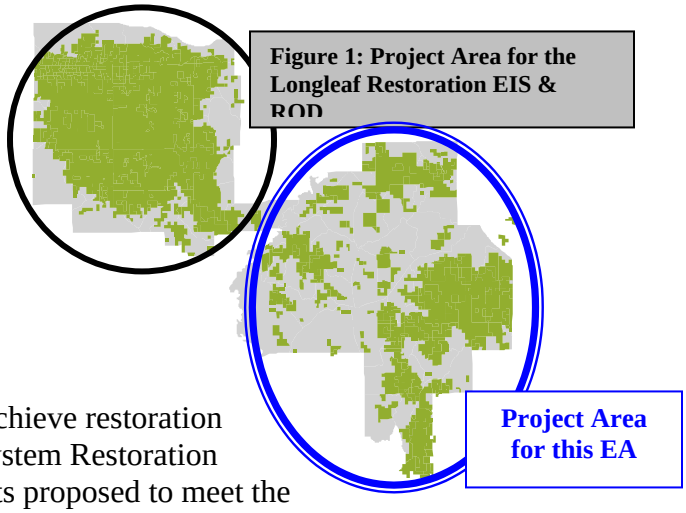


Figure 1: Project Area for the Longleaf Restoration EIS & ROD

II. Proposed Management Actions

To maintain consistency in terminology used to achieve restoration results, the definitions used in the Longleaf Ecosystem Restoration Project are also applied to this Project. Treatments proposed to meet the purpose of and need for action are:

- **Areas of Concern 2:** Restore forest composition on approximately 81 stands of loblolly pine (approximately 20-40 years old) existing on high-risk sites (Loblolly Decline Risk Map), with a history of SPBs infestations. Remove remaining loblolly pine stems and re-establish longleaf pine seedlings. Treatments include herbicide applications to achieve the necessary site preparation and control of over-abundant woody stems. On an estimated 500 acres mechanical treatments may be used to address areas of SPB infestations where heavy debris now exist impeding planting success. (Approximate acres: 3,900)
- **Areas of Concern 3:** Reduce the risk of SPB infestations on approximately 60 stands by modifying the structure of dense loblolly pine (approximately 20-40 years old). Thin these areas by removing 50% or more of the existing stems resulting in open park-like stands. Residual tree selection will be achieved utilizing crown ranking criteria to achieve the most resilient stand practicable. The use of herbicides may be needed to establish and maintain the desired grass and shrub component of the under story. (Approximate acres: 1,920)
- **Areas of Concern 4:** Reduce the risk of SPB infestations on 36 native longleaf stands currently providing foraging and nesting habitat to active RCW clusters by thinning the over-story trees to achieve healthier, well-spaced, and more resilient longleaf pine stands. Mid-story removal with chainsaws post-thinning and/or herbicide use will ensure the maximum

results are achieved, moving these stands closer to meeting the criteria of GQFH as defined by the RCW Recovery Plan. (Approximate acres: 880)

Suppression: Address active SPB infestations meeting treatment design criteria by cutting and removing, or cutting and leaving infested trees along with trees to serve as a buffer at the "head" of infestation.

Proposed Action Design Criteria for Suppression of Active SPB Infestations:

- Active SPB infestations will be treated when 5-10 freshly attacked trees are present, and there is suitable host type (live pine trees) available for additional infestation.
- The availability of suppression crews, current market conditions for beetle-infested timber and the priority of the spot for treatment during periods of epidemic SPB activity will determine treatment type.
- Treating SPB spots threatening RCW clusters or critical RCW habitat and those likely to spread to adjacent private ownership with susceptible host type will be a priority.
- 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.
- Site-specific control procedures will be compliant with the goals, objectives, and standards found the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan).

III. Species Considered and Species Evaluated

All Forest PETC species relative to the project areas were considered for this project. See Figure 2 below for species considered and included/excluded from analysis for this project based on whether or not they currently occur or potentially occur within the area of analysis.

Figure 2: Threatened, Endangered, and Candidate Species Considered and Included/Excluded from Analysis –SPB Abatement BE/EA, Oakmulgee Ranger District, 2007. (List derived from Longleaf Ecosystem Restoration Project EIS and the Revised Land and Resource Management Plan, National Forests in Alabama, Jan. 2004).

USFWS Endangered Species	Habitat	Occurrence on Oakmulgee RD	Considered but Excluded from Analysis	Considered in BE
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	✓2	

Alabama canebrake pitcher plant (*Sarracenia rubra var al*)	Acidic, highly saturated deep, peaty sands or clay	1 occurrence on private land within Oakmulgee RD	✓2	
Tennessee yellow-eyed grass (*Xyris tennesseensis*)	Thinly wooded. Moist to wet soils year round along streams	Just below fall line in Bibb County	✓2	
Mitchell's satyr (*Neonympha mitchellii*)	Shrub-sedge marshes, forest swamps, and beaver ponds	Occasionally encountered in appropriate habitat	✓2	
USFWS Threatened Species	**Habitat**	**Occurrence on Oakmulgee RD**	**Considered but Excluded from Analysis**	**Considered in BE**
Bald eagle (*Haliaeetus leucocephalus*)	Near large bodies of water	Infrequent sightings around Payne Lake	✓2	
Blue shiner (*Cyprinella caerulea*)	Tributary streams in NE Ala.	Documented as extirpated and outside the influence of any Oak. Mgmt actions	✓1,2	
Goldline darter (*Percina aurolineata*)	Affonee water shed	No known occurrences	✓1,2	
Mohr's Barbara's buttons (*Marshallia mohrii*)	Shale-bedded streams in a grass sedge community	No known occurrences	✓2	
Georgia rockcress (*Arabis Georgiana*)*	Rocky bluffs and slopes along water courses	A few occurrences on the northern part of the Oak.	✓2	
Inflated heelsplitter (*Potamilus inflatus*)	Clean gravel riffles with some current	No known occurrences	✓2	
White-fringeless orchid (*Platanthera integrilabia*)*	Wetland areas	No known occurrences	✓2	

Notes:
[1] Project areas are not within the species' range in Alabama.
[2] Project areas are not currently appropriate or potentially appropriate habitat for the species, nor are the access routes into the project areas.

IV. Evaluated Species Survey Information

Information gathered from the botanical survey completed on May 11, 2007 and the amount and distribution of potential suitable habitat for each PETC species, was used to create Figure 2. No T&E plant species were identified to be within the project areas. A Phase 2 inventory will begin in September for *Xyris tennesseenisis* and *Platanthera integrilabia* as those species will be easily identified while in bloom or fruiting. Any occurrences of this species will most likely fall out of the project areas due to their close association with wetlands and stream courses. However, known locations will be protected and the sale area boundary will be moved to mitigate any potential risks associated with implementing the proposed action. Their inventory will serve as a baseline for sensitive plant occurrences on the Oakmulgee District, east of the Cahaba River.

Figure 3 describes the composition of stands that fall within the ½ mile buffers constructed around each cluster or group of RCW clusters under the area of analysis. Figure 3 emphasizes two things: 1) Stand composition by buffer using forest type, age, acres, and percent acres relative to the total acres in each buffer; and 2) Proposed restoration cuts by buffer, number of treatment areas by compartment, stand, and acres, as well as a percent total of treated acres relative to the total acres included in each buffer. These proposed restoration stands are also highlighted in lavender to coincide with their locations in lavender on the associated maps.

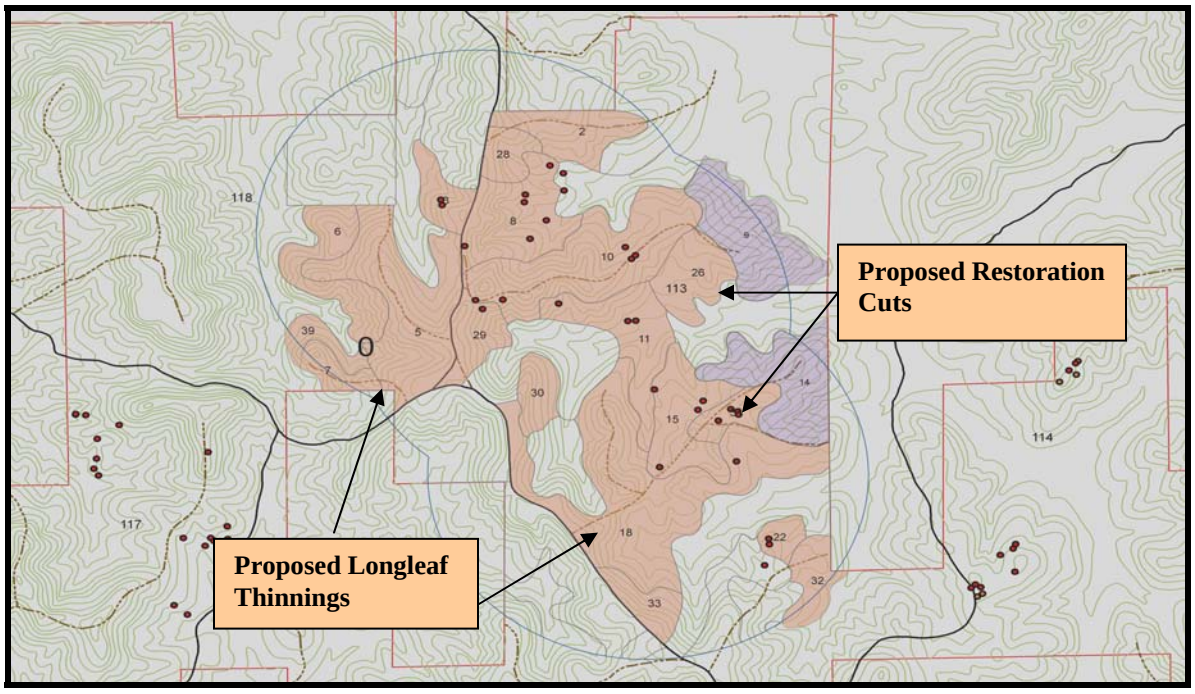
Proposed thinning, whether in loblolly or longleaf pine are not included in the below Figure 3 tables, rather the emphasis is on Proposed Restoration cuts and their size relative to the total acres under analysis specific to the RCW (2,487 acres).

For each map included below the associated Buffer, longleaf stands proposed for thinning are colored in rose, loblolly stands proposed for thinning are in red and restoration cuts are in lavender. All other stands within a given buffer are outlined in grey and represent the stands listed in the table and have no proposed treatments. Refer to Appendix A for maps of all treatment areas under the Proposed Action.

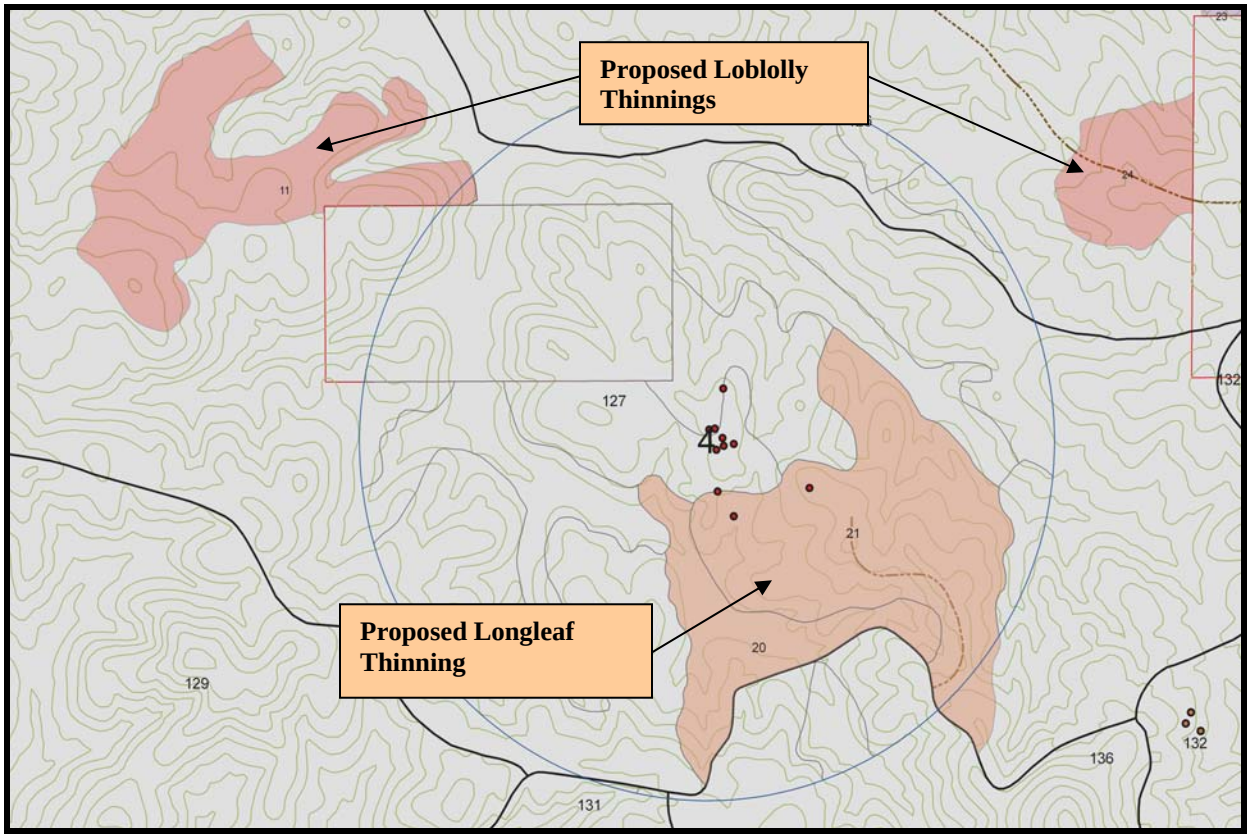
Figure 3: RCW Foraging Description by Buffer Id

Buffer Id: 1*	Forest Type	Number of Stands by Forest Type within Buffer	Acres by Forest Type	Average Stand Age by Forest Type	% Acres by Forest Type in Buffer
Cahaba Clusters					
	13	1	7	25	1
	21	28	637	78	71
	31	4	86	64	10
	53	5	97	71	11
	56	2	52	104	5
	58	1	22	95	2
Total Buffer Acres: 901					
Restoration cuts within Cahaba Clusters:					
Compartment		**Stands**	**Acres**	**Treatment**	
113		9	37	Restoration cut	
113		14	35	Restoration cut	
Percentage of Restoration acres relative to Total Buffer : 8%					

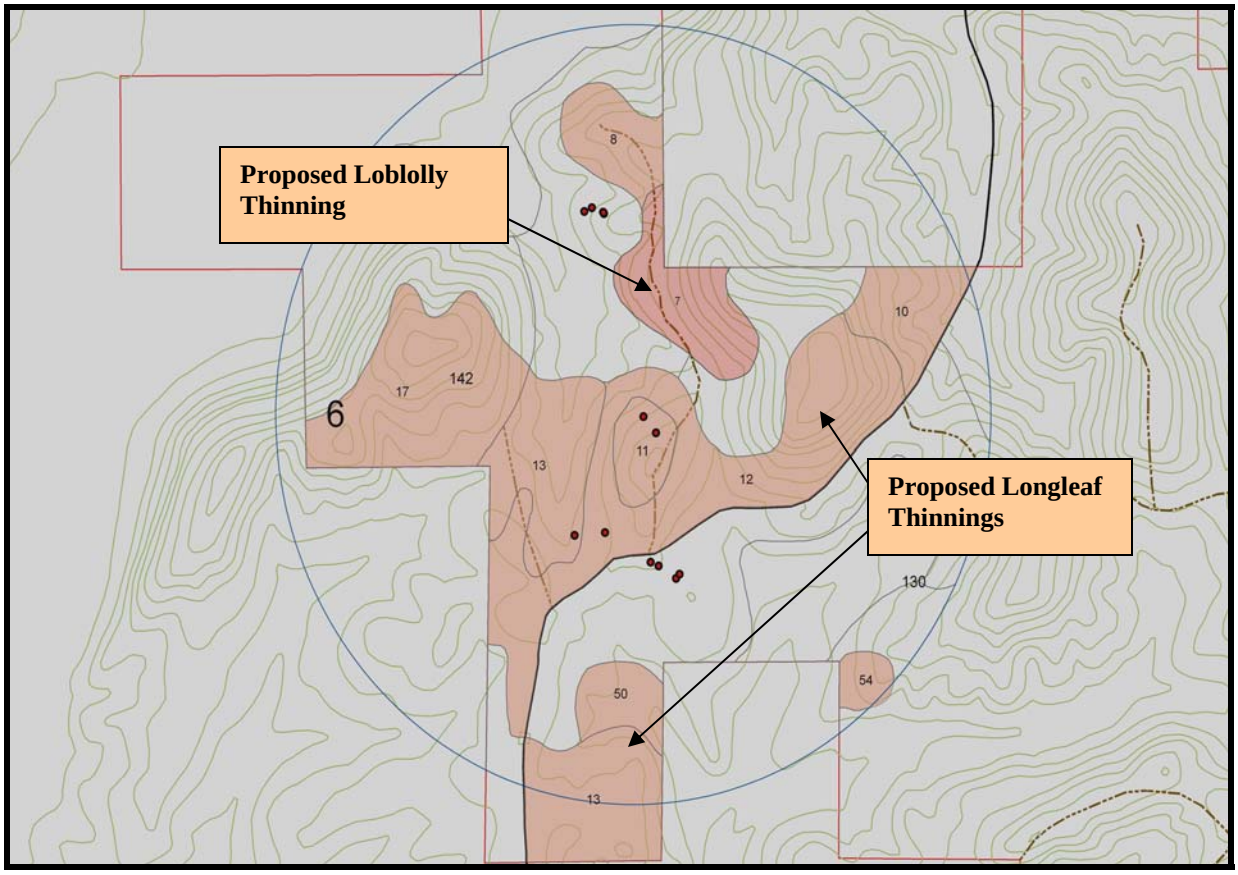
- **Cahaba buffer has a total of 901acres due to three active RCW clusters' ½ mile buffers being combined for analysis due to their close proximity to one another.**



Buffer Id: 4	Forest Type	Number of Stands by Forest Type within Buffer	Acres by Forest Type	Average Stand Age by Forest Type	% Acres by Forest Type in Buffer
Perry Mountain Clusters					
	21	10	229	64	52
	31	4	116	58	26
	53	3	68	77	16
	56	1	0.3	92	<1
	58	1	27	67	6
Total Buffer Acres: 441					
Percentage of Restoration acres relative to Total Buffer: 0%					



Buffer Id: 6	Forest Type	Number of Stands by Forest Type within Buffer	Acres by Forest Type	Average Stand Age by Forest Type	% Acres by Forest Type in Buffer
Oakmulgee Creek Cluster					
	13	1	36	97	10
	21	12	206	75	56
	31	1	14	28	4
	46	1	25	94	7
	53	3	59	70	16
	56	1	0.4	86	<1
	62	1	23	96	5
Total Buffer Acres: 363					
Percentage of Restoration acres relative to Total Buffer: 0%					

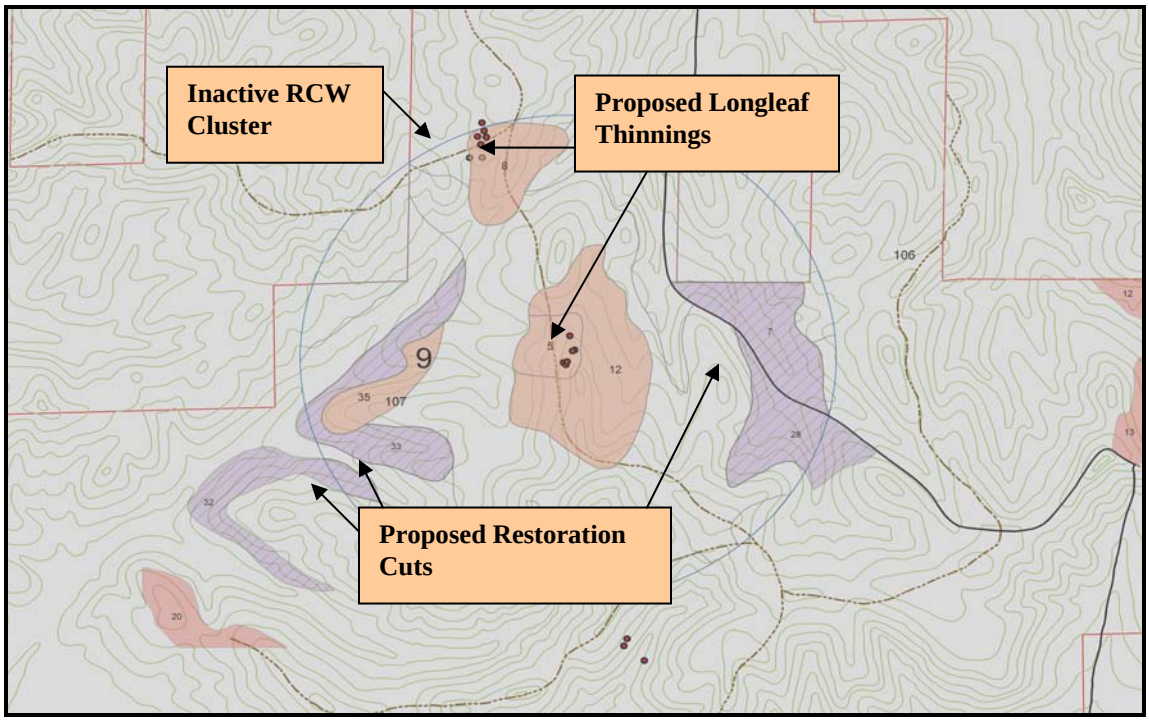


Buffer Id: 9	Forest Type	Number of Stands by Forest Type within Buffer	Acres by Forest Type	Average Stand Age by Forest Type	% Acres by Forest Type in Buffer
Vick's Shooting Range Clusters					
	21	11	308	95	68
	31	4	65	36	14
	53	1	5	37	1
	56	3	77	77	17
Total Buffer Acres: 455					

Restoration cuts within Vick's Shooting range Clusters:

Compartment	Stands	Acres	Treatment
106	7	22	Restoration cut
107	28	17	Restoration cut
107	32	3	Restoration cut
107	33	23	Restoration cut

Percentage of Restoration acres relative to Total Buffer : 14%

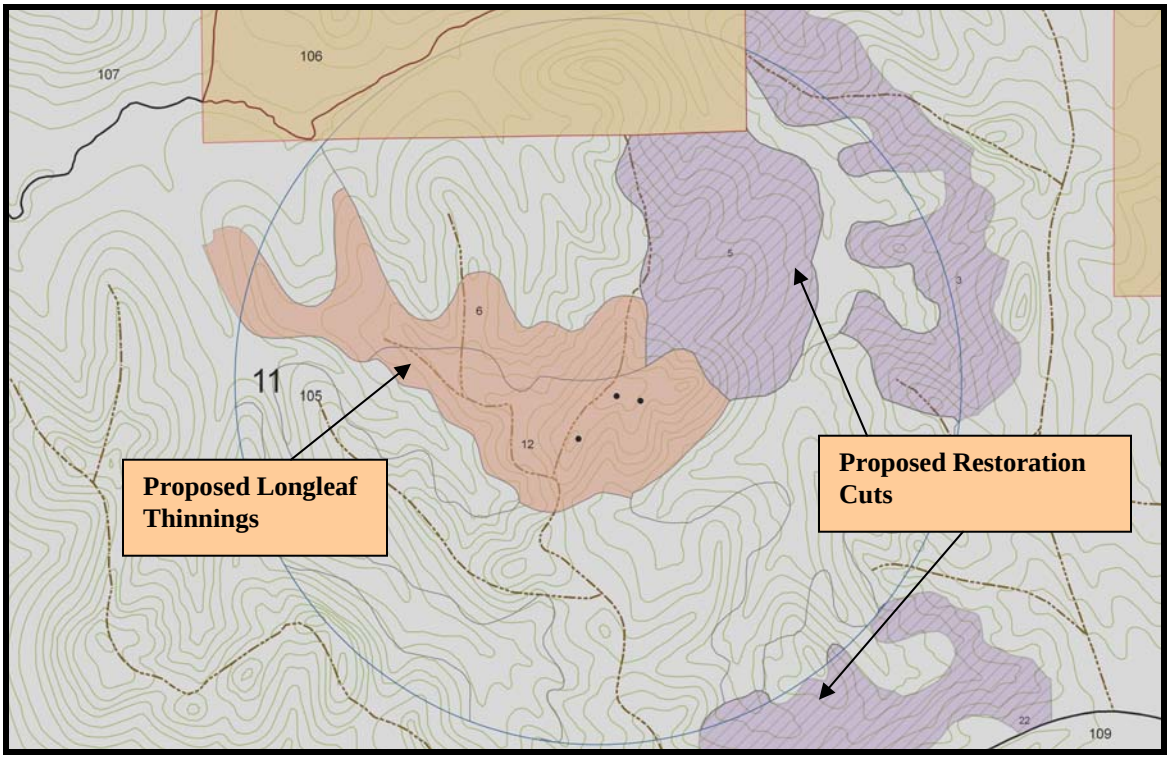


Buffer Id: 11	Forest Type	Number of Stands by Forest Type within Buffer	Acres by Forest Type	Average Stand Age by Forest Type	% Acres by Forest Type in Buffer
Roy 'O Martin Cluster					
	21	6	190	63	42
	31	3	75	35	16
	53	5	194	60	42
Total Buffer Acres: 459					

Restoration cuts within C-105 Cluster:

Compartment	Stands	Acres	Treatment
105	3	23	Restoration cut
105	5	50	Restoration cut
105	22	2	Restoration cut

Percentage of Restoration acres relative to Total Buffer : 16%



Forest Type	Forest Type Code	Number of Stands by Forest Type within ALL Buffers	Acres by Forest Type	Approximate % Acres by Forest Type in Buffer
Summary for all Buffers				
Pine Hwd	13	2	43	2%
Longleaf	21	67	1,570	60%
Loblolly	31	16	356	14%
Hwd Pine	46	1	25	1%
Oak Hickory	53	17	290	11%
Poplar Oak	56	7	130	5%
Gum Poplar	58	2	50	2%
Gum Oak	62	1	23	1%
Total Percentage of Restoration acres relative to Total Buffer : 6.51%				
Total Approximate Buffer Acres Under Analysis: 2,487				

As you can see from Figure 3, all RCW buffers have from 190 to 637 acres of existing longleaf pine that meet at least one of the criteria for Good Quality Foraging Habitat (GQFH) as defined by the RCW Recovery Plan. One criteria requires that stand age should be at least 60 years of age for longleaf pine. All longleaf stands within each of the ½ mile buffers under analysis meet or exceed this criteria. The Proposed Action will only increase the number of criteria these stands will satisfy post treatment.

The need to conduct site-specific inventories of T&E species for this project using direction in the Forest Service Manual Supplement R8-2600-2002-2 was assessed. The assessment concluded that no additional surveys for T&E species were necessary to analyze and disclose effects, and to provide protection adequate for maintaining viability of T&E species that may occur on the Oakmulgee District. For those species not already covered by inventories for the affected areas, either the proposed action would have beneficial effects or more information on the number and location of individuals would not improve the project design or reduce effects.

V. Environmental Baseline for the Species Evaluated

The Talladega National Forest - Oakmulgee District lands lie on the northern limits of the range of Alabama's native longleaf. The topography is rolling allowing a mosaic of forest types to exist intermingled with upland sites that were historically stands of open park-like longleaf forest. Today, for a variety of reasons, many of these native longleaf sites exist as over-stocked plantations of loblolly pines. This shift in the natural balance is producing symptoms of stress, both within these stands and within the larger ecosystem. These altered sites are considered to be exotic ecosystems (Ostrosina 2005) defined as pathologically unstable arising from edaphic and environmental changes brought about by past land use or current management practices. The instability resulting from the weakened or stressed conditions makes these stands highly susceptible to insect and disease infestation, specifically SPBs.

Once SPB populations build up and become epidemic, then otherwise healthy trees or stable ecosystems, are at risk. At the epidemic level, SPB infestations pose a threat to mature longleaf pine trees and RCW habitat. Left unchecked, SPB infestations can result in the loss of entire pine stands and subsequent build up of hazardous fuels.

The RCW is a non-migratory species that once occurred throughout the southeast and into eastern Texas. The RCW is associated with the longleaf pine community and its fire dependent ecosystem, but it also utilizes other pine types of the south out of necessity. The RCW is the only woodpecker that excavates cavities in living pine trees and it prefers areas with little midstory vegetation. An eighteen percent decline of the Oakmulgee's population of RCWs was documented in October of 2003. The District's current status has been estimated at approximately 100 active clusters with 92 of those classified as Potential Breeding Groups. Only 8 of the 92 groups are on the east side and have been included in the analysis (Figure 3).

No other PETC species have been documented from the proposed project areas.

VI. Effects of Proposed Actions on Each Species Evaluated

Red-cockaded woodpecker (Endangered)

The RCW can only benefit from the Proposed Action due to the fact that over-stocked, SPB infested, off-site loblolly plantations are of no use to the RCW either for nesting or foraging habitat and thus, should be regenerated to longleaf. Only 162 of 2,487 acres (6.51%) are proposed for restoration (within the five ½ mile buffers). The Proposed action is taking a step in the right direction by steering away from the exotic, non-native stand conditions of over-stocked, SPB infested loblolly pine and restoring longleaf to its original sites. Due to the present age of the adjacent longleaf stands in each buffer to a proposed restoration cut, there should be no negative effect on the RCW from lack of habitat because the restored longleaf will become available for foraging long before the current mature longleaf stands fall out of the system. (Reference Figure 3)

Stands that have not been infested by SPB and have not become inundated with signs of loblolly decline will be thinned. By mimicking the desired structure of a longleaf pine stand, those loblolly stands will be moved one step closer to meeting the criteria for GQFH as defined by the RCW Recovery Plan.

Thinning of mature longleaf pine stands within the ½ mile buffer of an active cluster will greatly enhance the usability as foraging and nesting habitat for the RCW in and adjacent to those clusters.

Suppression activities in RCW clusters will be paramount as SPB infestations become epidemic. The Proposed Action will ensure the best technique with the lowest possible threat to those RCW cavity trees, should there be an infestation that would spread to within or adjacent to an RCW cluster.

VII. Determinations of Effect and Rationale

The Proposed Treatment Areas are scattered about the east side of the Oakmulgee District. There are loblolly and longleaf stands that are proposed for a much-needed thinning to supply the RCW with more foraging and nesting habitat. Thinning can only be entirely beneficial for the RCW. There are also stands proposed for a restoration cut, however due to their small size in total acres relative to the total available habitat within their respective buffer, and that the stand ages of the existing mature longleaf pine should persist well beyond the point at which those

regenerated stands become available for foraging, the RCW should benefit in the long term from the restored longleaf pine.

The Proposed Action includes suppression criteria that will provide for a timely response to SPB infestations in or adjacent to existing RCW clusters. Although there may be a possibility in extreme cases where a mature longleaf may have to be cut down to prevent further spread of the SPB, the long term effect will far outweigh the loss of habitat in the short term. In considering all of the proposed treatments relative to the viability and health of the RCW, the Proposed Action should have a **"not likely to adversely effect**" determination for the RCW.

Approved by: **Date:**

/s/ ***Micah Thorning*** **May 11, 2007**

Micah Thorning
Wildlife Biologist
Oakmulgee Ranger District
Talladega National Forest

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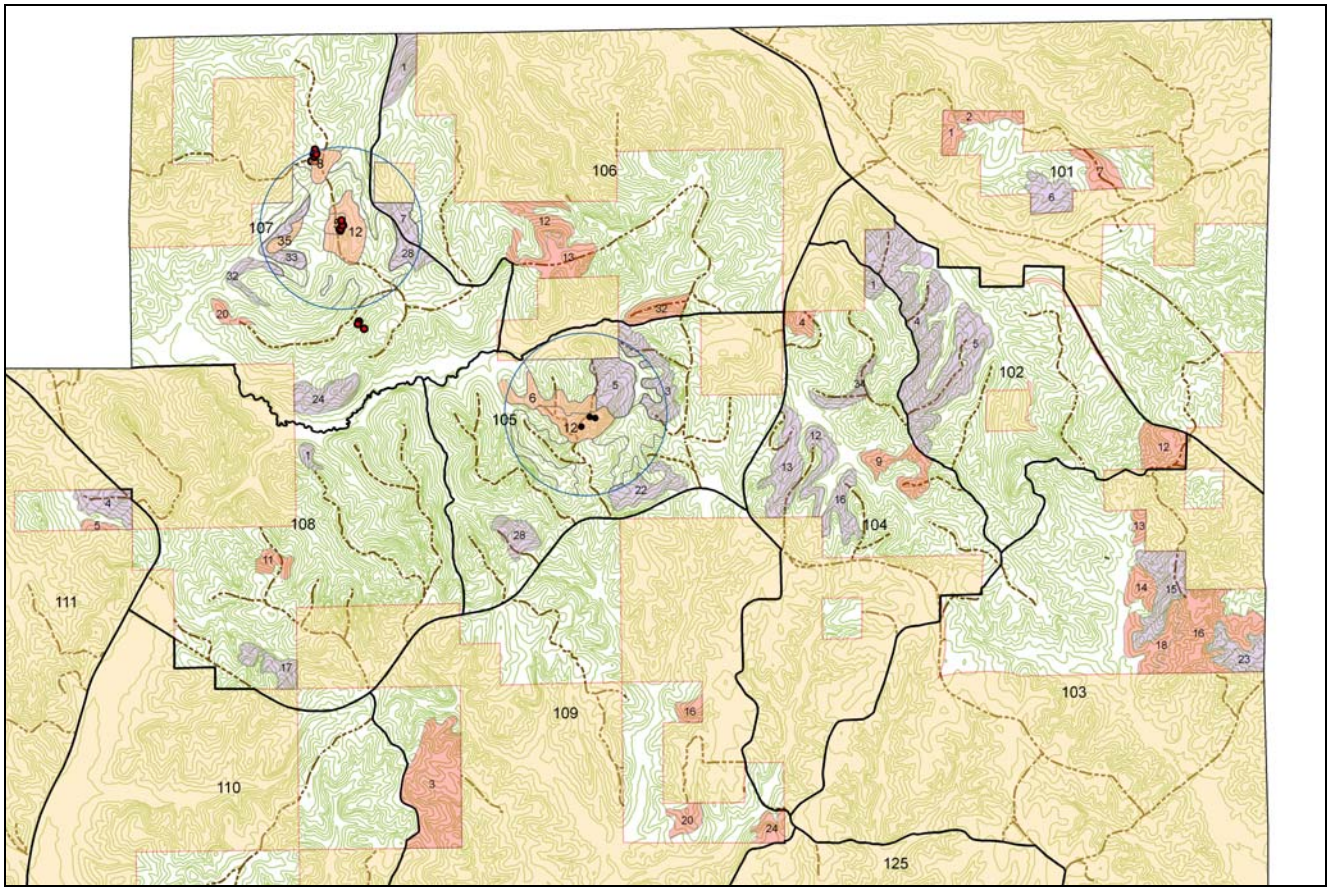
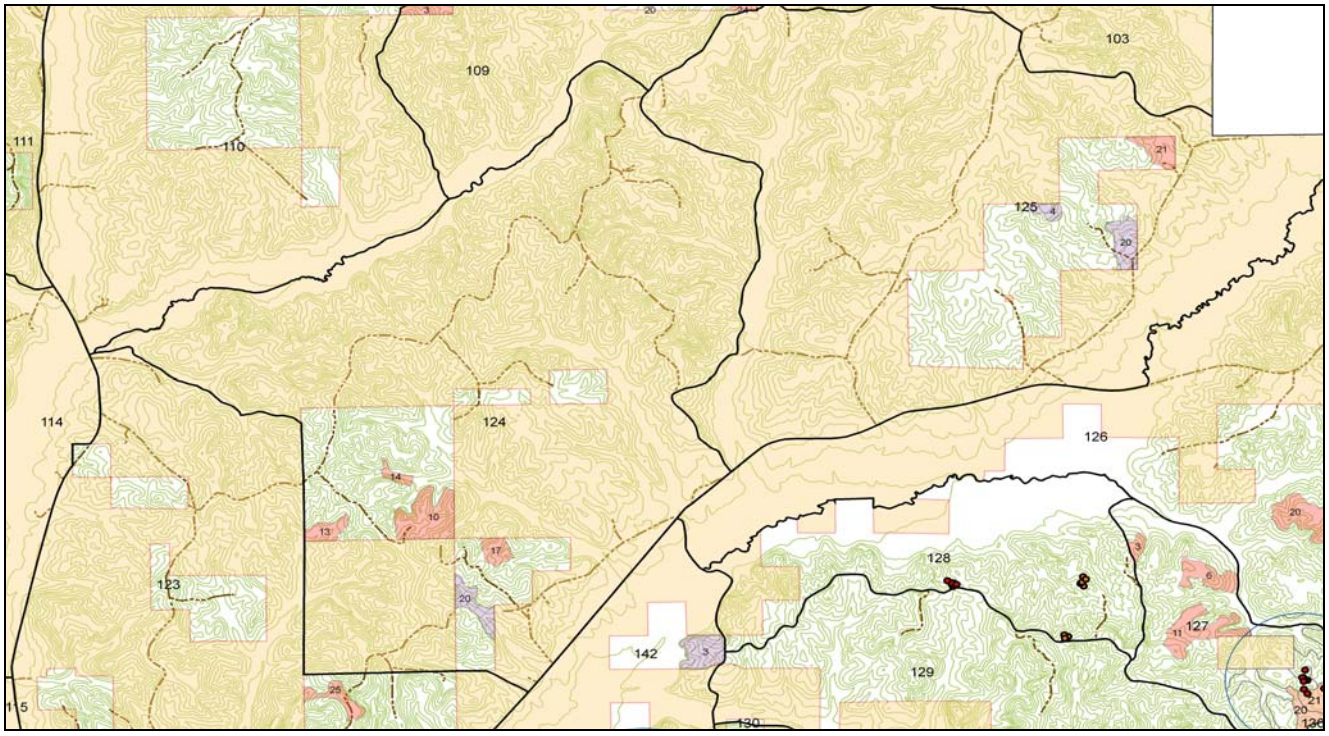
Appendix A: Vicinity Maps of Proposed Treatment Areas

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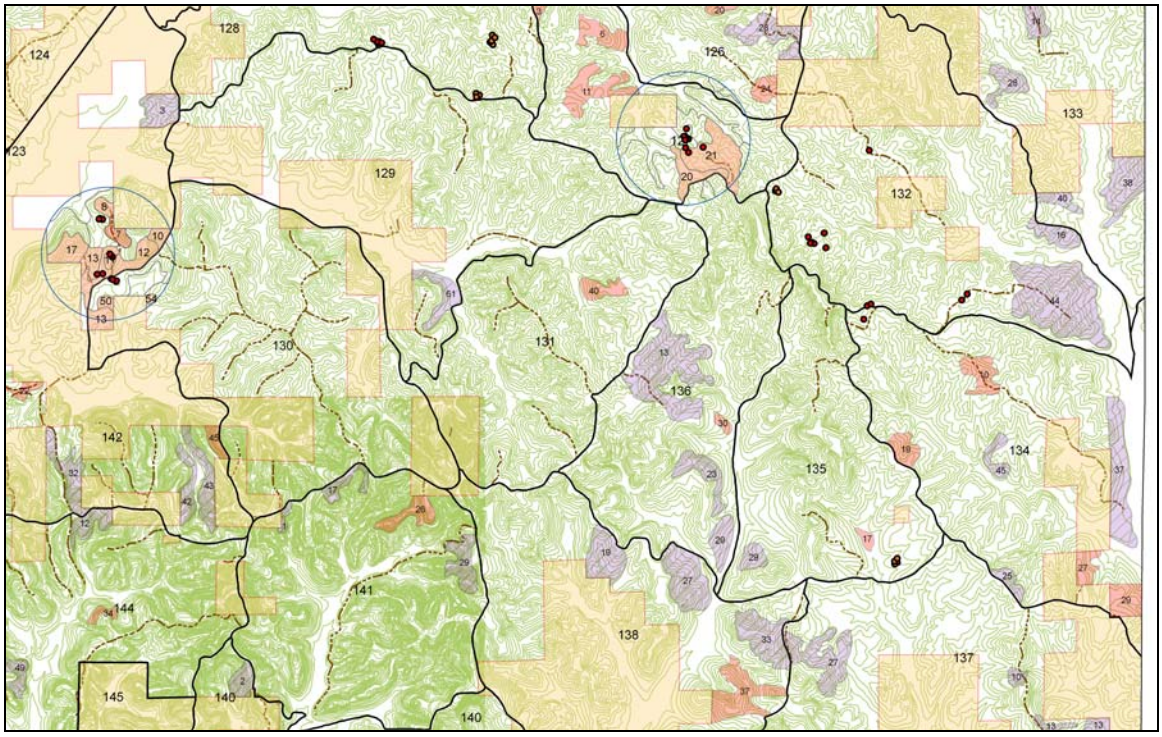
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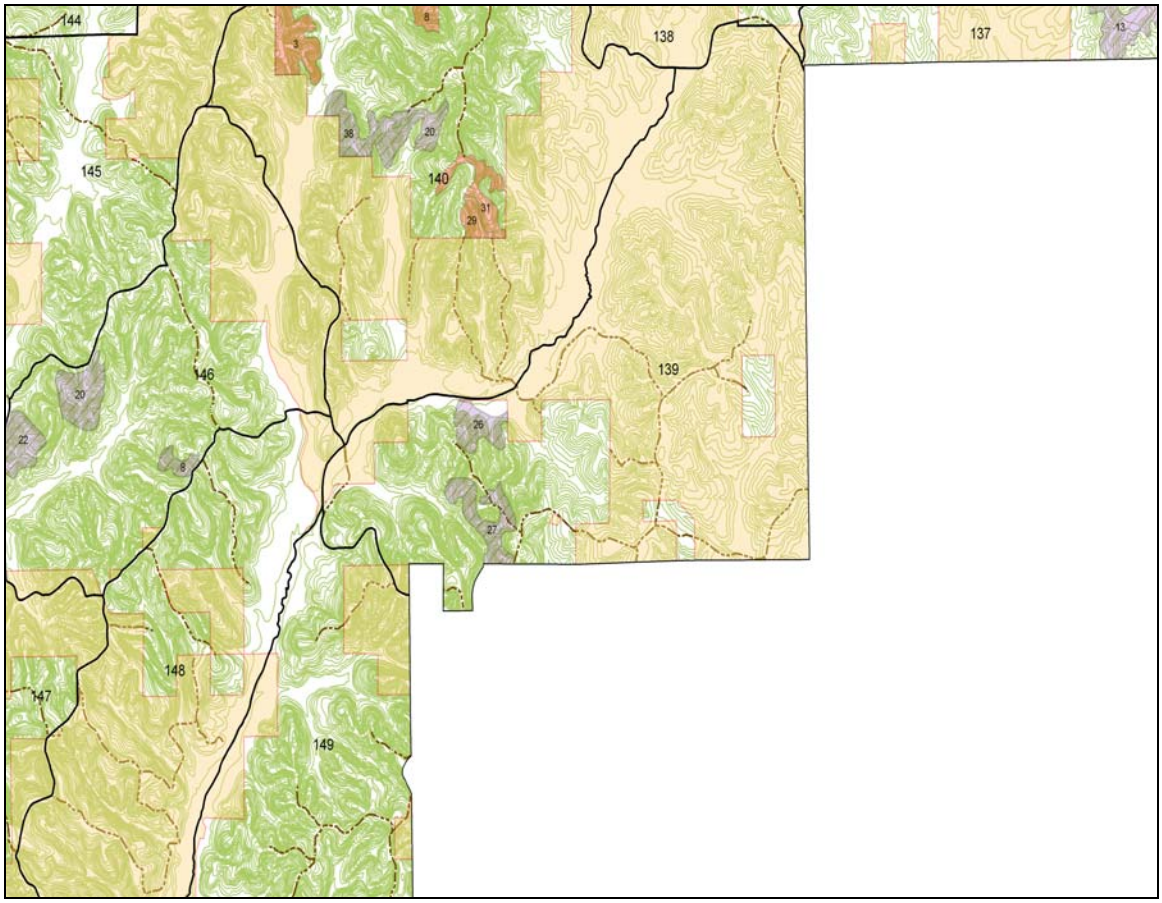
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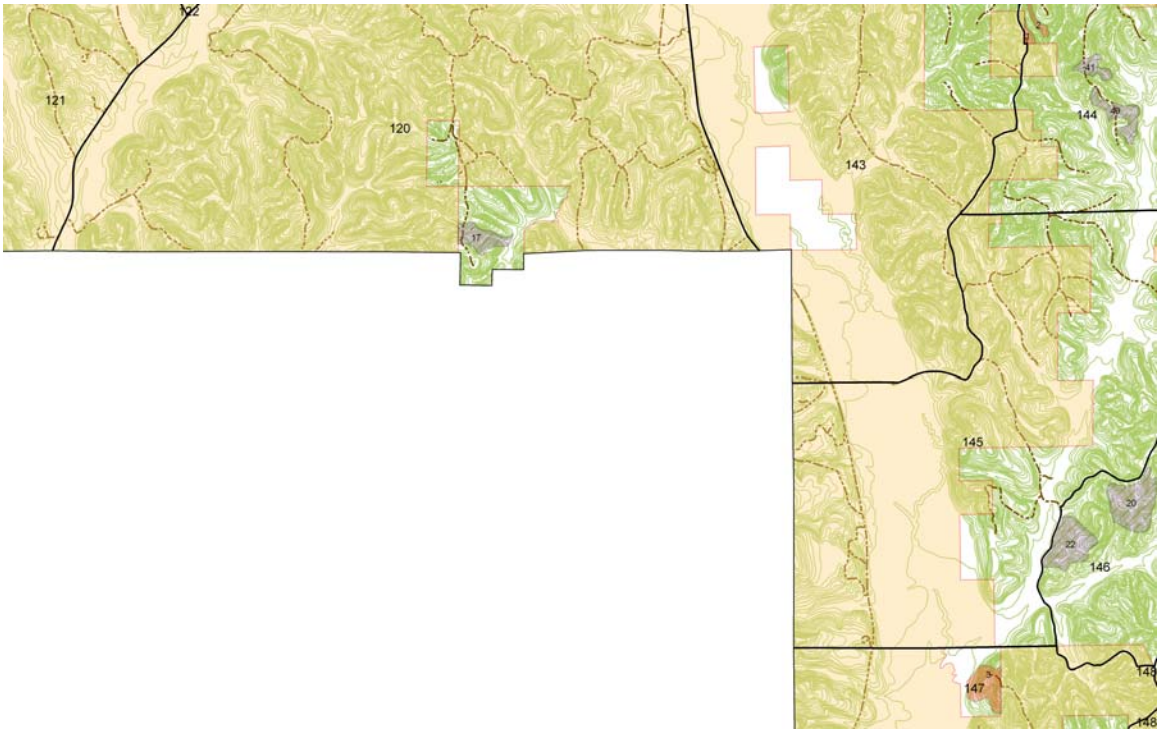
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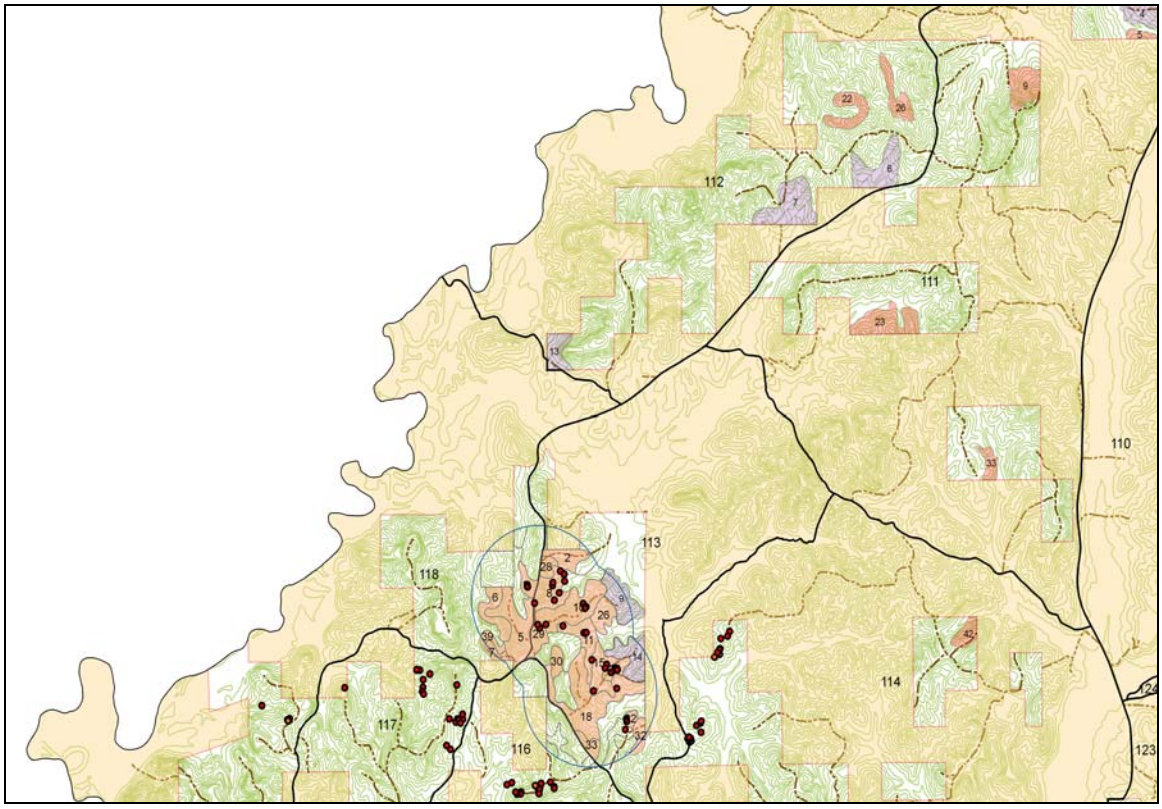
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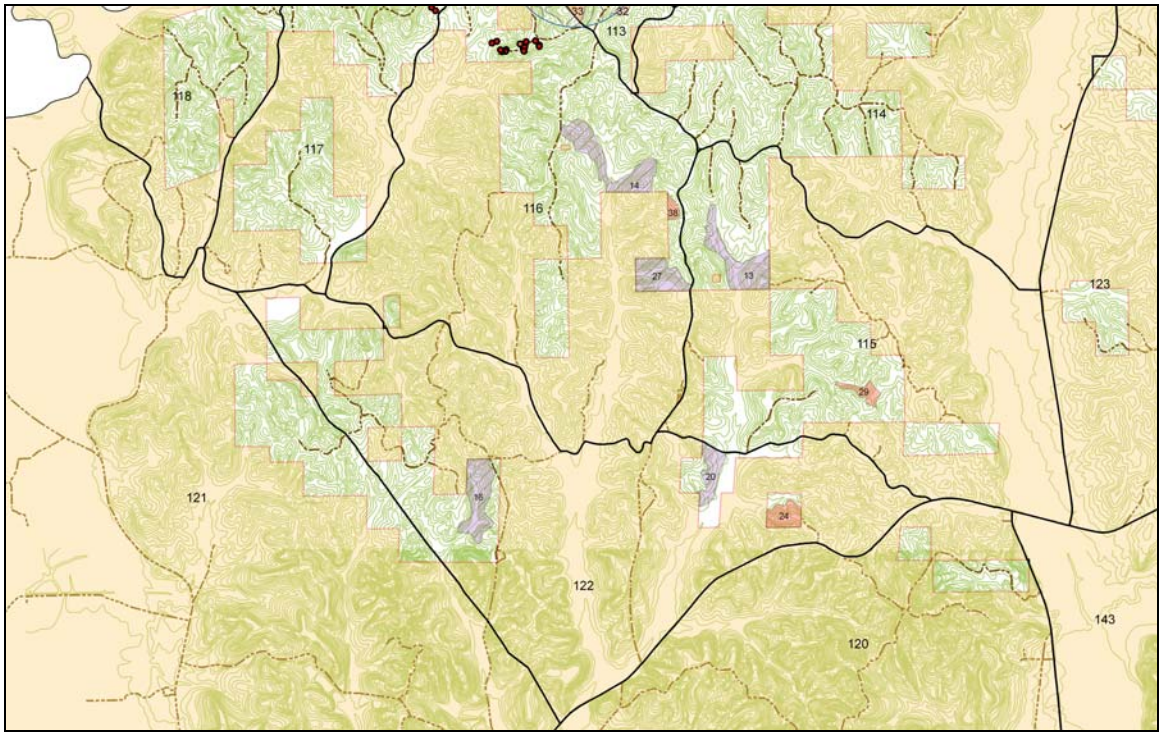
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Biological Evaluation
for
Sensitive Species
Southern Pine Beetle Abatement (SPB) – Environmental Assessment (EA)

Talladega National Forest
Oakmulgee District
Bibb, Chilton, Dallas, and Perry County, Alabama

I. Introduction

The Proposed Action addresses certain non-native, unhealthy forest conditions currently providing suitable conditions for SPB:

- Restoration of certain non-native loblolly stands to native longleaf.
- Improved resistance of certain non-native loblolly stands to SPB infestations while concurrently providing interim wildlife habitat.
- Improved resistance to SPB infestations of native longleaf currently providing habitat for active red-cockaded woodpecker (RCW) clusters.
- Suppression criteria to address active SPB infestation.
- Better delineation of mixed stands, transition zones, and hardwood drains where past practices have established non-native conditions.

This project complements the recently completed Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Longleaf Ecosystem Restoration Project on the Talladega National Forest – Oakmulgee District. The FEIS and ROD, signed February 2, 2005, made a strategic first step, on the western portion of the District, to balance longleaf restoration needs with forest health associated risks associated with non-native conditions and the need to provide a flow and distribution of longleaf habitat within various age classes and conditions.

The project addressed in this BE continues those strategic steps for the east side of the District, focusing specifically on upland pine stands in non-native conditions and those areas affected by SPB outbreaks. The project also proposes preventative measures that would reduce the susceptibility of RCW habitat to SPB infestations.

This Biological Evaluation (BE) is prepared in compliance with policy outlined in Forest Service Manual (FSM) 2670. A Biological Evaluation is required of all proposed Forest Service activities as to the potential effects on sensitive species. According to FSM 2670 the effects of all proposed actions must be analyzed for all regionally designated sensitive aquatic and terrestrial species. This policy is designed to avoid impacts that may cause a trend toward listing of a species under the Endangered Species Act, or loss of species viability.
The objectives of this biological evaluation (BE) are to:

1. Determine the effects of the proposed action on Sensitive species and their habitats that may occur within the project areas.

2. Provide biological input to ensure that the USDA Forest Service is compliant with the FSM 2670.3, FSH 2609.13, and the Endangered Species Act (ESA).
3. Reiterate mitigations and management requirements utilized during project implementation to minimize or avoid potential effects to Sensitive species or their habitats.
4. Adhere to the Forest Plan implementation requirement of a site-specific biological evaluation for a project area.

This BE was prepared in accordance with the Forest Service Handbook 2609.13 and regulations set forth in Section 7 (a) (2) of the Endangered Species Act.

A. Location

The project area is located on the eastern portion of the Oakmulgee District in Bibb, Dallas, Chilton, and Perry counties south of Centerville, east of Selma, and west of Maplesville, Alabama. Refer to Appendix A, for maps of the proposed treatment areas.

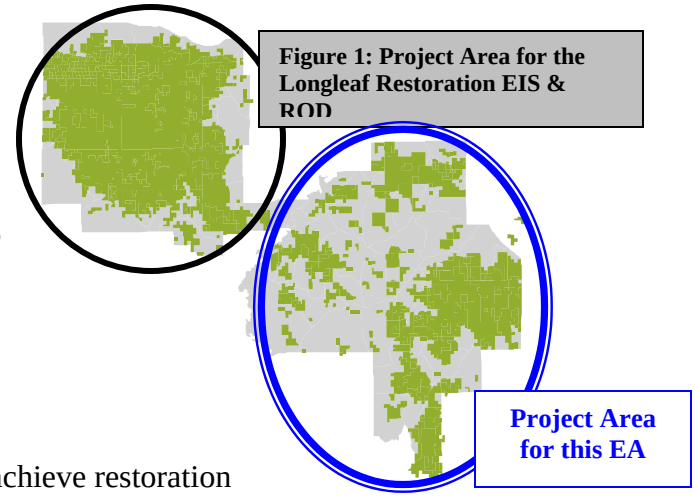

Figure 1: Project Area for the Longleaf Restoration EIS & ROD

II. Proposed Management Actions

To maintain consistency in terminology used to achieve restoration results, the definitions used in the Longleaf Ecosystem Restoration Project are also applied to this Project. Treatments proposed to meet the purpose of and need for action are:

- **Areas of Concern 2:** Restore forest composition on approximately 81 stands of loblolly pine (approximately 20-40 years old) existing on high-risk sites (LDRM), with a history of SPBs infestations. Remove remaining loblolly pine stems and re-establish longleaf pine seedlings. Treatments include herbicide applications to achieve the necessary site preparation and control of over-abundant woody stems. On an estimated 500 acres mechanical treatments may be used to address areas of SPB infestations where heavy debris now exist impeding planting success. (Approximate acres: 3,900)
- **Areas of Concern 3:** Reduce the risk of SPB infestations on approximately 60 stands by modifying the structure of dense loblolly pine (approximately 20-40 years old). Thin these areas by removing 50% or more of the existing stems resulting in open park-like stands. Residual tree selection will be achieved utilizing crown ranking criteria to achieve the most resilient stand practicable. The use of herbicides may be needed to establish and maintain the desired grass and shrub component of the under story. (Approximate acres: 1,920)
- **Areas of Concern 4:** Reduce the risk of SPB infestations on 36 native longleaf stands currently providing foraging and nesting habitat to active RCW clusters by thinning the over-story trees to achieve healthier, well-spaced, and more resilient longleaf pine stands. Mid-story removal with chainsaws post-thinning and/or herbicide use will ensure the maximum results are achieved, moving these stands closer to meeting the criteria of GQFH as defined by the RCW Recovery Plan. (Approximate acres: 880)

- **Suppression:** Address active SPB infestations meeting treatment design criteria by cutting and removing, or cutting and leaving infested trees along with trees to serve as a buffer at the "head" of infestation.

  Proposed Action Design Criteria for Suppression of Active SPB Infestations:

  - Active SPB infestations will be treated when 5-10 freshly attacked trees are present, and there is suitable host type (live pine trees) available for additional infestation.
  - The availability of suppression crews, current market conditions for beetle-infested timber and the priority of the spot for treatment during periods of epidemic SPB activity will determine treatment type.
  - Treating SPB spots threatening RCW clusters or critical RCW habitat and those likely to spread to adjacent private ownership with susceptible host type will be a priority.
  - 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.
  - Site-specific control procedures will be compliant with the goals, objectives, and standards found the Revised Land and Resource Management Plan for the National Forests in Alabama (Forest Plan).

III. Species Considered and Species Evaluated

All Forest Sensitive species relative to the project areas were considered for this project. See Figure 2 below for species considered and included/excluded from analysis for this project based on whether or not they currently occur or potentially occur within the area of analysis.

Figure 2: Sensitive Species Considered and Included/Excluded from Analysis – SPB Abatement BE/EA, Oakmulgee Ranger District, 2007. (List derived from Longleaf Ecosystem Restoration Project EIS, Revised Land and Resource Management Plan, National Forests in Alabama, Jan. 2004, and the Regional Forester's Sensitive Species List (RFSS), Updated August 7, 2001).

Regional Forester's Sensitive Species	Habitat	Occurrence on Oakmulgee RD	Considered but Excluded from Analysis	Considered in BE
Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)	Caves, large hollow trees in riparian areas	Occasionally encountered in specific situations	✓2	
Southeastern myotis (*Myotis austroriparius*)	Caves, large hollow trees in riparian areas	Rarely encountered in specific situations	✓2	
Bachman's sparrow (*Aimophila aestivalis*)	Open pine woods w/ thick ground cover	Commonly encountered in the appropriate habitat		✓

Small-flowered buckeye (*Aesculus parvifolia*)	Open, mesic hardwood communities	Rarely seen on the forest	✓2	
Apalachicola wild indigo (*Baptisia megacarpa*)	Moist shaded ravine slopes and stream banks	Can be encountered in appropriate habitat	✓1,2	
Cypress-knee sedge (*Carex decomposita*)	Cypress swamps and coastal plain ponds	Commonly encountered in the appropriate habitat	✓1,2	
Ravine sedge (*Carex impressinervia*)	Late successional mature riparian habitat	Low occurrence in appropriate habitat	✓2	
Alabama croton (*Croton albamensis*)	Glades and barrens	No known occurrences	✓1,2	
Southern lady's slipper (*Cypripedium kentuckiense*)	Moist, shaded, ravine slopes	Only one occurrence on the Oakmulgee RD	✓1,2	
Large Witch Alder (*Fothergilla major*)	Sandstone rock ridge tops	No sandstone on Oakmulgee RD	✓1,2	
Longleaf sunflower (*Helianthus longifolius*)	Glades, barrens, and rocky ridge tops	Only one recorded occurrence	✓1,2	
Harper's heartleaf (*Hexastylis speciosa*)	Bogs and Bay galls	Common in appropriate habitat	✓2	
Carolina spider lily (*Hymenocallis caroliniana*)	River corridors and sand banks	Common in appropriate habitat	✓2	
Alabama warbonnet (*Jamesianthus alabamensis*)	Moist shaded-to-partially-sunny riparian forests	Common in appropriate habitat	✓1,2	
Alabama snow-wreath (*Neviusia alabamensis*)	Late successional riparian forests	No known occurrences	✓1,2	
Arkansas oak (*Quercus arkansana*)	Dry upland, sandy soils	Common in appropriate habitat		✓
Thorne's beaksedge (*Rhynchospora thornei*)	Seepage bog or pond margin w/ open sun	Common in appropriate habitat	✓2	
Eared coneflower (*Rudbeckia auriculata*)	River corridors and stream banks	Common in appropriate habitat	✓2	
Bay starvine (*Schisandra glabra*)	Shaded hardwood slopes	Common in appropriate habitat	✓2	
Nevius' stonecrop (*Sedum nevii*)	Bluffs and rises in rich coves	No known occurrence	✓1,2	
Royal catchfly (*Silene regia*)	Forested grasslands	No known occurrence	✓1,2	
Lanceleaf trillium (*Trillium lancifolium*)	Moist to sunny riparian areas	Common in appropriate habitat	✓2	
A crayfish (*Procambarus marthae*)	Alabama river basin	No known occurrence	✓1,2	
Alabama shad (*Alosa alabamae*)	Streams and rivers	No known occurrence	✓1,2	
Crystal darter (*Crystallaria asprella*)	Afonnee watershed	No known occurrences, but potential to occur	✓1,2	
Gold stripe darter (*Etheostoma parvapinne*)	Mobile river basin	No known occurrences	✓1,2	
Alabama darter (*Etheostoma ramseyi*)	Mobile river basin	No known occurrences, but potential to occur	✓1,2	
Backwater darter (*Etheostoma zonifer*)	Turbid sluggish water over muddy substrates	No known occurrences, but potential to occur	✓2	
Skygazer shiner (*Notropis uranoscopus*)	Swift currents over sand-gravel substrates	No known occurrences, but potential to occur	✓2	

Frecklebelly madtom (*Noturus munitus*)	Swift currents over cobbled substrates in medium to large streams	No known occurrences, but potential to occur	✓2	
Coal darter (*Percina brevicauda*)	Swift currents over gravel substrates	No known occurrences, but potential to occur	✓2	
Freckled darter (*Percina lenticula*)	Deep swift currents over sandy substrate	No known occurrences, but potential to occur	✓1,2	
A caddisfly (*Cheumatopsyche bibbensis*)	Clean oxygenated water and riparian areas	No known occurrences, but potential to occur	✓2	
Cocoa clubtail (*Gomphus hybridus*)	Sand silt substrates in medium to large rivers	Commonly found in appropriate habitat	✓1,2	
A caddisfly (*Hydropsyche hageni*)	Small sandy streams	No known occurrences, but potential to occur	✓2	
A caddisfly (*Hydroptila paralatosa*)	Small streams near transition of the fall line	No known occurrences, but potential to occur	✓1,2	
Morse's long-horn sedge (*Oecetis morsei*)	Small sandy streams near transition of the fall line	No known occurrences, but potential to occur	✓1,2	
Alleghany snaketail (*Ophiogomphus alleghaniensis*)	Flowing currents over cobble-gravel-substrates. "Pristine streams"	No known occurrences, but potential to occur	✓2	
Treetop emerald dragonfly (*Somatochlora provocans*)	Trickling flow over sphagnum moss in bogs	No known occurrences, but potential to occur	✓1,2	
Laura's clubtail (*Stylurus laurae*)	Sand-mud substrates within small wooded streams	No known occurrences, but potential to occur	✓2	
Rayed creekshell (*Anodontoides radiatus*)	Moderate gradient sluggish currents over mud sand or gravel	No known occurrences, but potential to occur	✓2	
Alabama heelsplitter (*Lasmigona complanta alabamensis*)	Clean gravel riffles with some current	No known occurrences, but potential to occur	✓2	
Alabama hickorynut (*Obovaria unicolor*)	Clean gravel riffles with some current	No known occurrences, but potential to occur	✓2	
Ridged mapleleaf (*Quadrula rumphiana*)	Clean gravel riffles with some current	No known occurrences, but potential to occur	✓2	
Alabama creekmussel (*Strophitis connasaugaensis*)	Clean gravel riffles with some current	No known occurrences, but potential to occur	✓2	
Alabama rainbow (*Villosa nebulosa*)	Clean gravel riffles with some current	No known occurrences, but potential to occur	✓2	

Notes:
[1] Project areas are not within the species' range in Alabama.
[2] Project areas are not currently appropriate or potentially appropriate habitat for the species, nor are the access routes into the project areas.

IV. Evaluated Species Survey Information

Information gathered from the botanical survey completed on May 11, 2007 and the amount and distribution of potential suitable habitat for each RFSS, was used to create Figure 2. Two RFS species *(Cypripedium kentukiense* and *Hexastylis speciosa)* were identified to be within the stand boundaries but due to their close proximity to the stream bank, their locations will not be included in the sale area boundary and will be protected by existing guidelines for stream-side management zones in the Forest Plan. A third species, *Quercus arkansana*, was potentially found

in one area, but will require a re-survey in the fall when the acorns will provide a more accurate means for identification. The location of the *Quercus arkansana* was found within a streamside management zone for that stand and will not be included within the sale area boundary. Their inventory will serve as a baseline for sensitive plant occurrences on the Oakmulgee District, east of the Cahaba River.

The Bachman's sparrow has been identified in our neo-tropical migratory bird point surveys that are located on the east side of the District. The Proposed Action will improve habitat conditions for the species and we look forward to documenting increased numbers of the species post-treatment, using information attained though the bird point surveys on the east side of the District.

I assessed the need to conduct site-specific inventories of Sensitive species for this project using direction in the Forest Service Manual Supplement R8-2600-2002-2. Based on this assessment, I concluded that no additional surveys for Sensitive species were necessary to analyze and disclose effects, and to provide protection adequate for maintaining viability of Sensitive species that may occur on the Oakmulgee District. For those species not already covered by inventories for the affected areas, either the proposed action would have beneficial effects or more information on the number and location of individuals would not improve the project design or reduce effects.

V. Environmental Baseline for the Species Evaluated

The Talladega National Forest - Oakmulgee District lands lie on the northern limits of the range of Alabama's native longleaf. The topography is rolling allowing a mosaic of forest types to exist intermingled with upland sites that were historically stands of open park-like longleaf forest. Today, for a variety of reasons, many of these native longleaf sites exist as over-stocked plantations of loblolly pines. This shift in the natural balance is producing symptoms of stress, both within these stands and within the larger ecosystem. These altered sites are considered to be exotic ecosystems (Ostrosina 2005) defined as pathologically unstable arising from edaphic and environmental changes brought about by past land use or current management practices. The instability resulting from the weakened or stressed conditions makes these stands highly susceptible to insect and disease infestation, specifically SPBs.

Once SPB populations build up and become epidemic, then otherwise healthy trees or stable ecosystems, are at risk. At the epidemic level, SPB infestations pose a threat to mature longleaf pine trees and RCW habitat. Left unchecked, SPB infestations can result in the loss of entire pine stands and subsequent build up of hazardous fuels.

No Sensitive species have been documented from the proposed project areas.

VI. Effects of Proposed Actions on Each Species Evaluated

Regional Forester's Sensitive Species (Avian and Plant)

Bachman's sparrow: Bachman's sparrow is a ground-nesting, herb gleaning insectivore-gramivore, inhabiting open pinewoods where grasses dominate the herbaceous layer (Hamel 1992). Habitat for Bachman's sparrow consists of open pine stands with grasses and scattered shrubs in the understory. Habitat requirements include dense herbaceous cover with, or bordered by, shrubs and trees. Bachman's sparrow nests and forages on the ground, needing thick ground

cover. These habitats are generally in longleaf pine stands with low tree densities. Woodland or savannah structures are preferred over densely timbered forest stands. Open woodland and savanna conditions maintained by thinning and prescribe fires are the habitat components most likely to be limiting due to their rarity on the landscape across the southeast. Restoration of longleaf pine and management of mature and old-growth pine stands by thinning and prescribe burning is a primary need (NatureServe Explorer 2003).

Determinations of Effect and Rationale -- Implementation of the Proposed Action **"may impact individuals, but is not likely to cause a trend toward listing or loss of viability"**. Impacts to individuals are expected because the management actions that may cause mortality or habitat loss in the short-term must be implemented in order to produce long-term benefits to the species' population. However, these birds evolved in an ecosystem in which fires (and other disturbance) occur within breeding seasons, and any short-term losses that may occur are compensated for by the long-term improvement of landscape level habitat conditions. Improved population health is more critical than the loss of a few individuals (Partners in Flight 2001). Cumulatively, these habitats are not usually maintained on private lands, making their presence on National Forest land increasingly important to the species.

Arkansas oak: This species is commonly associated with ridge top and dry, rocky longleaf pine forests, and open woodland savannah settings. It is found only in the upper gulf coast plains, often at the fall line or transition to a more northern eco-region. The habitat plays a moderate role in limiting the viability of this species, currently at a high risk, while management can mitigate this effect by playing a critical role in restoring habitat. Regular use of fire and canopy removal should prove beneficial to this species as well. Activities used to achieve this restoration may disturb individuals in the short run, but improve conditions in the long run.

Determinations of Effect and Rationale -- A botanical survey completed on May 11, 2007, found no occurrences of this species within the treatment areas, however if identified, the species will be protected where applicable. Therefore implementing the Proposed Action should have **"beneficial impacts"** for the Arkansas Oak due to conditions improving with the implementation of the Proposed Action**.**

Approved by: **Date:**

/s/ Micah Thorning **May 11, 2007**

Micah Thorning
Wildlife Biologist
Oakmulgee District
Talladega National Forest

VIII. References and Data Sources

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Terrestrial Wildlife, Plant, and Aquatic Resources

This Appendix addresses the affected environment and the environmental effects of implementing the Proposed Action. Refer to the BE for the effects determinations made for those species evaluated.

Affected Environment:

The effects analysis for Wildlife, Plant, and Aquatic Species will be broken down into four sections: MIS/Demand Species, PETS Avian and Insect Species, PETS Plant Species, and PETS Aquatic Species. For a list of those species considered but not evaluated, refer to the attached Biological Evaluation.

Management Indicator Species (MIS): Management Indicator Species were selected to monitor Forest Plan implementation "because their population changes are believed to indicate the effects of management activities". Twelve species were selected as MIS for the revised Forest Plan (Table 2-10, pg. 2-48, Revised Forest Plan). The species in Figure 1 were chosen because they provide meaningful comparisons of the potential effects of the Proposed Actions and its No Action Alternative. Figure 1 also lists the reason for each MIS's selection and relates them to Objectives for management in the Revised Forest Plan.

Figure 1: Management Indicator Species selected for use and primary reason(s) for their selection. Talladega National Forest – Oakmulgee District.

Common Name	Reason for Selection	Related Revised Forest Plan Objectives
Red-cockaded Woodpecker	To help indicate management effects to mid- and late-successional pine and pine-oak forest.	1.2, 1.4, 1.5, 12.1, 12.2, 12.3, 12.4, 16.1, 18.1
Eastern Wild Turkey	To help indicate management effects on meeting hunting demand for this species.	1.3, 1.2, 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
White-tailed Deer	To help indicate management effects on meeting hunting demand for this species.	1.1, 1.2, 1.3, 16.3

Red-cockaded woodpecker (MIS & Endangered): The red-cockaded woodpecker (RCW) is a non-migratory species that once occurred throughout the southeast and into eastern Texas. The RCW is associated with the longleaf pine community and its fire dependent ecosystem, but it also utilizes other pine types of the south out of necessity. The RCW is the only woodpecker that excavates cavities in living pine trees and it prefers areas with little to no midstory vegetation. An eighteen percent decline of the Oakmulgee's population of RCWs was documented in October of 2003. The District's current status has been estimated at approximately 100 active clusters with 92 classified as Potential Breeding Groups. Of the 92 groups only 7 are located on east side of the District and within the scope of this EA.

It is expected that with the implementation of the proposed thinning, a considerable increase in population health will occur, leading to a noticeable increase in Potential Breeding Groups on the east side of the District within two to seven years post-treatment. Increased tree spacing in the over story will not only increase tree vigor but also provide light to the forest floor encouraging a grassy understory. This desired understory will produce an increase in insects, carry fire through the stand, and provide much needed habitat for other species like the Northern bobwhite quail, Eastern wild turkey and the Bachman's sparrow.

Restoring longleaf on the AOC 2 stands will also benefit the RCW in the long-term by establishing long-term valuable woodland habitats because this tree is longer-lived, fire-adapted, and better co-adapted to woodland habitats and RCW utilization.

Eastern Wild Turkey (MIS & Demand Species): The Eastern wild turkey occupies a wide range of habitats that includes: mature mast-producing stands during the 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 prescribe burning, thinning (Hurst 1978; Pack et al. 1988), and the development of herbaceous openings (Nenno and Lindzey 1979, Healy and Nenno 1983).

Thinning over-stocked loblolly and longleaf stands can only increase the available sunlight to the forest floor, which will regenerate the native grasses and legumes in the under story providing beneficial food sources for the turkey. Restoring longleaf pine on 3,900 acres of AOC2 stands will ensure that the proper stand type and structure will be available for future Turkey populations on the Oakmulgee District. Using herbicide treatments as a possible follow-up against woody plants and trees from becoming established in the mid-story should preserve the utility of these stands for the Eastern wild turkey to at least ten years following planting and will also prevent predators from utilizing the mid-story as cover.

Northern Bobwhite Quail (MIS & Demand species): The Northern Bobwhite Quail are known to occur in croplands, grasslands, pastures, fallow fields, grass-brush rangelands, and open mixed pine-hardwood forests. The 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).

It can only be beneficial to the quail population if over-stocked loblolly and longleaf stands are thinned allowing for an increase in the available sunlight to the forest floor, which will regenerate the native grasses and legumes in the under story providing beneficial food sources for the bobwhite quail.

Restoring AOC2 stands to native longleaf types would provide long-term, valuable woodland habitats because this tree is longer-lived, fire-adapted, and better co-adapted to woodland habitats and RCW utilization. The open, park-like herbaceous understory component of restored longleaf woodlands will also provide optimal habitat for the Northern bobwhite quail.

White-tailed Deer (MIS & Demand species): The white-tailed deer are known to occur throughout the state occupying forests lands, grasslands, agricultural lands, and bottom and

swamplands. The Alabama Wildlife and Freshwater Fisheries and the Oakmulgee District are working towards a healthier deer population that will produce a higher quality deer and satisfy the needs of our hunters. Both agencies are actively involved in the installation and maintenance of wildlife food plots and wildlife openings. Managing the landscape level issue of SPB infestation and over-stocked loblolly and longleaf pine stands will only increase foraging potential and available food sources utilized by the white-tailed deer. By thinning the over story pine, an herbaceous under story will become present allowing for an increase in suitable deer browse. Restoring longleaf pine in AOC2 stands should also provide new for foraging potential for the white-tailed deer.

PETS Avian and Insect Species

Red-cockaded woodpecker (Endangered): The red-cockaded woodpecker is classified as an endangered species as well as one of the Forest's MIS species. (Reference prior discussion)

Bachman's sparrow (Sensitive): Bachman's sparrow is a ground-nesting, herb gleaning insectivore-gramivore, inhabiting open pinewoods where grasses dominate the herbaceous layer (Hamel 1992). Habitat for Bachman's sparrow consists of open pine stands with grasses and scattered shrubs in the under story. Habitat requirements include dense herbaceous cover with, or bordered by, shrubs and trees. Bachman's sparrow nests and forages on the ground, needing thick ground cover.

The Bachmann sparrow should benefit from the thinning of loblolly and longleaf pine stands due to the increase in native grasses appearing within the treatment areas, post treatment. The open, park-like structure that will be created by the proposed action is preferred by the Bachman sparrow.

The Bachman sparrow should benefit greatly by the restoring of native longleaf community types that will provide long-term sustainability and suitability as upland woodland communities the Bachman's sparrow prefers.

There should be little to no threat to the species with the implementation of the Proposed Action and should be beneficial both in the short and long term.

Mitchell's satyr (Endangered): On June 24, 2000, a single male Mitchell's satyr was photographed on the Oakmulgee District of the Talladega National Forest, Bibb County, Alabama. On June 5, 2001, the first colony or deme for Alabama was located and documented by a series of photographs. Since then, genetic studies have found that the District's species is most probably a sub species 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 effective until September 30, 2007. Enforcement of this Order aims to protect satyrs from local extirpation due to collection. No alterations of wetlands, or beaver control measures are associated with the Proposed Action. No direct effects to the Mitchell's satyr are expected. None of the proposed treatment areas fall within a wetland, within a stream-side management zone, nor are their access routes within or thru Mitchell's Satyr habitat. Additionally the Proposed Action takes place entirely outside Bibb County. There should be no indirect effects with the proposed action.

PETS Plant Species

Arkansas oak: This species is commonly associated with ridge top and dry, rocky longleaf pine forests, and open woodland savannah settings. It is found only in the upper gulf coast plains, often at the fall line or transition to a more northern eco-region. Restoring longleaf pine and thinning existing, over-stocked loblolly and longleaf pine should greatly improve its preferred habitat in the long run. There are no known occurrences of this species within the treatment areas, however if identified, the species will be protected where applicable and will be omitted from any herbicide treatment. Based upon this, implementing the Proposed Action should be beneficial to the species in the long term.

PETS Aquatic Species

Backwater darter, Skygazer shiner, Frecklebelly madtom, Coal darter, Freckled darter, A caddisfly, A caddisfly, Alleghany snaketail, Laura's clubtail, Rayed creek shell, Alabama heelsplitter, Alabama hickorynut, Ridged mapleleaf, Alabama creekmussel, and Alabama rainbow.

These species exist in a variety of aquatic environments, from clean gravel riffles to turbid sluggish water over muddy substrates. None of the sensitive aquatic species listed above are known to occur on the Oakmulgee District. However, it is worth mentioning that anytime a proposed treatment area lay in or adjacent to a stream or riparian corridor, Standards 54-76 of the Revised Forest Plan limit management activities within SMZs and riparian corridors and provide protection for the habitat of aquatic species, whether they are known to occupy that area and downstream or not. Due to the standards and guidelines in place and that there are no known locations of any Sensitive Aquatic species on the Oakmulgee District; the Proposed Action should not effect any aquatic species.

Environmental Effects:

Under the **No Action Alternative**, current plans with documented decisions complying with the NEPA process would continue to guide management of the Project Area. There would be no restoration of off-site or exotic loblolly stands. Management would be limited to only custodial forest management, and would be limited to resource protection measures such as erosion control, wildfire suppression, and routine road maintenance.

Preventative measures or restoration activities are not allowed under custodial forest management. SPB infestations would only be addressed by "cut and leave" treatments AFTER insect and disease infestations occurred. Furthermore, the No Action Alternative would not

address the growing need to actively thin and manage the longleaf overstory component for the RCW by achieving an increasing number of criteria for GQFH.

The No Action Alternative would only put existing RCW clusters at risk for SPB infestations due to current stand conditions that may aid in the spread of the SPB during epidemic proportions. The No Action Alternative would also hinder the development of new longleaf pine stands that will serve as much needed, future foraging, and nesting habitats for the RCW.

The No Action Alternative would do nothing to provide adequate habitat for the Northern bobwhite quail, Eastern wild turkey, or the Bachman's sparrow. Existing conditions would only worsen with time and the absence of desired under story vegetation for these species would only persist. A decline in both the short term and long term for these species on the District would be inevitable with the No Action Alternative.

The **Proposed Action** addresses certain non-native, unhealthy forest conditions currently providing suitable conditions for SPB. The proposed action addresses five needs:

- Restoration of certain non-native loblolly stands to native longleaf.
- Improved resistance of certain non-native loblolly stands to SPB infestations while concurrently providing interim wildlife habitat.
- Improved resistance to SPB infestations of native longleaf currently providing habitat for active RCW clusters.
- Suppression criteria to address active SPB infestation.

To maintain consistency in terminology used to achieve restoration results the definitions used in the Longleaf Ecosystem Restoration Project are also applied to this Project. Treatments proposed to meet the above addressed needs are classified as:

- **Areas of Concern 2:** Restore forest composition on approximately 81 stands of loblolly pine (approximately 20-40 years old) existing on high-risk sites (LDRM), with a history of SPBs infestations. Remove remaining loblolly pine stems and re-establish longleaf pine seedlings. Treatments include herbicide applications to achieve the necessary site preparation and control of over-abundant woody stems. On an estimated 500 acres mechanical treatments may be used to address areas of SPB infestations where heavy debris now exist impeding planting success. (Approximate acres: 3,900)
- **Areas of Concern 3:** Reduce the risk of SPB infestations on 60 stands by modifying the structure of dense loblolly pine (approximately 20-40 years old). Thin these areas by removing 50% or more of the existing stems resulting in an open park-like stand. Residual tree selection will be achieved utilizing crown ranking criteria to achieve the most resilient stand practicable. The use of herbicides, along with prescribe fire, may be needed to establish and maintain the desired grass and shrub component of the under story. (Approximate acres: 1,920)
- **Areas of Concern 4:** Reduce the risk of SPB infestations in 36 native longleaf stands currently providing foraging and nesting habitat to active RCW clusters by thinning the over-story trees to achieve open park-like conditions as defined by the RCW Recovery Plan as Good Quality Foraging Habitat. Mid-story removal with chainsaws post-thinning and/or

herbicide use will ensure the maximum results are achieved, moving these stands closer to meeting the criteria of GQFH as defined by the RCW Recovery Plan. (Approximate acres: 880)

The proposed action includes using the following EPA approved herbicides:

Imazapyr: For both aquatic and terrestrial animals, the weight of evidence suggests that no adverse effects are plausible using typical or even very conservative worst-case exposure assumptions. This characterization of risk must be qualified. Imazapyr has been tested in only a limited number of animal species and under conditions that may not well-represent populations of free-ranging target animals. Notwithstanding this limitation, the available data are sufficient to assert that no adverse effects associated with the toxicity of imazapyr can be anticipated in terrestrial or aquatic animals from the use of this compound in Forest Service programs (SERA, 1999).

Triclopyr: This herbicide is listed as low to moderate toxicity to wildlife. The amine formulations of this chemical are relatively nontoxic to fish, but the ester formulation is highly toxic to fish because the oil coats the gills of the fish and make it difficult for them to breathe. Therefore, the locations where this herbicide is used will be important and the proper formulation will vary depending on the site of application. In the risk assessments completed by SERA (2003b) there was a concern that lethal doses could be achieved through consumption of contaminated vegetation at the maximum application rates.

- **Suppression:** Address active SPB infestations meeting treatment design criteria by cutting and removing, or cutting and leaving infested trees along with trees to serve as a buffer at the "head" of infestation. Prior to actual suppression activities SPB monitoring will take place during the spring emergence period (Mar-April) to help predict potential for outbreaks. This will also be used to adjust staffing utilizing tools such as the Incident Command System to aid in increasing response time.

***Proposed Action Design Criteria for Suppression of Active SPB Infestations*:**

- Active SPB infestations will be treated when 5-10 freshly attacked trees are present, and there is suitable host type (live pine trees) available for additional infestation.
- The availability of suppression crews, current market conditions for beetle-infested timber and the priority of the spot for treatment during periods of epidemic SPB activity will determine treatment type.
- Treating SPB spots threatening RCW clusters or critical RCW habitat and those likely to spread to adjacent private ownership with susceptible host type will be a priority.
- 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.

- Site-specific control procedures will be compliant with the goals, objectives, and standards found 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.

Based on the results of the cumulative effects analysis for water quality, the Proposed Action does have a higher potential for adverse effects as a result of sedimentation than does the No Action alternative. However, from a long term or extended temporal scale the adverse effects of the No Action alternative may have a higher potential for adverse effects due to a possible decline of the vegetative composition of theses watersheds as a result of SPB infestations and/or continued support of off-site loblolly pine communities that are not conducive to the sustainability and/or expansion of endemic aquatic species.

The RCW can only benefit from the Proposed Action due to the fact that over-stocked, SPB infested, off-site loblolly plantations are of no use to the RCW either for nesting or foraging habitat and thus, should be regenerated to Longleaf.

Those stands that have not been infested by SPB and have not become inundated with signs of loblolly decline will be thinned. By mimicking the desired structure of a longleaf pine stand, those loblolly stands will be moved one step closer to meeting the criteria for GQFH as defined by the RCW Recovery Plan.

The thinning of mature longleaf pine stands within the ½ mile buffers of an active cluster will greatly enhance the usability as foraging and nesting habitat for the RCW in and adjacent to those clusters.

Suppression activities in RCW clusters will be paramount as SPB infestations become epidemic. The Proposed Action will ensure the best technique with the lowest possible threat to those RCW cavity trees, should there be an infestation that would spread to within or adjacent to an RCW cluster.

For further effects analysis and effects determinations, refer to the Biological Evaluation.

Submitted By: **Date:**

/s/ Micah Thorning **May 1, 2007**

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Fuels Assessment
for the
Healthy Forest Restoration
Southern Pine Beetle Abatement Project

Talladega National Forest - Oakmulgee District

Prepared by: S. Douglas Gantt
Fire Management Officer
Talladega National Forest Oakmulgee District
April 16, 2007

Current Situation

In March of 2005 the Oakmulgee District of the Talladega National Forest began implementation of it EIS to restoration of the native longleaf forest. Through timber management practices and aggressive prescribed burning the district has made good strides towards this goal.

The fire management program is responsible for implementing prescribed fire in the support of longleaf pine restoration, RCW habitat maintenance, timber management, and fuels reduction. The program currently targets upwards of 25 thousand acres per year with management ignited fire. Growing season burns make up greater than 50 percent of the total acreage. The Oakmulgee Ranger District experiences wildland fires throughout the year. Most natural fire occurrences occur in the late spring and summer months. Arson caused fires are not tied to any one season. In 2006, The Oakmulgee District experienced 7 wildland fires. Four of those were human caused. Three were natural ignitions.

Early management ignited fire was utilized in support of the large timber program. District records indicate that prescribed burning was conducted as early as 1964 focusing on site preparation burns and fuels reduction burns in loblolly plantations. Following the direction of the RCW recovery plan, prescribed fire was utilized to support wildlife management in the late 1980s. By, 2000 the district's prescribed fire frequency within RCW habitat areas was 2-4 years. Since 2002, the Fire Management Program has been actively targeting 20-25000 acres a year. Sixty percent of this yearly total is slated for growing season.

This report provides an assessment of the fuels conditions currently found within the forest. It will illustrate the fuels conditions post SPB outbreaks including predicted fire behavior, resources values at risk, and a discussion of the impacts of the proposed

treatment alternative on management priorities and potential fire danger for the project area.

Priorities and Objectives

The risks and consequences of the treatments proposed in the SPB EA and a no-action alternative will be measured against these priorities.

- Human health and safety
  - The highest priority established by the Federal Wildland Fire Management Policy is the health and safety of firefighters and the general public.
- Protection of communities and resources through hazardous fuels reduction
  - Human communities in the Wildland-Urban Interface and cultural resources on the Forest are high priorities for fuels management and fire protection.
- Ecosystem restoration
  - The restoration and management of healthy, resilient ecosystems and the protection of key ecosystem components is an important priority for achieving the Desired Future Conditions (DFC) on the Forest and for minimizing large, catastrophic fires by improving the Fire Regime Condition Class status.

The key objectives of this report are to:

- Describe vegetation and fuel conditions prior to and following SPB outbreaks and for the Desired Future Conditions.
- Conduct fire behavior analysis of current fuel conditions and assess risks and consequences of wildland and prescribed fire.
- Assess the needs and benefits of fuels reduction treatments and describe the effects of taking no action in relation to fire management priorities.

Current Vegetation and Desired Future Conditions

The predominant upland vegetation type within the project area is longleaf pine. In many areas, loblolly pine is a major component. Most longleaf pine dominated stands have a significant hardwood and shrub component in the understory due to fire suppression. The topography plays a role in the vegetation communities. Unlike the coastal plain where longleaf pine spans long expanses, the longleaf pine dominates the higher dry ridge tops. These pines succeed into a pine hardwood mix and then into hardwood bottoms as you descend to moister soils.

The Desired Future Conditions for project areas are primarily open to moderately dense upland pine and pine-hardwood communities characterized mostly by grass dominated understory with scattered shrubs and smaller trees. Longleaf pine is the dominate tree on the dryer, frequently burned sites. The Desired Future Conditions for project areas are open longleaf pine with understory vegetation dominated primarily by perennial grasses and forbs. Loblolly pine occurs primarily on the lower slopes and in stream bottoms.

The Desired Future Conditions are believed to approximate the vegetation communities that existed prior to European settlement. These desired vegetation types are characterized by short-interval, low-intensity fire regimes historically maintained by lightning and Native American fires.

Treatment Area Descriptions

The overall project area consists of approximately 6700 acres comprising 141 stands east of the Cahaba River. This area is scattered forest service land with adjacent private land creating a large mix of urban interface areas. Larger Forest Service expanses are found in the Perry Mountain area west of Maplesville, AL and the Vick/Maude tower areas

Table 1. Fuel models and assigned parameters used in fire predictions.

Fuel Model	Fuel Loading (tons/ac)				Moisture of extinction	Fuel Bed Depth
	1 hr 0-.25"	10 hr .25-1"	100 hr 1-3"	live woody	%	ft
FM2	2	1	0.5	.5	15	1
FM7	1.1	1.9	1.5	.37	40	2.5
FM8	1.5	1.0	2.5	n/a	30	0.2
FM9	2.9	0.4	0.15	n/a	25	0.2

southeast of Centreville, AL. The area consists of both longleaf pine and loblolly pine often intermixed even on ridges. Hardwood pine mix and hardwoods are found as you walk downslope. Prescribed fire on the east side focuses on priority areas that include RCW clusters and areas with heavy fuel loading and wildland urban interface. Fire return intervals range from 2 years to greater than 20 years.

Post SPB Fuel Conditions

The most common fuel models in the project area are fuel models 8 and 9 (Anderson 1982). Due to the lack of burning, some of the more productive areas and dense stands are representative of fuel model 7. A description of the fuel models and the parameters used in the analysis is provided in Table 1.

Desired Future Conditions for much of the dry uplands and upper slopes within the project area are best represented by fuel model 2, with fuel models 8 and 9 primarily occurring on the moist, lower slopes or in other fire protected areas. Currently there are few small areas representative of fuel model 2.

Damaged areas that were previously a fuel model 9 would be more representative of fuel model 10 and 11 depending on the contributing stand density. Widely scattered downed trees and a substantial increase in litter and small diameter dead woody fuels would occur.

In some of these damage areas, needles and woody fuels may continue to accumulate over time due to the delayed mortality of damaged timber in the residual stand. Also, a shrub component is expected to rapidly develop on some sites due to the reduced overstory. The continued accumulation of fine surface fuels, the emerging shrub community, and the large amount of dead woody fuels will create hazardous fuel loadings for several years resulting in the potential for extreme fire behavior and elevated fire danger within these localized areas.

The heavier 1,000-hr and larger diameter fuels are not included in the fuel model descriptions because of their minimal influence on fire behavior in the flaming front under most burning conditions (Miller 2001). However, under prolonged drought and severe weather conditions these fuels can ignite and burn for long periods. They may also impede fire suppression efforts and require extended mop-up. For these reasons, consideration of the larger downed woody fuels is extremely important in assessing potential smoke management problems, resource damage, and fire control issues.

Fire Behavior Analysis

Fire behavior predictions for the pre- and post SPB fuel conditions in the project area were generated using the BehavePlus fire modeling system (Andrews *et al*. 2005). The fuel and weather parameters used in the analysis are presented in Table 2.

Table 2. Fire Behavior inputs used in the analysis.

	normal	severe
1-hr Fuel Moisture	8%	5%
10-hr Fuel Moisture	10%	7%
100-hr Fuel Moisture	18%	12%
Temperature	75°	85°
20 ft Wind speed	10 mph	20 mph
Live Woody Fuel Moisture	70%	70%

Weather parameters were selected to represent both average and more severe conditions. Live woody fuel moistures reflect vegetation entering dormancy.

The results of the fire behavior analysis (Table 3) indicate increases in predicted fire behavior and fire danger in the SPB damaged stands at both the normal and severe categories as compared to pre-SPB conditions.

Under normal burning conditions, fire behavior in the damaged stands represented by fuel models 10 and 11 is predicted to exhibit low rates of spread and flame lengths

although there is a substantial increase over pre-SPB conditions (fuel model 9). Hand lines may be adequate to hold the fire, however, predicted fire behavior is approaching the limit of direct attack.

Under drier fuel conditions and with less favorable weather, moderate fire behavior is predicted for all damaged areas. Fires are potentially dangerous to personnel and equipment and hand lines cannot be relied on to hold fire. Equipment such as dozers, engines and aircraft may be effective in direct attack. These results suggest that, for the immediate future, fire managers should expect more active fire behavior and extra precautions should be taken when conducting prescribed burning particularly when burning at the high end of the prescription. The increased fire behavior in these areas should be short-lived as the finer fuels decompose rapidly.

These conditions may continue to worsen as dense shrub communities develop in some areas due to the more open canopy and lack of fire. For the remaining fuel models, predicted flame lengths of greater than 8 feet indicate high to extreme fire danger, the potential for long range spotting and torching of trees, and serious control problems. Control efforts at the fire head will likely be ineffective and indirect attack may be the only means of suppression. There is also a significant increase in the predicted overstory mortality in these fuel models resulting in a potential change in species composition and additional increases in fuels.

The impact of the large diameter (1000-hr time lag and larger) downed woody fuels on fire behavior is difficult to predict and these fuels are not included in the

Table 3. Fire behavior outputs for pre- and post-SPB fuels

Fuel Model	ROS		Fireline intensity		Flame length	
	ch/h		Btu/ft/s		ft	
	Average	Severe	Average	Severe	Average	Severe
Pre-SPB Conditions						
FM7	16	44	145	444	4.4	7.4
FM8	1	2.8	3	10	0.7	1.3
FM9	3.6	13	22	91	2	3.6
Post SPB Conditions						
FM10	5	14.1	118	354	4	6.7
FM11	3	8	43	110	2.5	3.9

fire behavior models. Under normal burning conditions large diameter materials are not considered available fuels due to their high moisture content and the difficulty of ignition and sustaining combustion. With somewhat drier conditions, the surface layer of these

fuels may initially support flames; however, they primarily burn in the glowing or smoldering phases of combustion and not in the flaming front of the fire. Under very dry conditions, the larger materials become more involved in the fire front resulting in increased fire behavior (Miller 2001, Brown 2000). Fuel burnout time is also increased resulting in long-duration smoldering fires. These conditions can potentially result in serious smoke management problems, increased difficulty in control, and added risks to firefighter and public safety.

Impacts of the Proposed Action on Management Priorities

Under an epidemic SPB outbreak a number of sites within the project area will experience fuel loadings resulting in increased fire danger and risks to identified management priorities and resources. The options being considered are to take no action or to initiate a plan focusing on healthy forests through active suppression of SPB stands, conversion to longleaf pine, and stand thinning. The risks and consequences of these alternatives in relation to each of the major fire management priorities on the Oakmulgee District are discussed below.

Firefighter and public safety — Under severe weather and drought conditions, the heavy fuels in the SPB damaged areas will substantially increase the risk to firefighter and public safety. The higher fireline intensities, flame lengths, and rates of spread predicted in the damaged areas will likely result in the combustion of the larger downed fuels and standing snags which will increase the risks for spotting and escape and pose a direct threat to the safety of firefighters working near the fireline. These risks will increase over the next several years as the heavy fuels begin to decompose and become punky. The heavy fuel loadings with large concentrations of downed trees, tops and broken branches also create a safety hazard for firefighters by obstructing access to safety zones and increasing potential for injury while maneuvering through the debris and working with chainsaws. These heavier fuels will be difficult to extinguish and will create additional safety hazards by requiring firefighters to work long hours and after dark.

Another serious problem is that the heavier fuels, once ignited, may actively burn or smolder for long periods of time. This will increase the potential for smoke management problems including smoke settling on nearby highways and bridges, reducing visibility, and threatening public safety. Nearby residents and firefighters will also be exposed to the health hazards from the high levels of smoke pollutants and particulates in the air.

The removal of the heavier fuels will lessen the risk of escape, reduce the likelihood for injury to fire fighters on the fireline and during mop-up, and remove a serious potential for smoke related accidents and fatalities.

Protection of human communities and cultural resources in the Wildland-Urban Interface — Heavy fuel loadings will increase the risk of damage to nearby homes and property due to the increased difficulty in control and the higher potential for escape under more extreme weather and fuel moisture conditions. Hand crews will be

ineffective due to the high fireline intensities and flame lengths, and fireline production rates for suppression resources will be lowered due to the additional time in moving aside the larger materials. The ignition of large snags and fallen trunks will also increase the risk of spotting and torching of trees near heavy concentrations of fuel. Once ignited, these fuels will likely burn or smolder for a considerable time, increasing the risk of starting new fires outside the control line or initiating re-burns as the newly fallen, scorched needles accumulate in the burned area. Additional equipment resources will be necessary to address fire suppression needs.

Even with the removal of the larger material, fire behavior and danger will remain elevated for some time due to the increased 1- to 100-hr fuels loadings. However, the mechanical removal of the heavier fuels will enhance the ability of the Forest to implement effective fire suppression and control thus reducing the risks to nearby communities and important resources on the Forest.

Ecosystem restoration — High intensity or severity fires in the damaged stands could have serious detrimental effects to the ecosystem including increased mortality in the residual stand and the loss of key components of the ecosystem, such as red-cockaded woodpecker cavity trees which are important components in ongoing ecosystem restoration efforts. Damage to these resources will be most evident in areas with heavy concentrations of downed trees and tops. High severity fire in heavy concentrations of fuel could also result in localized loss of soil organic matter and soil erosion leading to vegetation change and degradation of aquatic resources. Removal of the large diameter fuels will reduce these threats by decreasing the potential for high intensity or high severity fires during dry conditions.

Another important concern is that the loss of the overstory canopy will result in the development of dense shrub communities in many areas, shading out the preferred grasses and understory forbs which are important ecosystem components targeted for restoration. Therefore, once mechanical fuel removal treatments are completed, it will be extremely important to resume the prescribed burning program as soon as possible in order to control the encroaching woody vegetation and to restore the open, grass dominated understory representative of the Desired Future Conditions. A major fire management objective is to achieve Fire Regime Condition Class 1, in which vegetation and fuel conditions approximate the natural conditions and the threats to key ecosystem components due to high intensity or severity wildfires are relatively low.

The presence of heavy fuels from SPB mortality will impact the ability of the Forest to implement a safe, effective, and cost-efficient prescribed burning program. Concerns for smoke management and fire control due to these larger fuels will require additional firefighter and equipment resources and will extend the time and effort required in the preparation, implementation, and mop-up phase of burning. These conditions will also necessitate narrow burning prescriptions that utilize only the low end of the normal burn prescription and result in less desirable prescribed fire effects. These factors will reduce the window of opportunity for conducting burns in a safe, timely and effective manner and potentially result in longer fire return intervals for many compartments on the Forest.

This would allow undesirable shrub vegetation to establish, further increasing fire danger and moving the Forest away from the desired Fire Regime Condition Class 1.

Conclusions

A great effort was completed addressing the fuel loading scenarios from SPB outbreaks within this report as it impacts the district Fire Management program to a large extent. It should be noted that an active pursuit of stand conversion and thinning addresses both SPB and fuels mitigation simultaneously. Conversion of stands to open park-like conditions and thinning overstocked stands reduces fuel bed contributors, encourages herbaceous and grass understory and mitigates the hazards faced in dense heavy fuel loaded stands. The fuel loadings resulting from SPB outbreaks, as well as, overstocked stands pose serious risks to management priorities and resources on the Oakmulgee District. In response, the proposed action of the mechanical removal of the SPB timber, thinning of overstocked stands and restoration of Longleaf pine to its natural habitat is recommended. These treatments will be extremely important in mitigating the threats of high intensity or high severity wildfires that may occur during severe weather or drought conditions. These treatments will also help to ensure the continued implementation of a safe, effective, and cost efficient prescribed burning program that is needed to achieve the Desired Future Conditions on the Forest.

The results of this analysis indicate that a proactive approach to SPB management through aggressive suppression, stand manipulation and restoration would significantly enhance the efforts of the Forest to achieve the following:

- Provide for firefighter and public safety
- Reduce the risks to private property and forest resources from wildfire
- Reduce the potential for smoke management and air quality problems
- Enhance ecosystem restoration efforts including on-going efforts to achieve Desired Future Conditions and Fire Regime Condition Class 1

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Economic Analysis
For The
Healthy Forest Restoration
SPB Abatement Project

The monetary cost of implementing this proposal is significant. Revenue from the sale of timber can be applied to the reforestation costs and will greatly reduce the amount of money needed from government appropriations or other contributions to finance the reforestation requirements. The revenue generated from timber removal will not cover all reforestation costs. The intangible benefits of restoring longleaf pine on some parts of their native landforms, thinning high risk loblolly stands, and thinning overstocked longleaf stands to reduce SPB hazard and improve RCW habitat are described in preceding sections of this document.

This project objective is to reduce SPB hazard and improve forest health and RCW habitat in overstocked loblolly pine stands (AOC 3) and longleaf pine stands (AOC 4) and restore longleaf pine on upland sites occupied by loblolly pine stands (AOC 2) that have been significantly impacted by previous SPB infestations to the point stand integrity is compromised (See Figure 1 – Stand and Treatment Map).

The project was not proposed to make money for the Forest Service or to supply timber for local mills. However, processing timber removed during the project implementation will benefit the local economy and, as illustrated in the following table, the value of timber removed will defray a significant amount of the restoration cost.

Figure 1: Stand and Treatment Map

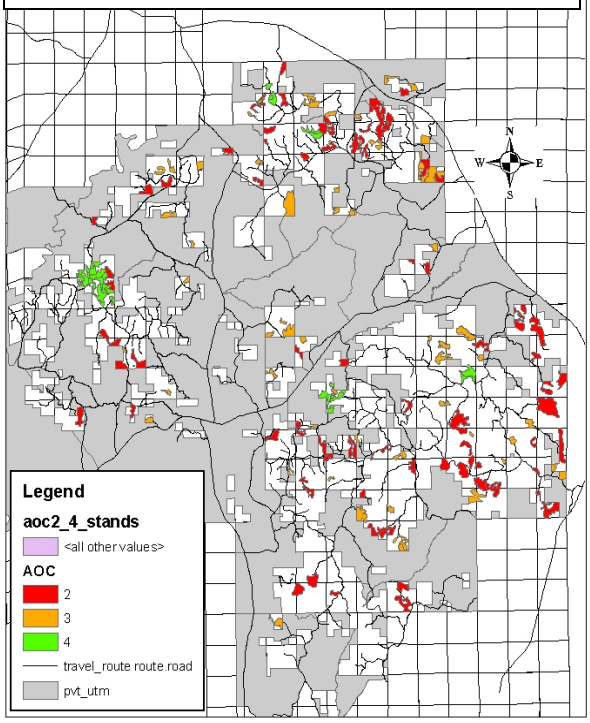


Figure 2: Summary Of Economic Considerations					
CATEGORY	**UNITS**	**AOC 2**	**AOC 3**	**AOC 4**	**Total**
Estimated treatment area	Acres	3,900	1,920	879	**6,699**
Estimated Timber Volume	CCF	70,200	33,408	7,735	**111,343**
Estimated Timber Value	$	2,297,609	981,669	487,948	**3,767,226**
Reforestation Costs	$	-2,780,700	0	0	**-2,780,700**
35% Fund	$	-804,163	-343,584	-170,782	**-1,318,529**
Pine Release	$	-1,329,900	0	0	**-1,329,900**
BALANCE	**$**	**-2,617,154**	**638,085**	**317,166**	**-1,661,903**

The stand condition that causes this project cost to be greater than the revenue generated from the sale of timber is found in AOC 2 stands. These AOC 2 stands are loblolly pine stands generally between the ages of 20 to 40 years old. They are overstocked stands located primarily on drier upland landforms that were historically dominated with longleaf pine and are considered to be off site for loblolly pine. These site conditions also place the loblolly pines occupying them in a moderate to high risk for loblolly decline, a condition that slowly destroys the feeder root system and weakens the trees, causing them to be more susceptible to SPB infestations.

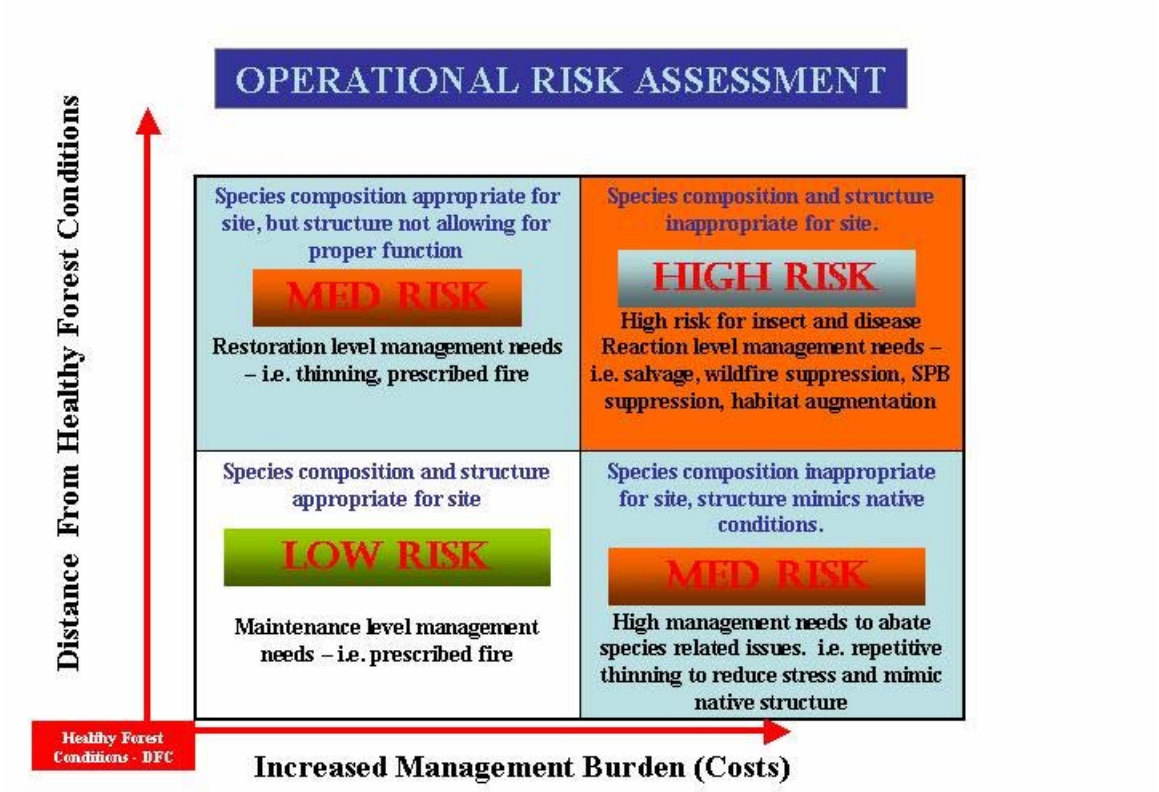
SPB infestations over time have caused extensive damage to the AOC 2 stands to the point stand integrity is compromised. Loblolly pine tree losses from SPB attacks in these stands range from 25% to 90%. This premature loss of significant portions of the trees in these stands along with the relative low value of the remaining trees, due to their small size, prevents the value of the timber removed from covering the cost of re-establishing longleaf pine on their native sites (See Figure 2: Summary of Economic Considerations). These AOC 2 stands have suffered numerous SPB attacks over several years during SPB epidemics. Indications are that they will continue to attract SPB during times of high SPB population levels.

In addition, these stands are occupying sites that are rated moderate to high for loblolly decline, a condition that weakens the infected trees and causes mortality over time even without the presence of SPB attacks. Since these AOC 2 stands have historically acted as magnets to attract SPB infestations, it is expected that they will continue to suffer losses due to SPB in the future. Therefore these stands, left in their present condition, are expected to continue to deteriorate over time rather than increase in value, so restoring them to longleaf pine is recommended at this time.

The cost of SPB spot suppression, while not included in Figure 1, is expensive and certainly one that should be acknowledged while considering forest health treatments and costs. The preferred SPB suppression method is to cut and remove the infested trees along with a buffer of un-infested trees in front of the direction in which the SPB spot is moving. Up until approximately 2003 we were able to suppress the majority of SPB spots found on the Oakmulgee district with the cut and remove suppression method using commercial timber sales that helped reduce the SPB suppression costs. Since that time, the demand for SPB damaged timber, both pulpwood and saw timber, has weakened to the point that we can no longer depend on cut and remove for SPB suppression. We are now using cut and leave to suppress the majority of our SPB infestations. While cut and leave is not as effective as cut and remove for SPB suppression, it is an effective method; however, it is expensive, costing up to $650.00 per acre. With the average

treatment size of an SPB spot being approximately ½ acre and approximately 125 SPB spots located during an epidemic year, the suppression cost could exceed $40,000 to $50,000 on cut and leave contracts alone. This does not include the timber value lost to the SPB or the loss of future revenue by taking that land base out of production.

Just as preventive measures in human health care reduces health care costs for society, preventive measures to keep tree stands healthy reduce the costs of forest management by reducing the likelihood of catastrophic events that commonly occur in unhealthy forest conditions. Maintaining vegetative species on sites where they naturally occur, thinning overstocked stands to maintain growing conditions with abundant sunlight and nutrients, and using prescribed fire where appropriate to maintain and enhance understory vegetation are some of the less costly methods to maintaining forest health.



The initial economic benefit from timber removal is the amount of money or profit that the sale of timber would bring. For this project the post sale costs are greater than the income received from the timber sale, so there is no short-term economic incentive for the Forest Service to proceed with this project (Table 1). Infusion of timber raw material into local processing facilities will have 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 many other products that are sold to wholesale and retail distributors.

While the short-term effects of this project will be a cost to the government, there will be substantial long-term benefits both economically and ecologically. Economic benefits include a greater timber value as healthy, higher value longleaf pine trees replace SPB impacted loblolly pines on sites better suited for longleaf pine. This in turn will create ecosystems well stocked with healthy longleaf pine trees native to those landforms and that are naturally longer lived, preferred by red-cockaded woodpeckers and less susceptible to diseases and infestations from southern pine beetle attacks.

The economic analysis estimates the value of timber removed and the estimated restoration cost for a single treatment each for site preparation, site prep burn, and hand planting longleaf pines and releasing pine seedlings from natural vegetative competition. It does not estimate or evaluate the successfulness of each treatment and therefore may not reveal the actual cost of achieving the desired objective. For example, the cost of pine release using hand tools may be less than the cost of pine release using herbicides for a single treatment. However, a single release treatment using herbicides may actually accomplish the desired results that could require two or three treatments using hand tools. In that case, the herbicide treatment would be less costly than the hand tool treatment to accomplish the desired objective of establishing an adequately stocked longleaf pine landform.

This project would contribute 100% of our annual sale program on the Oakmulgee Ranger District for the next five years, based on our funding level over the past two years. However the intent is to implement this project concurrently with our *Longleaf Ecosystem Restoration Project EIS* at an accelerated rate. Based on local volume estimates, the annual harvest from this project alone would be approximately 22,000 CCF per year for the next five years and the average annual deficit from project implementation would be approximately $323,381.00.

Government appropriated funds will be required in addition to Knutson-Vandenberg deposits from the timber sales to cover deficits incurred from project implementation. In addition, some contributions from partnerships may also become available.

While the short-term costs are greater than the revenue received from project implementation, the long-term benefits will justify these initial costs. For example, much of the Oakmulgee Ranger District's land that is considered prime forest land by many people today was once cut over timber land and abandoned farms with serious erosion problems when the Forest Service acquired it. Even today, much of the land that the Forest Service acquires is cut over and in need of reforestation and some erosion control work to achieve our desired future conditions. Historically these initial investments have proven to be worth their costs by greatly increasing the land value over time as well as improving ecological and environmental qualities that make the Alabama National Forests unique.

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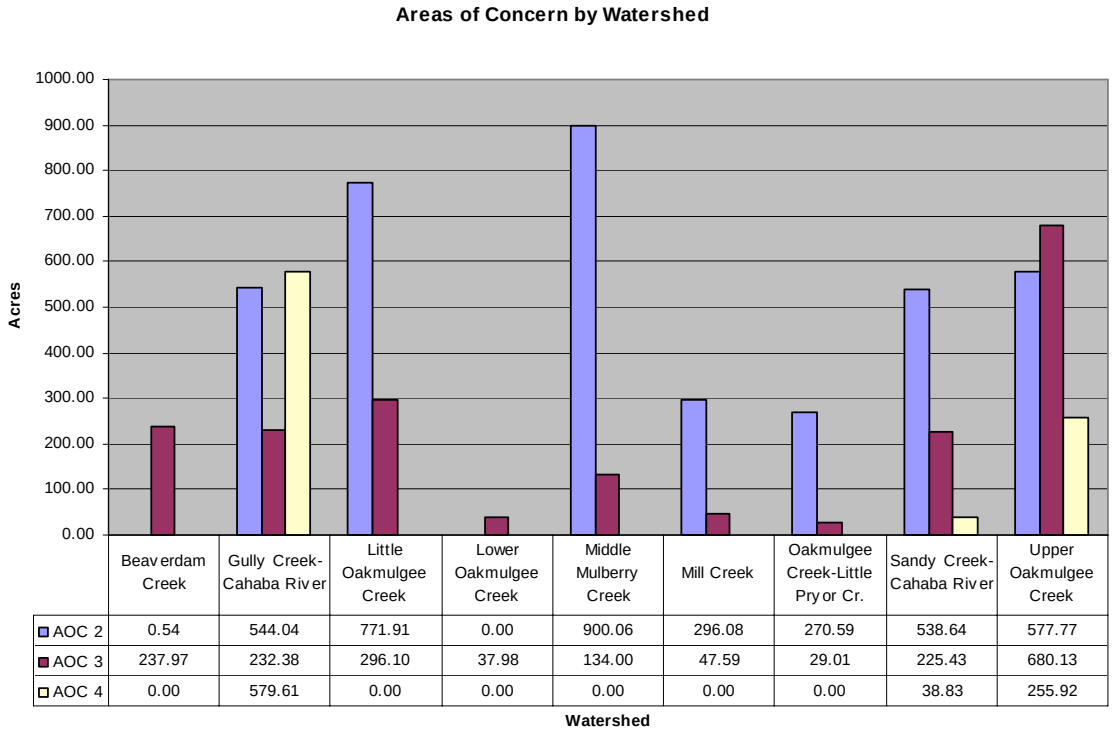
Water Resources

Affected Environment:
Management activities are proposed in nine 6th level HUC's or watersheds located on the eastern half of the District. The Upper Oakmulgee Creek watershed, the Beaverdam Creek watershed, the Little Oakmulgee Creek watershed, the Oakmulgee Creek – Little Pryor Creek watershed, and the Lower Oakmulgee Creek watershed are located within the Oakmulgee Creek 5th level HUC of the Cahaba River 4th level HUC of the Cahaba River Basin. The Sandy Creek – Cahaba River watershed and the Gully Creek – Cahaba River watershed are located within the Upper Cahaba River 5th level HUC of the Cahaba River 4th level HUC of the Cahaba River Basin. The Mill Creek watershed is located within the Cahaba River – Mill Creek 5th level HUC of the Cahaba River 4th level HUC of the Cahaba River Basin. The Middle Mulberry Creek watershed is located in the Lower Mulberry Creek 5th level HUC of the Upper Alabama River 4th level HUC of the Alabama River Basin.

All of the affected watersheds are predominantly forested with a significant wetland component. Three watersheds, Sandy Creek – Cahaba River, Middle Mulberry Creek, and the Lower Oakmulgee Creek have a significant component of agricultural land use, more than 10 percent. Water flowing from these watersheds is typically high. Ownership within these nine watersheds is fragmented and varied, ranging from 38% to 1% National Forest System lands. Water use designations as provided by the Alabama Department of Environmental Management for these nine 6th level watersheds include Outstanding Alabama Water, Swimming and Other Whole Body Water – Contact Sports, and Fish and Wildlife.

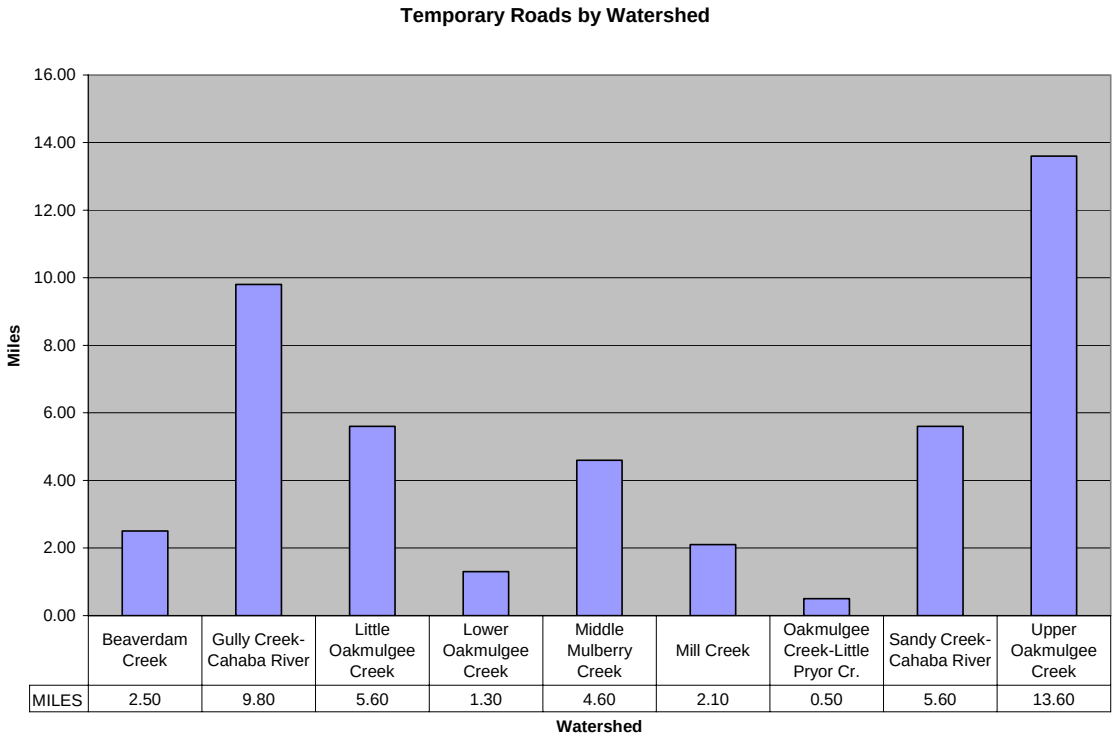
Environmental Effects:
Silvicultural Practices, in particularly clear cutting, thinning and mid-story removal will be used under the proposed action to achieve management objectives. The Proposed Action calls for the restoration of 3,900 acres of existing loblolly pine to re-establish longleaf pine in Areas of Concern 2 (clear cutting). 1,920 acres of dense stands of loblolly pine in Areas of Concern 3 would be thinned by removing 50% or more of the existing stems under the Proposed Action (thinning). Areas of Concern 4 would be treated under the Proposed Action by the removal mid-story and over-story trees in foraging and nesting habitat for active RCW clusters on 880 acres (mid-story removal and thinning). Suppression activities for active SPB infestations under the proposed action would be cut and remove or cut and leave. Suppression activities under the No Action Alternative would address SPB infestations with cut and leave. The proposed management activities in Areas of Concern 2, 3, and 4, as well as suppression activities in both the Proposed Alternative and the No Action Alternative are known to potentially affect water quality, water quantity, channel morphology, and downstream designated uses. Potential direct effects from these activities are: erosion, changes in ground cover condition, and changes in stand composition of streamside forest communities (Golden et al., 1984: Ursic, 1991; 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).

Silvicultural activities associated with Areas of Concern 2 would have the highest potential of effects. Silvicultural activities associated with Areas of Concern 3 and 4 would have a much lower potential for effects. The Middle Mulberry Creek Watershed has the highest potential for effects as a result of the proposed silvicultural activities, followed by the Little Oakmulgee Creek Watershed, the Upper Oakmulgee Creek Watershed, the Gully Creek – Cahaba River Watershed, and Sandy Creek – Cahaba River Watershed. (See chart below).



	Beaverdam Creek	Gully Creek-Cahaba River	Little Oakmulgee Creek	Lower Oakmulgee Creek	Middle Mulberry Creek	Mill Creek	Oakmulgee Creek-Little Pryor Cr.	Sandy Creek-Cahaba River	Upper Oakmulgee Creek
AOC 2	0.54	544.04	771.91	0.00	900.06	296.08	270.59	538.64	577.77
AOC 3	237.97	232.38	296.10	37.98	134.00	47.59	29.01	225.43	680.13
AOC 4	0.00	579.61	0.00	0.00	0.00	0.00	0.00	38.83	255.92

Temporary roads associated with the proposed silvicultural activities are also known to potentially affect water quality, water quantity, channel morphology, and downstream designated uses. State Best Management Practices as well as Forest-Wide standards will be applied to these roads as mitigation measures. There are 45.6 miles of temporary roads proposed. The recovery period of the temporary roads is two years. The Upper Oakmulgee Creek Watershed and the Gully Creek – Cahaba River Watershed have the highest potential to be impacted by these temporary roads. (See Chart below).



Water pollution by the application of ***herbicides*** can occur during storage, transport, application, clean up and/or container disposal. Direct effects of herbicide application are potential chemical contamination of surface 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 nitrates (Neary et al., 1993), may also occur as an indirect effect. Herbicide applications are proposed in three ways; site prep, release, and mid-story control. The proposed herbicides are Imazapyr and Triclopyr.

Imazapyr

- **Solubility:** Imazapyr is soluble in water.
- **Potential For Leaching Into Ground-Water:** Imazapyr has a low potential for leaching into ground-water.
- **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 significantly reduce the amount of offsite movement of imazapyr in storm flow. The half-life of imazapyr in water is about 4 days.

Triclopyr

- **Solubility:** moderate to low
- **Potential For Leaching Into Ground-Water:** The potential for leaching depends on the soil type, acidity, and rainfall conditions. Triclopyr should not be a leaching problem

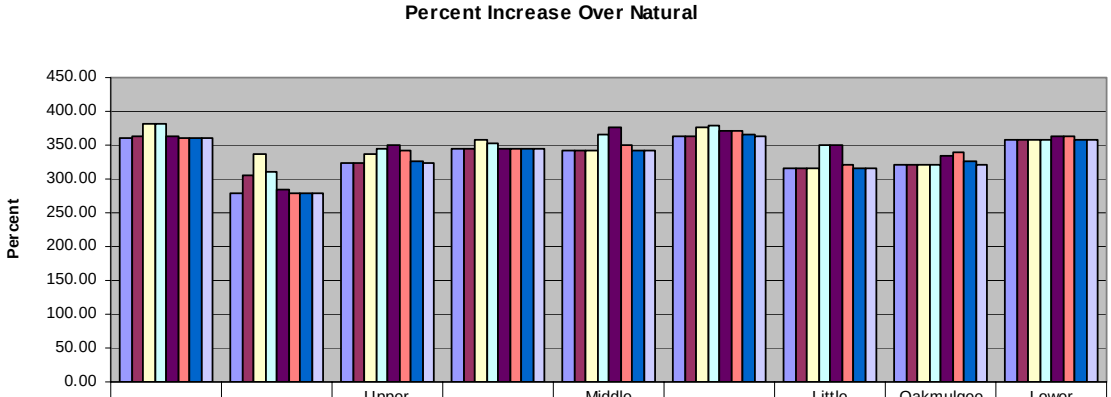
under normal conditions since it binds to clay and organic matter in soil. Triclopyr may leach from light soils if rainfall is very heavy.

- **Surface Waters:** Sunlight rapidly breaks down Triclopyr in water. The half-life in water is less than 24 hours.

Mechanical site preparation is proposed on areas of SPB infestations where heavy debris will impede planting success. The type of mechanical site preparation proposed is mastication or mulching. Mastication is proposed on an estimated 500 acres and will result in the equivalent effects of drum chopping. Direct effects from heavy mechanical site preparation are potential changes in ground cover, increased exposure of soil, surface soil compaction from equipment, and exposure of subsurface soil layers (Blackburn et al., 1985).

Hand or mechanical planting of young trees has no direct effect upon the water resource. Indirect effects (after a period of years) are potential decreases in water yield and changes in the composition of streamside forest communities.

Cumulative Effects on Water Resources:
Current land use for all segments of the water including agricultural practices and industrial and private timber production along with these proposed actions and other influences were analyzed using the previously established Clingenpeel Model to determine the impacts of cumulative effects. The results of the model indicate that there would be minimal increases in sediment yield but only on a very short temporal scale, less than seven years, for the Proposed Action. (See chart below).



	Sandy Creek-Cahaba River	Gully Creek-Cahaba River	Upper Oakmulgee Creek	Beaverdam Creek	Middle Mulberry Creek	Mill Creek	Little Oakmulgee Creek	Oakmulgee Creek-Little Pryor Cr.	Lower Oakmulgee Creek
Current	360.70	280.05	324.98	343.68	342.41	363.52	316.01	321.37	358.40
2007	363.44	305.21	324.98	343.70	342.41	363.52	316.01	321.37	358.40
2008	380.89	337.63	336.18	357.62	342.41	375.61	316.01	321.37	358.40
2009	382.71	310.01	344.20	353.63	366.85	380.01	349.52	321.37	358.40
2010	363.89	283.39	349.24	343.68	377.23	371.54	350.41	333.03	362.89
2011	360.70	280.05	343.34	343.68	349.32	370.64	320.84	339.93	362.40
2012	360.70	280.05	327.11	343.68	342.41	364.94	316.83	325.82	358.40
2013	360.70	280.05	324.98	343.68	342.41	363.52	316.01	321.37	358.40

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Soil Resources

Issues

Issues related to soil resources raised during scooping with USDA Forest Service employees and the public, were concerns of the effects of timber harvest methods used and associated impacts to the soil resource, soil erosion, and soil compaction resulting from proposed activities. Monitoring of impacts to the soil resource was also expressed. The proposed activities include restoration, thinning, midstory removal, site preparation, temporary roads, prescribed fire, Southern Pine Beetle suppression, and associated cumulative effects.

Affected Environment

Soils within the boundaries of the proposed project are located primarily in the Gordo Formation Landtype Associaton (LTA) of the Upper Clay Hills Subsection and the Coker Formation LTA of the Middle Coastal Plains - Upper Loam Hills Subsection. All three LTAs are located in the northwest and central west portions of the Forest. All three 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 subsurfaces. 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. Overstory vegetation is primarily pine-oak.

Currently, the Forest is in the mid stages of updating the Order 2 Soil Resource Inventory completed in 1980. To date, Bibb, Hale, Perry, and Tuscaloosa Counties have been completed with Chilton and Dallas Counties scheduled for completion in 2007. For the purposes of this analysis, the new soil information will be used where available. The older soil information will be used primarily for projects occurring in Chilton and Dallas Counties where current soil inventory is in progress. An Order 3 Soil Resource Inventory of the Oakmulgee Division, Talladega National Forest (1980) at a 1:24,000 scale, identified 12 soil map units within the proposed project boundary located in Chilton and Dallas Counties. An Order 2 Soil Resource Inventory that is still in progress to date and mapped at a 1:24,000 scale identified 18 soil map units within the proposed project boundary located in Bibb, Hale, Perry, and Tuscaloosa Counties.

Eighteen 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 511 acres of wetlands/floodplains (hydric soils) and 6 acres of floodplain soils are identified for all the action alternatives. Stand layout and delineation of riparian areas, prior to implementing management prescriptions, will eliminate management activities within any wetland or floodplain soils on 505 acres. Maps and soil descriptions are available for viewing at the Forest Supervisor's Office in Montgomery, AL.

Soil Resource Inventory Map Units

1980 SRI – Bibb County

Luverne-Boswell complex, 2-12 percent slopes
Mantachie-Johnston association, 0-2 percent slopes, frequently flooded
Mantachie-Kirkville association, 0-2 percent slopes, occasionally flooded
Saffell-Smithdale complex, 5-15 percent slopes
Saffell-Smithdale complex, 15-45 percent slopes
Smithdale-Luverne complex, 5-20 percent slopes
Smithdale-Luverne complex, 20-50 percent slopes
Smithdale, Luverne and Saffell soils, 5-20 percent slopes
Smithdale, Luverne, Saffell soils, 20-60 percent slopes
Smithdale association, 0-10 percent slopes
Smithdale-Troup complex, 10-20 percent slopes
Troup-Harleston-Mantachie association, 0-15 percent slopes

Current On-going SRI - Hale, Perry, Tuscaloosa Counties completed

Bama fine sandy loam, 2-5 percent slopes
Bibb-Iuka complex, 0-1 percent slopes, frequently flooded
Columbus loam, 0-2 percent slopes, occasionally flooded
Luverene-Smithdale complex, 5-15 percent slopes
Luverne-Smithdale complex, 15-35 percent slopes
Mantachie, Iuka, and Kinston soils, 0-1 percent slopes, frequently flooded
Maubila flaggy loam, 2-8 percent slopes, eroded
Maubila-Smithdale-Boykin complex, 5-20 percent slopes
Maubila-Smithdale complex, 15-35 percent slopes
Maubila-Smithdale complex, 35-45 percent slopes
Saffell gravelly sandy loam, 5-15 percent slopes
Saffell-Maubila complex, 2-5 percent slopes
Smithdale sandy loam, 2-8 percent slopes
Smithdale sandy loam, 5-15 percent slopes
Wadley-Smithdale-Boykin complex, 5-20 percent slopes
Wadley-Boykin complex, 15-35 percent slopes
Wilcox clay loam, 2-5 percent slopes
Wilcox-Boswell complex, 5-15 percent slopes

The Oakmulgee is located within 5 counties: Bibb, Chilton, Dallas, Perry, Hale, and Tuscaloosa. To date, five soil surveys conducted by the Natural Resources Conservation Service (NRCS) have occurred: Chilton County 1972, Dallas County 1979, Hale County 2002, Perry County 1998, and Tuscaloosa County 1981. Currently Bibb County is being surveyed. No known previous soil inventories are known for the area. Proposed actions under this document are predominately located in Bibb, Chilton, Dallas, and Perry Counties. 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.

Bama soils are located on ridge tops and have average surface horizons consisting of sandy loam textures 6 inches thick with subsurface textures of sandy clay loam. Boswell and Wilcox soils are located on ridge tops and side slopes. Boswell surface horizons are eroded having a clay loam texture with subsurface textures of clay loam and clay. Wilcox surface and subsurface texture is clay. Both these soils have vertic properties or shrink and swell causing cracks when dry and subsidence over time. Luverne and Saffell soils are located on mid to lower slopes or narrow ridge tops. Surface horizons for Luverne consist of sandy loam textures averaging 3 to 5 inches thick over subsurface clay loam textures. Luverne soils on narrow ridge tops are eroded from past and current locations of roads. Surface textures are clay loam. Saffell soils have surface horizons consisting of gravelly sandy loam approximately 15 inches thick over gravelly sandy clay loam subsurfaces. 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. Troup, Wadley, and 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. The Columbus and Kirkville soils are located on nearly level broad stream terraces. They were historically farmed in the past. Surface textures are silt loams and clay loams to depths of 6 inches over clay loam to clay subsurfaces. Columbus and Kirkville soils are occasionally flooded. Bibb, Harleston, Iuka, Johnston, 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.

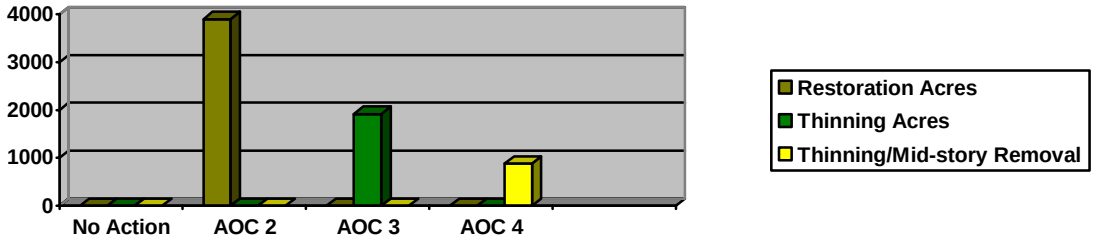
Environmental Effects

Disturbance of soils from 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.

Silvicultural practices (restoration and thinning) are known to potentially affect the soil resource primarily through nutrient removal. Tree harvest methods by the proposed action

involves treatment by thinning, mid-story removal, or restoration involving over story removal leaving residual Longleaf pine. 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, harvesting the stem only, reduces nutrient removal by 50-60% (Pritchett and Fisher, 1987). Nutrients lost from stem removal are believed to be replaced by soil weathering and natural inputs (Grier et al., 1989, Jorgensen et al, 1971, Wells, 1971 and Pritchett and Fisher, 1987).

Comparison of alternatives reveals Alternative 1, the no action alternative, as having the least impact since no harvest treatments are proposed. Nutrient removal can be expected to be greatest for Area of Concern (AOC) 2, Alternative 2 resulting from the removal of all pine stems from the sites and the quantity of acres. AOC 3, Alternative 2 is expected to have greater nutrient removal than AOC 4, Alternative 2 as a result of removing a greater amount of stems from thinning and quantity of acres versus thinning and mid-story removal over less acreage (refer to **Figure 3.1-1 "Vegetation Treatment and Temporary Access"**).

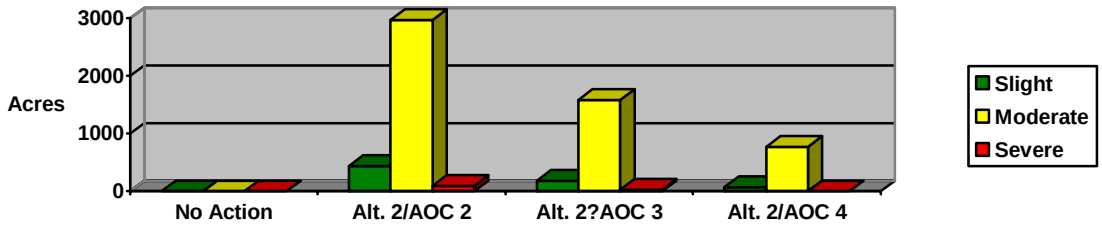


	No Action	Alt. 2/AOC 2	Alt. 2/AOC 3	Alt. 2/AOC 4
Restoration	0	3900	0	
Thinning	0	0	1920	879
Mid-story Removal	0	0	0	879

Figure 3.1-1- Vegetation Treatment

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. 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 do 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. Soil compaction is dependant on soil texture, organic mater, and soil moisture (McKee et al. 1985). Soil compaction effects bulk density. The lower the bulk density range, the greater the impacts to tree growth from soil compaction. Lighter textured soils (sand) have a higher range in bulk density compared to heavier textured soils (clay). Presence of surface organic matter, tree limbs, and leaves can buffer soil compaction by providing support to equipment. Soil moisture content has a pronounced effect on soil compaction as it influences soil porosity. Identifying soils by surface texture, maintaining surface organic matter, and operating equipment under low

soil moisture conditions will reduce the effects of soil compaction within the general forest and on skid trails used for thinning and restoration operations. Temporary roads will be compacted the greatest from multiple traffic use. Harvest technique can also reduce or increase soil compaction



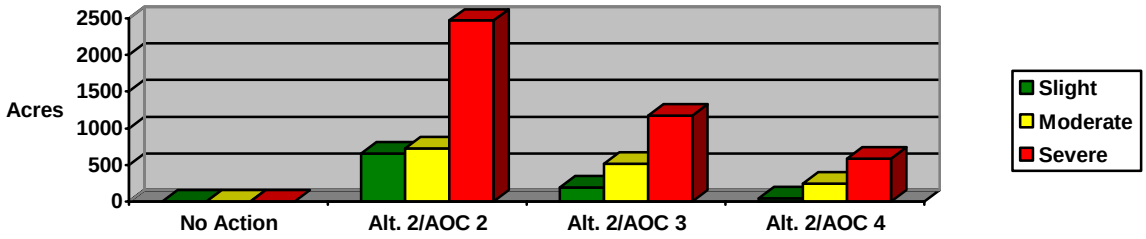
	No Action	Alt. 2/AOC 2	Alt./AOC 3	Alt. 2/AOC 4
Slight	0	442	181	71
Moderate	0	2973	1586	773
Severe	0	94	30	0

Figure 3.1-2 - Potential Soil Compaction

potential. Use of standard logging equipment (skidders) can compact the soil with as few as three passes over the same ground. Specialized equipment that reduces or disperses equipment weight, such as low-pressure tires, can assist with limiting soil compaction effects. The No Action proposes no treatments (refer to SPB discussion for impacts from cut and leave) therefore soil compaction will not result from silvicultural activities. AOC 2, Alternative 2 has the greatest potential for soil compaction due to the quantity of acres involved followed by AOC 3, Alternative 2 with AOC 4, Alternative 2 having the lowest potential for compaction.(refer to **Figure 3.1-2 "Potential Soil Compaction"**). The majority of the soils have a moderate compaction rating. Operating under seasonally dry soil conditions, usually April thru November, will aide in reducing soil compaction from conventional harvesting equipment within stands. Harvest operations on soils rated as severe (the Boswell and Wilcox soil series) need to be conducted under dry conditions that usually occur late summer and early fall. Also, the Boswell and Wilcox soils, being vertic, will need additional engineering input to construction/re-construction of temporary roads. Soil compaction can be expected on temporary roads. The Action Alternative proposes an estimated 46 miles or approximately 126 acres of temporary roads. Application of mitigating measures will assist in reducing the effects of soil compaction over a three to five year period. Full recovery can take as long as 20 years.

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) have found soil exposure to occur primarily on temporary roads and skid trails with minor soil exposure off roads and skid trails. 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. Treatment of stands is restricted on sustained slopes exceeding 40 percent using conventional harvesting equipment. The No Action proposes no treatments (refer to SPB

discussion for impacts from cut and leave) therefore soil erosion will not result from silvicultural activities. Comparison of AOCs under Alternative 2 (refer to **Figure 3.1-3 "Potential Soil Erosion"**) finds AOC 2 having the greatest potential for soil erosion due to steepness of slopes and quantity of acres being treated. AOC 3 has a lower soil erosion potential with AOC 4 having the lowest soil erosion potential.



	No Action	Alt. 2/AOC 2	Alt. 2/AOC 3	Alt. 2/AOC 4
Slight	0	652	196	48
Moderate	0	723	516	243
Severe	0	2469	1171	588

Figure 3.1-3 - Potential Soil Erosion

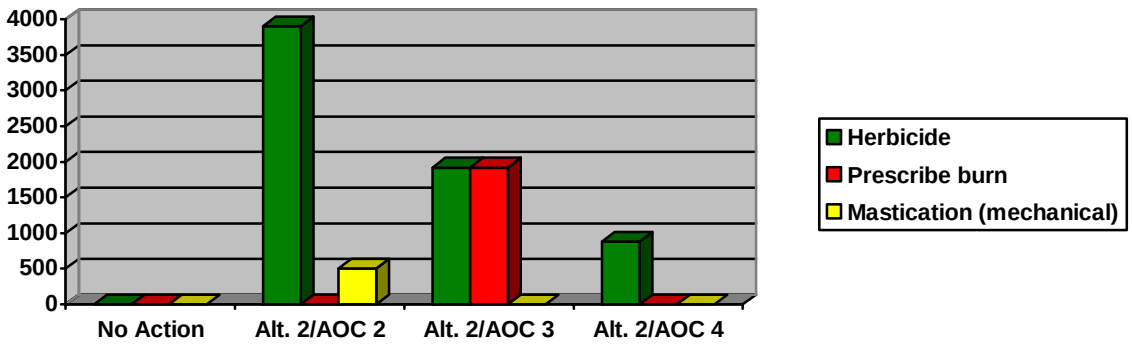
The primary source of soil erosion is temporary roads and primary skid trails for the duration they are in use. Alternative 2 proposes an estimated 46 miles or 126 acres of temporary roads. It is recommended to operate timber harvest and mechanical site preparation during the driest time of year (August thru October) or restrict operations during dry periods during the year. Application of mitigating measures will assist in reducing the effects of soil erosion over a two to three year period.

Herbicide Site Preparation has no known direct or indirect effects on the 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 from 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). However, a general consensus is herbicide usage at normal forestry rates does not reduce the activity of soil micro-organisms. There is no evidence to date that herbicides currently in forest management in the South produce any adverse effects on site productivity. Herbicides do not disturb the surface soil. Soil erosion is limited to pre-existing exposed soils that may lose vegetative cover from herbicide use or from mechanical method of application. The Action Alternative uses a foliar application method. Neary and others (1986) found erosion rates to be less than burning or mechanical forms of site preparation and depending on the quantity of pre-existing bare soil sites, soil erosion was slightly above no treatment (control) plots. Nutrient leaching after herbicide use has been little studied. Based on nitrate losses found by Neary, Bush, and Douglas (1983), nitrogen losses are less than 10 lbs/acre due to suppression of vegetative uptake. Loses of other less mobile nutrients are negligible.

Triclopyr (Garlon 4 or equivalent product) is not highly mobile in the soil and is absorbed primarily by plant leaves moving readily throughout the plant. Triclopyr is rapidly broken down by soil organisms and ultraviolet light, persist in the soil an average of 30-56 days depending on soils and weather. Triclopyr is not strongly absorbed by soil. Imazapyr (Arsenal or equivalent product) is also not very mobile in soil but is soil active as well as foliar active. 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.

Comparison of herbicide use by AOC, under the Action Alternative, (refer to **Figure 3.1-4 "Site Preparation Treatments"**) reveals AOC 2 proposing the greatest acreage for herbicide application followed by AOCs 3 and 4. AOC 3 and AOC 4 herbicide use will involve the least acreage and will involve spot treatment of sprouting stumps as needed

Prescribe burn and site preparation burning 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 effects 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.



Site Prep/Release	No Action	Alt. 2/AOC 2	Alt. 2/AOC 3	Alt. 2/AOC 4
Herbicide	0	3900	1920	880
Prescribe Burn	0	0	1920	0
Mastication (mechanical)	0	500	0	0

Figure 3.1-4 - Site Preparation Treatments

Comparison of burns by alternative (refer to **Figure 3.1-4 - "Site Preparation Treatments"**) reveals AOC 3, under the Proposed Action, plans prescribed burn on 1920 acres. No other AOC's under the Proposed Action plans any prescribed fire.

Mechanical site preparation is planned on 500 acres under Alternative 2/AOC 2 (refer to ***Figure 3.1-4 - "Site Preparation Treatments"***). The 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 former SPB sites where there is heavy downed dead timber. 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 mulcher 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 the debris. Under dry soil conditions, soil compaction will be slight equivalent to one pass discussed under soil compaction in this document.

Additional discussion of direct, indirect and cumulative effects from herbicides, prescribed burns and mechanical methods to soil productivity are presented in the Vegetative Management-Final Environmental Impact Statement (VM-FEIS).

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

SPB suppression using either the cut and leave or cut and remove methods are planned under the 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, 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. Exposure of soil to rainfall results in erosion. Road traffic results in soil compaction.

No –Action Alternative
Effects to the soil resource are a result of ground disturbing activities. Under this alternative, SPB suppression using the method of cut and leave is planned. Slight to moderate soil compaction and slight soil erosion will occur on access roads and within the SPB area(s) if equipment is used to cut and leave the infected trees.

Proposed Action
This alternative proposes activities on 1920 acres of thinning; 3,900 acres of restoration, 880 acres of midstory and overstory removal in RCW foraging and nesting habitat and 46 miles of temporary roads providing access. Site preparation associated with restoration is as follows: herbicide treatment on 5,820 acres, prescribed burn on 1,920 acres, and 500 acres mastication mechanical treatment. Planting trees will occur on 3,900 acres. The potential for soil erosion is of concern on temporary roads and on fire lines. The potential for soil compaction is of concern on soils rated as moderate during wet soil conditions and soil rated as severe during moist to wet soil conditions. Application and maintenance of mitigating standards should result in minimizing impacts from soil compaction and reducing the potential for soil erosion to occur. Application and maintenance of soil standards are expected to maintain soil productivity.

The potential for a reduction in site productivity by implementing SPB suppression methods is slight if SPB treatment sites are few in number and under 5 acres in size. The potential for impacts to site productivity are expected to be moderate if SPB sites are numerous and large in size. Removal of infected wood is the primary control method. Cut and remove will have the greatest effect on the soil resource compared to the other treatment methods. Although the effects on the soil resource are greater using the cut and remove method of treatment, using this tool for SPB control can actually benefit the soil resource if sites are kept small (under 5 acres) versus using other methods that may not result in SPB control and allows for the spot to increase in size which directly results in more acres needing treatment and indirectly more acreage of soil disturbance. Cut and remove will result in the highest potential for nutrient loss, soil erosion, and soil compaction. Nutrient loss will be slight as tops are left on site. Erosion can be expected from exposed soils along skid trails, loading decks and roads for a short period of time.
Cut and leave will result in no nutrient loss and reduced soil erosion and compaction. Travel along roads is usually as few as one trip in and out of a site to as many as approximately 3 trips. Monitoring of southern pine beetle spots (NF in AL, 2000) showed cut and leave practices left little to no soil exposure within SPB sites and minimal ground disturbance along access roads leading into SPB sites.

Construction of temporary roads and skid trails will result in soil compaction and some soil erosion. Standards and guidelines for soil and water should mitigate effects from erosion and compaction. Restoration of skid trails and roads at the end of treatment will mitigate soil erosion and compaction over a 3-5 year period.

Mitigation Measures
Timber harvesting with conventional equipment is limited to slopes less than 40 percent.

Burning of material generated by timber activities or mechanical fuel treatments (slash) is done so it does not consume all liter and duff and does not alter the structure and color of mineral soil on more than 20 percent of the area.

Soils with a moderate to severe soil compaction and soil erosion rating will operate mechanical site preparation treatments when soils are dry. Soils are considered dry when rutting and/or equipment slippage is minimal.

Refer to section 3.2.4 (mitigation measures under the water section) for additional mitigation measures that provide protection to both soil and water resources.

Cumulative Effects (Soil)

Cumulative effects are changes in soil productivity. Research concludes that most soils could replace the nutrients in a harvested area without a long-term decrease in soil productivity (Grier et al., Jorgensen and Wells, Pritchett and Fisher). Comparison for soil compaction hazard rating results in AOC 2, Alternative 2 as having the greatest potential for soil compaction resulting from the quantity of acreage having equipment operating on. Cumulative effects of soil compaction are not expected on 13 percent of the acreage (slight hazard rating) for AOC 2, 10 percent for AOC 3 and 8 percent for AOC 4. Approximately 85 percent of the acreage (moderate hazard rating) under AOC 2, 88 percent under AOC 3, and 92 percent under AOC 4, Alternative 2 can expect some soil compaction primarily on skid trails, loading decks, and temporary roads. Approximately 2 percent of the acreage under both AOC 2 and AOC 3 (severe hazard rating) can expect severe soil compaction generally located on skid trails, loading decks, and temporary roads. There is no acreage having a severe compaction potential under AOC 4, Alternative 2. On average, 10 percent or less acreage consists of skid trials, loading decks and temporary roads. They are usually used again upon re-entry to the stand for future management needs. Application of mitigating measures to skid trails, loading decks, and temporary roads involving scarifying the ground, fertilizing, and planting grasses will aid in reducing the effects from soil compaction over a 2 to 3 year period as vegetation is established. Effects from soil compaction, particularly on temporary roads, are not expected to fully recover due to the expectation of being used again with future entry for vegetative management.

Comparison for soil erosion hazard rating results in AOC 2, Alternative 2 as having the greatest potential for soil erosion resulting from the quantity of acreage having severe soil erosion potential. Cumulative effects of soil erosion are not expected on 17 percent of the acreage (slight hazard rating) for AOC 2, 10 percent for AOC 3 and 5 percent for AOC 4. Approximately 18 percent of the acreage (moderate hazard rating) under AOC 2, 27 percent under AOC 3 and 28 percent under AOC 4 can expect moderate soil erosion. Alternative 2 can expect moderate soil erosion primarily on skid trails, loading decks, and temporary roads. Approximately 64 percent of the acreage under both AOC 2 and AOC 3 and 67 percent under AOC 4 (severe hazard rating) can expect severe soil erosion generally located on skid trails, loading decks, and temporary roads.

Application of mitigating measures will be needed to assist with reducing soil erosion. Soil erosion is expected to last from 2 to 3 years.

Cumulative effects to the soil resource from implementation of the Alternative 2 peaks in 2009 and is expected to continue thru 2013. No long-term loss of soil productivity is expected. No permanent roads or other permanent facilities are planned under any alternative. Short-term soil loss is expected on temporary roads and fire lines.

Monitoring

The proposed project area will be monitored for compliance with Forest standards (Best Management Practices) in accordance with the current Forest Land Management Plan. During vegetation operations, roads and skid trails account for more than 95 percent of the effects to soil productivity followed by site preparation which accounts for approximately 3 percent of the effects on soil productivity. An implementation and effectiveness monitoring plan of Forest standards (BMPs) for roads, skid trails, and site preparation methods will be developed and implemented.

Participant's Bio

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Southern Pine Beetle Abatement Project
Access Assessment

Rights-of Way Acquisition:
In 1971, the National Forest in Alabama implemented a right-of-way (ROW) acquisition program. The purpose of this program is to acquire, across private ownership, rights-of-way that are adequate for the protection, administration, and utilization of the National Forest Lands. Currently, the Forest is averaging one permanent right-of way easement per year.

There are three types of easements the Forest Service uses in acquiring ROWs: 1) Permanent easements where the United States acquires an exclusive easement that permits full multiple-use of the National Forest System lands served, including access for public users, 2) limited easements which are permanent, but may be restricted in various ways such as excluding public use access, 3) and temporary easements, which are by definition, something less than permanent easements. Long-term public access needs and current public access are evaluated when determining the type of easements that are pursued. Additionally, the need for long-term access to implement activities identified in he Forest Land Management Plan is also a determining factor of whether a permanent or temporary easement is pursued.

Existing Conditions
Activities associated with the 2007 Southern Pine Beetle Abatement (SPBA) project will be conducted primarily on the eastern portion of the Oakmulgee Ranger District in Bibb, Chilton, Perry, and Dallas Counties. Ownership of National Forest Lands in this area can be characterized as broken and intermingled with many tracts of individually and corporate owned lands. Reference **Figure 1: Oakmulgee Ranger District-East Side Land Ownership Patterns**, which illustrates the land ownership pattern for the east side of the Oakmulgee Ranger District. Areas in green represent National Forest lands. Acquiring access to National Forest lands is an ongoing process and ROWs are often obtained on a project driven basis. An assessment of ROW needs has been conducted for this project to ensure to that legal access has been or will be obtained. The assessment process revealed seven ROW needs to access all the stands proposed in the SPBA project **(Table 1)**. In the event that a ROW cannot be obtained or was not identified as

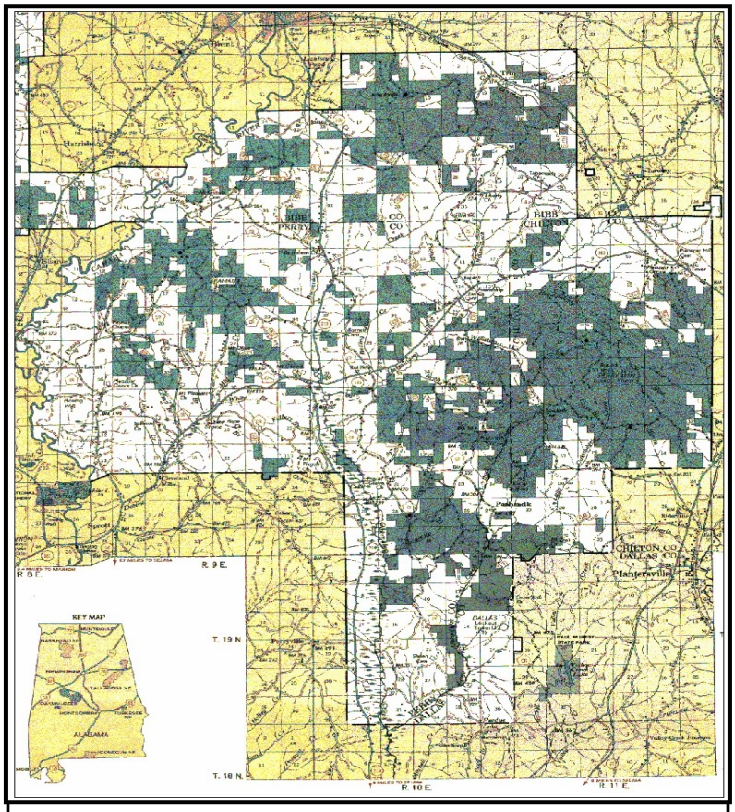

Figure 1: Oakmulgee Ranger District - East Side Land Ownership Patterns.

part of this assessment, alternate routes and/or ROW accesses will be pursued.

Table 1: 2007 Southern Pine Beetle Abatement ROW Needs

Compartment	Stand	Miles of ROW Needed	Planned Year of Need	Private Owner/ Potential Grantor
101	6	0.3	FY08	Fred and Charlene Ward
134	27	0.3	FY09	I. H. Harrison
140	3	0.5	FY09	Westervelt Co.
122	24	0.3	FY10	Rome Simmons
123	25	0.2	FY10	Jack M. & Alma Bolling or Samuel Hixon III
125	21	0.2	FY10	Butch Lovelady or Charles Chapman
141	26	0.4	FY10	A. D. Lovelady

Implementation

The activities for the SPBA project are proposed to occur between fiscal years 2008-2010. To ensure enough lead-time to obtain access easements, the ROW acquisition process should begin in the year prior to the proposed activity for each area identified in Table 1. The ROW acquisition process for compartments 101, 134, and 140 should begin in FY08 with compartment 101 being the first priority as timber management activities are proposed to occur in that fiscal year. ROW acquisition for the remaining four compartments should begin as early as FY08 and be obtained no later than the end of FY09.

Summary

As previously mentioned, the assessment of access needs for the proposed SPBA project revealed seven ROW needs. Eight landowners were found that have the potential to grant access through their property to National Forest lands for the seven areas identified. A total of approximately 2.2 miles of linear road right-of-way is needed to conduct the timber management activities for the proposed seven stands currently without access.

Report Prepared By:

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Talladega National Forest
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Cultural Resource Assessment for the Southern Pine Beetle Abatement Project

The Talladega National Forest – Oakmulgee District and the University of Alabama – Office of Archaeological Research (OAR) are in a multi-year partnership to develop a better understanding of past lifeways and the cultural history of the lands that now make up the Oakmulgee District (#04-PA-11080104-065). While addressing the immediate needs for Section 106 Compliance, the long-term goal of this partnership is to build a heritage and cultural resource program that connects the past to the present, building on the social, cultural, and traditional values that influenced the land and people of the Oakmulgee area.

As ground-disturbing activities are planned, OAR is conducting Phase I Cultural Resource Surveys, with the resulting data and recommendations produced as Heritage Resource Reports for submission to the Alabama Historical Commission and the federally recognized tribes on behalf of the Oakmulgee district. All phases of the survey and research will be in compliance with the guidelines set forth by the Department of the Interior and the Alabama Historical Commission (AHC) for Section 106 compliance.

A cultural resources reconnaissance survey generally involves a literature/records search and an actual on-site field survey. A literature/records search identifies any National Register of Historic Places (NRHP) properties which may be located in the project area, as well as previously recorded archaeological sites, historic and prehistoric, in the area.

Field investigations include a pedestrian survey of the entire project area. Both archaeological and structural (historic) resources will be considered. Field techniques include visual inspection of exposed surface areas, and the employment of 30 cm by 30 cm shovel tests spaced at regular intervals along survey transects.

In the event that an archaeological site is encountered, a preliminary assessment of NRHP eligibility is made. Sites that are considered potentially eligible for the NRHP will be recommended for avoidance or Phase II testing. Also, this survey will identify historic structures, defined as 50 years or older. Historic structures will be evaluated to a preliminary level regarding their NRHP eligibility. Finally, a report will be prepared detailing our Phase I investigations in the field and laboratory. Recommendations for treatment of cultural resources will also be generated in the report.

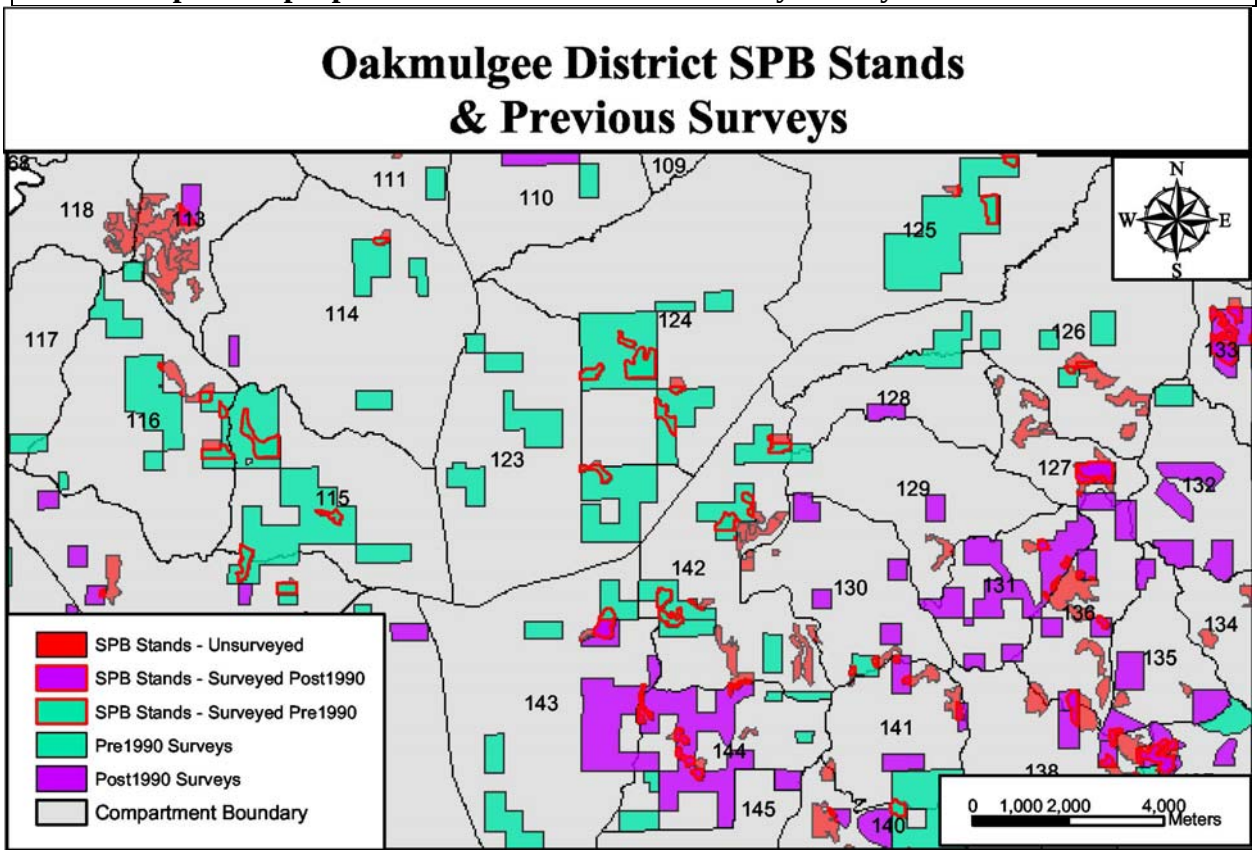
The partnership is also developing and maintaining a database to catalog Phase I Cultural Resource Surveys for the Talladega National Forest – Oakmulgee District. Specific to this project, OAR has reviewed the survey database and mapped those areas previously surveyed in relation to the proposed ground disturbing activities. This serves as a coarse filter planning tool for the Oakmulgee District in determining the time and resources needed to allow for adequate survey prior to project implementation. As a general rule of thumb, surveys prior to 1990 are not considered consistent with current standards (AHC Policy for Archaeological Survey & Testing in Alabama, 1996) and these areas will be revisited under the Forest Service's survey monitoring program. Surveys conducted between 1990 and 1996, when the AHC established its new policies, are evaluated by the USFS Archaeologist on a case by case basis.

As depicted in **Figure 1: Summary of Prior Phase I Surveys,** approximately 18% of the treatment areas listed in the proposed action have been surveyed to current standards. These areas will receive a more detailed review by the Forest Archeologist to determine the need for additional survey and/or monitoring. The remaining 82% of the treatment areas that were surveyed prior to 1990 or have not had a survey will have a Phase I survey and report completed prior to project implementation.

Figure 1: Summary of Prior Phase I Surveys		
	Acres	**%**
Surveyed Prior to 1990	1,191	18
Surveyed After 1990	1,250	18
No Survey	4,258	64
Total	**6,699**	**100**

All access roads will receive survey and report documentation. The appropriate protection measures, including site avoidance, will be incorporated into contract requirements along with clauses regarding the ceasing of operations if there is a discovery during the ground disturbing activities.

Figure 2: Treatment Areas and Survey History provides an example of the spatial relationship of the proposed treatment areas and survey history.



Prepared by: Sam Mizelle
Cultural Resource Investigator/ IT Manager
Office of Archaeological Research
University of Alabama Museums

Introduction: This report documents public involvement regarding the Forest Service's proposal to address southern pine beetle infestations on the national forest lands east of the Cahaba River on the Talladega National Forest – Oakmulgee District. Official comments received for this project are summarized herein, but are available for review in the official project file maintained by project team leader, Joe Fowler at the Oakmulgee Ranger Station office at 9901 Highway 5 in Brent, Alabama.

Initial Request for Comments: In May 2005, faced with ongoing SPB infestations, began public involvement for both immediate suppression activities to Categorically Excluded from an EA or EIS and addressed by a Decision Memo; and a more comprehensive "prevention and restoration" project that would require analysis within an EA. It was in May of 2005 that the Southern Pine Beetle project was first posted in the quarterly Schedule of Proposed Actions (SOPA), and has received quarterly posting since that time. On May 18, 2005 a letter explaining both proposed actions was sent to 404 recipients. That process, called scoping, resulting in three responses.

On June 7, 2005 Jim Hyland of the Alabama Forestry Commission responded with several issues:

a) *Unhealthy conditions on the Oakmulgee have been brought about by "non-Forest Management"*: Mr. Hyland stated that the loblolly pines in question had been allowed to grow beyond biological maturity. **Response:** Given that the proposed treatment areas had not been defined at the time of this request for comments, it is likely that Mr. Hyland is referring to the loblolly pines greater than age 50. The SPB Abatement Project EA does not propose treatment for these stands, as they do not pose as great a risk for SPB infestation as do the loblolly stands less than age 50. Albeit outside the scope of this decision the non-management questioned by Mr. Hyland resulted from policy requirements limiting the amount of early succession habitat created within a ten year period. While there is a considerable amount of dying and declining loblolly on the Oakmulgee, there is approximately 20,000 acres of longleaf currently evolving into a more restored condition. This is a result of active management over the past twenty years strategically addressing these over-mature loblolly stands.

b) *Hot growing season burns putting stands under stress:* **Response:** Only site preparation burning is addressed by the proposed action of the SPB Abatement Project EA, however the current decision to re-establish a more native 3-5 year rotation prescribed burning rotation was addressed within the EA relative to cumulative effects. Mr. Hyland's comment is one that we take very seriously, as fire is documented to increase stress in trees and that stress is acerbated when the trees are in non-native sites and in over-stocked conditions. However, fire is a natural and necessary component of the longleaf ecosystem and restoring a range of fire seasonality including growing season burns in critical to restoring the native grasses in the understory. The District uses detailed firing techniques to lessen the potential stresses from burns.

c) *Aggressive suppression:* Mr. Hyland recommended timely treatment of the active SPB spots to coincide with the 30-day life cycle of the beetle. **Response:** We concur with this recommendation and have included this concept in the proposed action.

d) *Aggressive prevention:* Mr. Hyland stated that "thinning is the answer to SPB". **Response:** We agree that thinning is an accepted treatment in at risk stands and that is the crux of the proposed actions within AOC 3 stands. The methodology of arriving at the proposed action is discussed in the EA and the Decision Support Matrix is included as Appendix A.

On June 9, 2005 Ray Vaughan, representing Wild South responded with the following points;

a) *Natural Disturbance Processes:* Mr. Vaughan pointed out the need to use good science in the context of assessing SPB impacts relative to natural disturbance processes. He also referenced a 1994 Forest Service paper titled "Disturbance Processes and Ecosystem Management". **Response:** The EA acknowledges that SPB infestations are a natural process and the Proposed Action Suppression Design Criteria gives consideration to allowing small infestations (less than 5 freshly attacked trees) not threatening additional live pines to work through the natural processes. However, threats of disturbances from insects within unhealthy or exotic systems often do not occur within the range of natural variability. The focus of the SPB EA is to address certain unhealthy conditions through restoration of native conditions. Yet, in actuality suppression treatments are likely to be needed before the benefits of the restoration can be realized.

b) *Fully disclosed impacts:* Mr. Vaughan stressed the responsibility of fully disclosing the impacts from the proposed action, such as ground disturbing activities. **Response:** The direct, indirect, and cumulative effects of the proposed action are disclosed within the appropriate Specialist Report and/or Biological Evaluation enclosed within the EA as appendices.

c) *Criteria for suppression activities:* Mr. Vaughan expressed concern that the speculative nature of suppression activities would not allow adequate public involvement and we would be "basically giving ourselves a blank check to log in the name of SPB suppression". ***Response:*** The overall design of the SPB Abatement Project places emphasis on prevention, with the full realization that when SPB epidemics occur suppression is often reactive. That stated, when outbreaks occur timely suppression is critical to control the size and extent of the infestations. While there are factors outside the scope of this EA, there are specific design criteria for suppression within the proposed action. These design criteria were developed to provide a framework for public understanding of the process during the public involvement process for this EA. There is tracking and evaluation process (Southern Pine Beetle Information System – SPBIS) included within the criteria to provide documentation of compliance.

On June 22, 2005 U.S. Fish and Wildlife Service (FWS), Daphne Field Office responded with the following points in accordance with the provisions of the Fish and Wildlife Coordination Act

(48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and Section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 et seq.)

a) *Listed species:* The FWS provided official notification of listed species occurring on the Oakmulgee District. **Response:** The effects to these species are discussed in Appendix C: Biological Evaluation_Threatened and Endangered Species

b) *Wetland and stream habitats:* FWS expressed concern over the proper delineation and protection of these habitats. **Response:** These areas have been mapped and are currently being inventoried for Regional Forester's Sensitive Species. Acknowledging and providing for the proper function of these habitats is listed as Goal #5 for the SPB Abatement Project.

Project Development: Based on the feedback from the initial scoping, the adaptive management process of the Longleaf Ecosystem Restoration Project, and unstable local market for SPB infested trees, the District began an aggressive and strategic assessment to support project development. After the 2005 SPB season it was clear that future SPB suppression was going to be expensive and would further degrade the already unhealthy forest conditions. Thus the Decision Matrix (Appendix A) was developed to assess the risk associated with non-sustainable, exotic forest conditions.

Concurrent Public Involvement and Collaboration: Given that the SPB Abatement Project carries forward the restoration focus of the Longleaf Ecosystem Restoration Project (Longleaf EIS), much of the public involvement for this project was concurrent to the public involvement associated with the Longleaf EIS.

Landowners Tour: On March 18, 2006, the Oakmulgee District partnered with the Hale and Tuscaloosa Forestry Planning Committees to host a tour of forest landowners regarding the on-going restoration activities. Approximately 60 people attended. Relevant discussion points on the tour included a review of a recently harvested AOC 3 (Longleaf EIS) stand and over-stocked RCW habitat (AOC 4). Forest health specialist were also on hand to discuss the relationship between over-stocked non-native loblolly stands and the stresses associated with SPB infestations and loblolly decline.

Academia Day: On December 16, 2006, the Oakmulgee District partnered with the University of Alabama Museums and The Nature Conservancy to host University professors and researchers. 171 participants were invited from university and colleges in Alabama and Mississippi. There were 17 attendees and key discussions included unhealthy forest conditions, loblolly decline, and the restoration goals for structure, composition and function.

Biomass Partnership/Meeting: Beginning in 2005, a group of partners including the Oakmulgee District submitted a grant proposal to develop a market for biomass utilization as a means to reduce fuels and restore unhealthy forest conditions. In March 2006, the group was notified that they would be receiving grant from the USDA Forest Service, Forest Product Lab. Within this grant are the goals to increase efficiencies relative to biomass harvesting. Specific to the Oakmulgee District we are charged with evaluating the changes in condition class relative to fuels reduction through biomass

removal. There are also grant goals to inform local landowners about the land management options from biomass harvesting. There will also be an economic evaluation component to the planned biomass harvesting on the Oakmulgee District.

On January 13, 2007, the biomass partnership hosted a landowner meeting to provide an overview of the project goals and timeline. The Oakmulgee District presented the need to look for new markets to facilitate the restoration of unhealthy conditions. The District Presentation included a description of AOC 2 and AOC 3 stands and the associated risk to SPB infestations. The audience was asked specifically what information they needed relative to the use of biomass harvesting of improve forest conditions. At that time, most questions were regarding the availability of a market, and the possible economic returns. [This meeting was attended by 100 individuals from across the state]

Rural Studio – West Alabama Project: In early 2005, the Oakmulgee District began discussions with Auburn University's Rural Studio regarding a project to test the feasibility of using small diameter loblolly pines as un-milled construction material. This project would explore two questions; the economic benefits that could be realized from local landowners experiencing forest health concerns and risk to SPB infestations from overstocked pines, and the potential to improve housing conditions by empowering local landowners in utilizing their own pine plantations.

Public Meeting: On April, 13 2007 invitations to a public meeting regarding the SPB EA were mailed to 227 recipients. A notice was also posted in the Centreville Press, and sent to x papers in the surrounding counties. The meeting was held on April 26, at the Forest Service Work Center in Brent, Alabama. During the meeting a draft EA was distributed as well as presentations regarding the effects to wildlife and fire management. The decisions matrix was explained and the economic assessment was presented. The meeting was attended by 4 members of the public and two representatives of cooperating partners (Auburn University and Alabama Forestry Commission). There were no project specific concerns raised during the meeting, only request for clarification regarding the protection given to Arkansas oaks during treatment, and the prescribed spacing/stocking for longleaf restoration. These questions were answered at the meeting and have since been clarified within the EA.

Legal Notice and Administrative Review: On May 11, 2007 copies of the final SPB EA were mailed to the participants from the public meeting that indicated they wanted a copy and those individuals submitting written comments as a result of the 2005 Request for Comments. A legal notice was submitted to the Tuscaloosa News, official paper of record for the Oakmulgee District, and is scheduled for printing on May 15, 2007. It is this notice that will mark the official beginning of the Administrative Review and Objection period pursuant to the Healthy Forest Restoration Act and 36 CRF 218.

On June 1, 2007, Ray Vaughan, Executive Director for Wildlaw notified the Forest Supervisor and District Ranger of concerns regarding the lack of specific language regarding the retention of fire-adapted hardwoods within the longleaf ecosystem. The District Ranger acknowledged that that language was not specific within the document, but that was incorporated through reference to Forest Plan guidelines. However, to affirm the District's commitment to restoring the full suite of species within the longleaf ecosystem, specific language was added to Appendix C:

Forest Structure and Composition. Mr. Vaughan accepted the language and stated that his concerns had been resolved. On June 11, 2007, Hank Byrnes, Development Coordinator for Wild South, submitted comments. However, Mr. Byrnes acknowledged that he had not been able to coordinate these comments with Mr. Vaughan and that they should be viewed only as suggestions and not a legal position.