

United States
Department of
Agriculture

Southern Region
Forest Service



August 2005

Environmental Assessment
For
Herbicide Use
In
Southern Pine Beetle
Restoration Areas
And for
Privet Control Research Studies

USDA Forest Service

Oconee Ranger District, Chattahoochee-Oconee National Forest
Greene, Oglethorpe, Putnam, Jasper and Jones Counties, Georgia



Environmental Assessment
for
Herbicide Use in SPB Restoration Areas
And for
Privet Control Research Studies

Location of Action: Oconee Ranger District
Chattahoochee-Oconee National Forests,
Counties Greene, Oglethorpe, Putnam, Jasper &
Jones, Georgia

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CHAPTER ONE

1.0 Purpose and Need for the Proposed Action

1.1 Introduction

This environmental assessment (EA) documents the results of site-specific analyses concerning the use of herbicides to restore species composition in stands impacted by the Southern Pine Beetle on the Oconee Ranger District. The EA discusses why the project is needed, the issues of concern, the existing condition of the project area, and the expected consequences of each alternative, including a “no action” alternative.

1.2 Proposed Action

The following is a general description of the proposed action. Maps showing site specific treatments that are proposed are included as Appendix F.

The following is a summary of the treatments proposed:

- Herbicide treatment to prepare the site for regeneration of longleaf pine in 14 stands totaling 104 acres. This would be followed by a release treatment within five years of planting, if necessary, within a portion of the following compartment and stand numbers: (Compartment/Stand) 5/06, 5/50, 6/08, 6/11, 6/07, 7/05, 8/08, 8/52, 9/03, 9/08, 9/12, 9/13, 9/14, and 9/16. All of the sites are located on the Hitchiti Experimental Forest and contain a loblolly pine over-story that was killed by Southern Pine Beetle outbreaks, and provides habitat for the Red-cockaded Woodpecker
- Herbicide treatment to prepare the site for regeneration of oak in portions of three stands totaling 20 acres. This will be followed by a release treatment within five years of planting, if needed, within a portion of the following compartment and stand numbers: (Compartment/Stand) 8/08, 107/22, 115/33, and 115/35. These sites contained offsite loblolly pine that will be restored to a mixed hardwood (oak) forest type.
- Herbicide treatment to prepare the site for regeneration of a mixture of pine and oak in portions of 18 stands totaling 236 acres. This will be followed by one release treatment within 5 years of planting, if needed, within a portion of the following compartment and stand numbers: (Compartment/Stand) 107/24, 115/32, 115/37, 125/04, 141/06, 144/07, 144/35, 150/01, 152/10, 153/01, 153/02, 153/19, 154/01, 156/02, 157/12, 161/02, 176/01, and 180/10. These stands contained a loblolly pine over-story that was killed by the Southern Pine Beetle. The proposed treatments will help to re-establish a mixed pine-oak community in these locations.
- Herbicide treatment to release planted and natural pine and oak trees in portions of 6 areas, totaling 48 acres. The areas are located within a portion of the following compartment and stand numbers: (Compartment/Stand) 115/18, 115/33, 155/37, 119/01, 144/37 and 172/05.

These areas contained a loblolly pine over-story that was killed by the Southern Pine Beetle. The proposed treatments will help desired pine and oak regeneration that is already present become re-established into a mixed pine-oak stand type.

- Herbicide treatment for a research study, by the Southern Research Station, for the efficiency of a combination of mechanical and herbicide treatments for Privet (Invasive species) control within the Schull Shoals Experimental Forest. Privet control is an important part of ecosystem restoration. The study area consists of approximately 20 acres within a portion of stand 30 and 31 in compartment 166; and stand 62 in compartment 170.

Treatment of stump sprouts and single stems of selected species for site preparation is proposed using one of the following application methods 1) basal stem spraying (for trees and shrubs less than 3 inches in diameter) with an herbicide with the active ingredient triclopyr (ester formulation); and 2) hack and squirt method (for trees and shrubs between 3 and 8 inches in diameter) with an herbicide with the active ingredient triclopyr (amine formulation) or glyphosate, depending on the time of year of application. 3) Cutting trees and then treating the cut stumps with an herbicide with the active ingredient triclopyr (amine) or glyphosate to prevent stump sprouts from the cut trees from becoming established. Treatment of species such as red maple, sweet gum, and various under-story brush species would occur throughout the stand. The objective is to control competing vegetation to allow species such as oak or pine to re-establish.

Release of planted and natural oak and pine trees would occur with a spot foliar treatment with an herbicide mixture containing the active ingredients triclopyr (ester) and imazapyr.

Application rates for herbicides are discussed in further detail in Chapter 3, Section 3.1.2, Environmental Effects of Alternative B on Health and Safety and in Appendix B, Results of the Risk Assessment.

Proposed treatments for release will only occur if they are determined to be needed after stocking checks are completed. Some sites may not require treatment, thus the proposed treatments represent the maximum, not the actual, number of acres that will be released. Additional site preparation may be done using mechanical methods or prescribed fire but these treatments would be proposed on a site specific basis and covered under a separate NEPA document.

1.3 Purpose and Need for the Proposed Action

The purpose and need of the Proposed Action is to:

- Improve the existing condition and composition of forested stands with Southern Pine Beetle mortality.
- Improve the existing condition of acorn mast production and wildlife habitat;
- Maintain and restore natural communities
- Restore long-term RCW habitat conditions in areas impacted by SPB mortality.

1.3.1 Why Here, Why Now?

The existing condition of the proposed treatment areas has been evaluated and compared against the desired future condition for the area as described in the Forest Plan. Where resources in the project area are found to be outside the desired future condition, opportunities for moving the resources towards the desired future condition exist.

Currently, stands proposed for treatment are not meeting Forest wide goals and standards. These stands have suffered heavy over-story mortality due to Southern Pine Beetle infestations. Many of the stands proposed for treatment contained species such as offsite loblolly or sweetgum on sites that are ecologically suited to oak-pine or mixed hardwood composition. The proposed treatments will lead to re-establishment of species compositions such as oak or oak - pine in areas that have been impacted by the Southern Pine Beetle. Sites proposed for longleaf planting will help sustain needed habitat for the Red-cockaded Woodpecker. Research on Privet control (invasive species) is consistent with the management objectives for the Schull Shoals Experimental Forest and Schull Shoals Archaeological Area. Stands are proposed for treatment in order to meet the following Forest Wide Goals and Management Prescriptions:

Forest Wide Goals:

Goal 3: Enhance, restore, manage and create habitats as required for wildlife and plant communities, including disturbance-dependent forest types.

Goal 4: Maintain and restore natural communities in amounts, arrangements, and conditions capable of supporting viable populations of existing native and desired non-native plants, fish, and wildlife species within the planning area.

Goal 7: Manage forest ecosystems to maintain or restore composition, structure, and function within desired ranges of variability.

Goal 8: Contribute to maintenance or restoration of native tree species whose role in forest ecosystems (a) has been reduced by past land use; or (b) is threatened by insects and disease, fire exclusion, forest succession, or other factors.

Goal 10: Manage for a diversity of oak species to minimize yearly fluctuations in acorn supplies.

Goal 51: Contribute to the conservation and recovery of the Red-cockaded Woodpecker (*Picoides borealis*) until species viability is assured throughout its range and it is no longer listed as an endangered species under the Endangered Species Act

Management Prescription Objectives:

3.B – *Experimental Forests are managed in accordance with the purpose for which the Forest was established. Lands are dedicated to experimentation and education by implementing national and international research programs with the primary purpose of producing scientific information useful to public and private sector management of the represented ecosystems. An operational situation of*

minimal constraint on activities carried out for that purpose is desired. Except for required legal compliances, research needs normally receive deference in the event of resource conflicts.

Research on PETS species, control of nonnative invasive species, and restoration are high priorities on these areas

Standard 3.B-003 – Insect and disease outbreaks may be controlled when necessary to protect the values for which the area was established; to reduce hazards to visitors; for safety or legal reasons;

4.E.1 Cultural/Heritage Areas – *Cultural/Heritage Areas are managed to highlight and protect unique heritage resources for public understanding and appreciation of the influence of human history on the forest ecosystem. The management focus is on protection and interpretation.*

Standard 4.E.1-006 – Eradication of established nonnative pests or plants may be considered.

8.A.1 Mix of Successional Forest Habitats – *Management activities are designed to retain a forested canopy across at least 50% of the prescription area (2) maintain or enhance hard and soft mast production (3) increase vegetative diversity, and (4) limit motorized access.*

Standard 8.A.1-003 – Stands may be actively managed to reduce the risks and hazards of damage from native and nonnative pests.

Standard 8.A.1-004 – Indigenous forest pests are kept within acceptable levels through integrated pest management techniques. Insect and disease outbreaks may be controlled when necessary to reduce hazards to visitors; for safety or legal reasons; to protect adjacent resources; or to protect ecosystem composition, structure, and function.

8.D & 8.D.1 Red-cockaded Woodpecker Habitat Management Area

Within the HMA (8.D), the management emphasis is to provide suitable-to-optimal habitat conditions and management activities that contribute the recovery of the red-cockaded woodpecker (RCW) on the Oconee National Forest. The habitat conditions needed by the RCW will be predominately southern pine forest in mid- and late-successional conditions.

Within the Sub-HMA (8.D.1), the management emphasis is to provide suitable-to-optimal habitat conditions in areas containing small RCW populations within the larger, designated habitat management area (8.D). These RCW populations are at the greatest risk of local extirpation and in need of immediate, aggressive management action to create and protect suitable habitat.

Standard 8.D-005 - Insect and disease outbreaks will be controlled when necessary to protect RCW habitat and populations; to reduce hazards to visitors; for safety or legal reasons; to protect adjacent resources; or to protect ecosystem composition, structure, and function.

Standard 8.D-006-Recognize that beyond 60 years high hazard littleleaf soils are incapable of supporting sustainable high-quality RCW nesting habitat and reforest to loblolly or shortleaf pine only if necessary to meet RCW foraging habitat conditions.

9.H. Management, Maintenance, and Restoration of Plant Associations to their Ecological Potential – *The purpose of this prescription is the restoration of historical plant associations and their ecological dynamics to ecologically appropriate locations. Focus is on (1) communities in decline, (2) communities converted from historic composition by land uses, (3) communities on ecologically appropriate sites but unable to maintain themselves.*

Standard 9.H-004 - Insect and disease outbreaks may be controlled to help move the area toward the desired conditions, where PETS or locally rare species and their habitats may be adversely impacted or to prevent damage to resources on adjacent lands.

Standard 9.H-005 - Stands may be actively managed to reduce the risks and damage from native and nonnative pests.

1.4 Decision Framework

Given the purpose and need, the Responsible Official (District Ranger) will review the proposed action and the other alternatives in order to make the following decision:

- Select the No-Action Alternative (deferring action); or
- Select an action alternative; or
- Select a modified action alternative.

1.5 Public Involvement

On *April 27, 2004*, a scoping letter explaining the proposal and requesting site-specific information on the proposal was mailed to 71 individuals and organizations that have expressed previous interest in management on the Chattahoochee-Oconee National Forests. *Two* total written and verbal responses were received during scoping.

On May 06, 2004, a public notice and opportunity to comment (scoping notice) was published in the Eatonton Messenger.

The following issues were identified from public comments received during the scoping period and internal management concerns. Analysis responding to key issues will be evaluated and disclosed in Chapter 3 – Environmental Effects.

1.6 Key Issues

Issues are defined as a point of discussion, debate, or dispute about environmental effects. Issues are used to develop alternatives, mitigation measures, or analyze environmental effects. The issues related to the proposed action were identified by the Interdisciplinary Team (IDT) and through comments from the public. The Forest Service separated issues into two groups: key and non-key issues.

The Council on Environmental Quality (CEQ) regulations specifies that environmental analysis focus on significant (key) issues. Issues determined not to be significant (non-key) shall be discussed only briefly and eliminated from detailed study [40 CFR 1500.1(b), 1500.2(b), 1500.4(c), 1501.7(3), and 1502.2(b)]. The key issues will be analyzed in Chapter 3 of this EA and will also help frame the decision. Each key issue has an issue statement and measurement. Measurements allow resource specialists to quantify and qualify anticipated effects. The non-key issues will be disclosed here in Chapter 1 with an analysis, but not in Chapter 3. They will not be used to frame the decision because their effects differ little between the action alternatives.

Key Issue 1: Health and Safety

- The use of herbicides may cause unknown or unwanted health effects to humans.

The boundary for this key issue will be the immediate area of the project where the herbicides will be applied and the period of time is the length of time the herbicide would be active in the environment.

Indicators: Human Health and Safety Protected (Yes/No)

Key Issue 2: Threatened, Endangered, Rare Species

- The proposed treatments may adversely affect rare species in the project area including Federally Threatened and Endangered species, Regional Forester's Sensitive species, and Forest Concern species.

Indicator: T&E, Rare Species Protected (Yes/No)

The boundary for this key issue will be the immediate area of the project where the herbicides will be applied and the period of time is the length of time the herbicide would be active in the environment.

Key Issue 3: Cost Effectiveness of Herbicide vs. Manual Methods

- The cost effectiveness of treating areas manually rather than using herbicides needs to be examined.

Indicator: Estimated Cost of Treatment Method

1.7 Non-key Issues

The following issues were eliminated from detailed discussion in this Environmental Assessment because the project would cause only inconsequential effects to these issues.

1.7.1 Non-Key Issue/Element A: Impacts to Wildlife

The use of herbicides may cause unknown or unwanted health effects to wildlife. However, any herbicides applied would be done according to the labeling information at the lowest rate effective to meet project objectives in accordance with guidelines for protecting the environment. When labeling and application directions are followed and safety recommendations are implemented no adverse effects are expected. The effects of the treatment would be limited to the vegetation and the immediate vicinity. All applicable mitigation measures contained in the Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement (VMEIS), issued in January 1989, would be followed. A complete discussion of the effects of herbicides is contained in this FEIS, to which this document tiers. Current risk assessments for Glyphosate, Imazapyr and Triclopyr may be found at: www.fs.fed.us/foresthealth/pesticide/work.shtml.

There are no known cumulative effect(s) from herbicide treatments outside of these watersheds because of the relatively short half-life of the specific herbicides. In addition, because an individual

stem or sprout group treatment method would be used, the true net acres treated would be only a small percentage the total stand acreage (estimated between 5 & 10%).

With the identified mitigation measures, the proposed activities would have no adverse direct or indirect effects to wildlife resources by implementing the Proposed Action.

Additional analysis on wildlife is disclosed in Appendix D, Biological Evaluation. Results of a herbicide risk analysis are discussed in detail in Chapter 3, Section 3.2, Impacts to Threatened, Endangered, and Rare Species and also in Appendix B, Risk Assessment Summary and Appendix E, Management Indicator Species.

1.7.2 Non-Key Issue/Element B Impacts to Water Quality and Aquatic Habitat

- The proposed activities may negatively impact water quality, aquatic communities, wetlands or wild and scenic rivers.
- Local streams and creeks may be negatively affected by the use of herbicide in the project area.

Herbicide with the active ingredients Glyphosate and Triclopyr are not considered soil active and with the provision of riparian buffer strips on stream zones, the risk of herbicide spills or movement into stream zones is further reduced. Imazapyr appears to bind loosely to clay particles and organic matter. It has relatively low soil mobility; soil activity expresses itself during the period of spring leaf expansion but applications made from late June through mid September produce little or no evidence of soil activity.

Drift of herbicides into surface water is influenced by application method, the existence of buffers and weather conditions. Some drift will likely occur in foliar, and less so by basal bark or injection method applications, and is greater in broadcast than by stem specific, selective treatments. Drift decreases as droplet size increases, or when granular form chemicals are used (VMEIS IV-103). The method of foliar application in the treatment areas would be by backpack sprayer to selected individual stems only.

Key factors influencing peak concentrations are presence of stream buffer areas, storm intensity and duration, herbicide application rate and properties (mobility and persistence), soil type, distance from application point, depth of the water table and downstream mixing and dilution. Perennial, intermittent, and ephemeral streams would be protected by 100, 100 & 25-foot buffers respectively, within which no chemical herbicides would be applied. Herbicides might be able to move through the buffer, but are subject to dilution and mixing in transit. No herbicide will be applied within 100 horizontal feet of lakes, wetlands, or perennial or intermittent streams or within 100 horizontal feet of any public or domestic water source. Exclusion zones will be clearly marked before herbicide application so applicators can easily see and avoid them.

Entry of herbicides into ground water is described in the Risk Assessment, Appendix A, VMEIS, Vol. II), and by Neary and Michael (Appendix C, VMEIS, Vol. II). After treatment, herbicides may move into aquifers by vertical seepage. In order to be considered to have polluted ground water,

herbicide must occur at concentrations high enough to render water quality unsuitable for human use, or to injure or kill aquatic plants or animals.

The potential for herbicide concentration in ground water is proportional to application rate. The rates proposed for use in this project are less than the manufacturer's recommended label rate. The selective treatment method which targets individual tree stems, or small clumps, further reduces application rate another 40-70 percent below what can be expected under general broadcast methods and manufacturer's rates (VMEIS, IV). When applied at the lowest effective rate, herbicides should not occur in ground water at concentrations exceeding the EPA's strictest drinking water standard. Deeper aquifers tapped by wells will have no presence or only negligible concentrations. Risk to ground water quality will remain minimal, in part, because the mitigation measures that are appropriate to apply in the treatment areas include the buffered, no treatment zone adjacent to all water sources (VMEIS, IV).

With the identified mitigation measures, the proposed activities would have no adverse direct or indirect effects to aquatic resources or aquatic species by implementing this alternative. By complying with and meeting the intents of the Forest Plan Standards and Guidelines for individual project areas and State of Georgia BMP's, the beneficial uses of water in or near project areas can be protected. All applicable mitigation measures contained in the Vegetation Management in the Coastal Plain/Piedmont (VMEIS), issued in January 1989, would be followed. A complete discussion of the effects of herbicides is contained in this FEIS, to which this document tiers. Current risk assessments for Glyphosate, Imazapyr and Triclopyr may be found at: www.fs.fed.us/foresthealth/pesticide/work.shtml.

Cumulative Effects: There are no known cumulative effect(s) from herbicide treatments outside of these watersheds because of the relatively short half-life of the specific herbicides. In addition, because an individual stem or sprout group treatment method would be used, the true net acres treated would be only a small percentage the total stand acreage (estimated between 5 & 10%). Since there are no expected effects on aquatic resources from current activities or this proposal, there would be no cumulative effects to aquatic resources.

There are streams and riparian areas located near some of the proposed treatment areas. There are no known wetlands or wild and scenic rivers located in the project areas.

Additional analysis on water quality and aquatic habitat is disclosed in Chapter 3, section 3.2, Appendix D, Biological Evaluation and Appendix B, Risk Assessment Summary.

1.7.3 Non Key Issue/Element C: Vegetation

- Some of the stands proposed for treatment do not have a native species composition
- The proposed treatments may adversely affect non-target vegetation.

The majority of these stands (256 acres) contained loblolly or shortleaf pine that was killed by the Southern Pine Beetle and will be reforested to a oak or mixed pine-oak forest type. A portion of the stands (104 acres) contained loblolly and shortleaf pine on moderate to high risk littleleaf disease

sites and will be reforested to longleaf pine. Approximately 48 acres proposed for release treatment contain small areas that were planted in oak for research purposes. The remaining 20 acres contain Privet, an invasive plant species which the Southern Research Station will study the efficacy of mechanical and herbicide controls.

Across all forest types there has been a shift to more shade tolerant species along with a shift to more aggressive colonizing species such as red maple and sweetgum, which are prolific sprouters. Many species such as white oak and hickory have decreased in numbers due to unfavorable growing conditions.

In many of the stands proposed for treatment there is a significant proportion of the previous mid-story that is interfering with the regeneration of the stand. In some areas, species such as small diameter red maple, sweetgum, and various brush species are out-competing more desirable species.

Environmental Effects of Alternative A on Vegetation

The vast majority of the Oconee Ranger District is forested, with a mosaic of evergreen, deciduous, and mixed (hardwood-pine and pine-hardwood) forest communities.

The sites proposed for treatment may generally be described as being dominated by loblolly pine (*Pinus taeda*), with a mixture of hardwood species, including cherry (*Prunus* spp.), dogwood (*Cornus* spp.), elm (*Ulmus* spp.), hickory (*Carya* spp.), oak (*Quercus* spp.), persimmon (*Diospyros virginiana*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), redbud (*Cercis canadensis*), and yellow poplar (*Liriodendron tulipifera*). The dominant understory species include blackberry (*Rubus* spp.), greenbriar (*Smilax rotundifolia*), Harbison's hawthorn (*Crataegus harbisonii*), honeysuckle (*Lonicera* spp.), muscadine (*Vitis rotundifolia*), and Virginia creeper (*Parthenocissus quinquefolia*) along with many other forbs and grasses (USFS, 2001).

Species composition and understory vegetation on SPB impacted sites would continue to be dominated by more aggressive species. These small diameter stems would continue to dominate the mid-story. Poor quality, multistem trees of prolific sprouters such as sweetgum and red maple would continue to dominate the stands and prevent enough light from reaching the forest floor for regeneration to occur or to allow light dependant species such as yellow pines and oak to compete. These stands would produce poor species composition and wildlife habitat due to a lower than desired pine and oak component.

Stands would have existing forest types that do not match their ecological or historical forest type. The majority of these stands (256 acres) originally contained loblolly or shortleaf pine that was killed by the Southern Pine Beetle and would not be reforested to a oak or mixed pine-oak forest type. Loblolly and shortleaf pine on moderate to high risk littleleaf disease sites would eventually reforest to the same species and never produce suitable RCW habitat. Approximately 6 acres of existing oak plantations planted for research purposes would succumb to competition (primarily sweetgum). The 20 acres of Chinese Privet, an invasive plant species would continue to dominate the undertory of those stands.

Across all forest types there has been a shift to more shade tolerant species along with a shift to more aggressive colonizing species such as red maple and sweetgum, which are prolific sprouters. Many species such as white oak and hickory have decreased in numbers due to unfavorable growing conditions. The dense midstories created by these aggressive colonizing species do not provide suitable RCW foraging habitat within the RCW HMA.

Environmental Effects of Alternative B on Vegetation

Regeneration of desired species would occur as more light reaches the forest floor from release of existing regeneration and less competition from aggressive colonizing species, sweetgum and red maples. Desired species composition would be better met in 68 acres of hardwoods, 236 acres of mixed hardwood/pines, and 104 acres of longleaf pine. Stand species composition and understory vegetation would include species valuable for wildlife habitat. The primary species that would be selected are white oak, and hickory. The oaks and hickories are also valuable for mast production for improved wildlife habitat.

Approximately 48 acres of existing oak plantations would be selectively released from adjacent competition consisting primarily of red maple and sweetgum.

Approximately 20 acres of Chinese privet, an invasive species, would be controlled/eradicated as part of a proposed research study by the Southern Research Station. This would allow for the re-establishment of native understory plant species.

All proposed herbicide applications are to be applied directly to the targeted vegetation; therefore by correctly following application procedures, impacts to non-targeted species would be minimal. Herbicide spray equipment is designed to treat the target plants with a minimum of off target movement of airborne droplets, called drift. Spray nozzles that are used are designed to produce large droplets because smaller droplets tend to remain airborne and may drift with air currents away from the target vegetation. Hand application equipment used for streamline, basal bark/stem, and hack and squirt techniques do not produce spray but rather a directed stream of formulation. Thus, these techniques do not produce herbicide drift. (VMEIS, Vol. II.). Well directed ground applications conducted under conditions that do not favor off-site drift will probably have no impact on off-site plant species.

It is also important to note that only a small portion of the stand will actually be treated. **Figure 2** shows the actual treatment density of approximately $\frac{3}{4}$ of an acre. This diagram shows a five-foot diameter treatment area, with the selected leave tree in the center of the treatment area. These trees are spaced equally on a 16-foot grid. The treatment area total is approximately 6% of the total area within the diagram. **Figure 2** depicts the conditions of an even-aged stand of young pine trees while **Figure 3** depicts the conditions of an uneven-aged stand. Actual treatment areas within uneven-aged stands are estimated to be less than 5% of the total stand area.

Areas scheduled for Chinese Privet control will have the entire area treated, except for control plots.

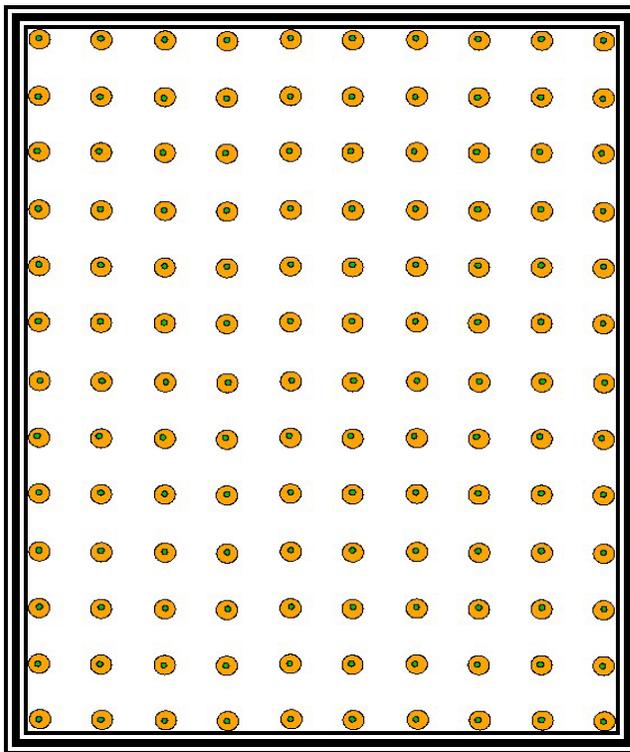


Figure 2. Even-aged Release Treatment Areas

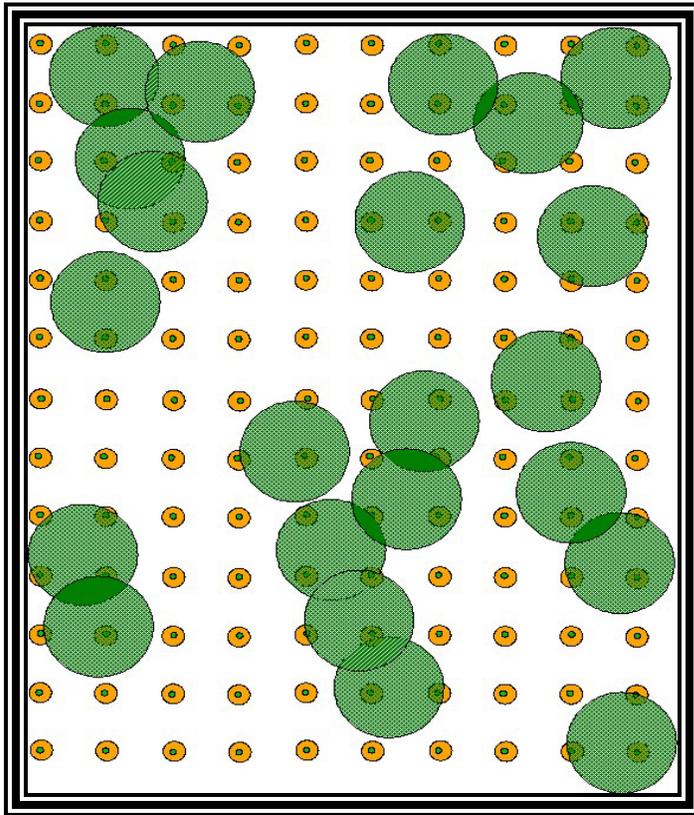


Figure 3. Uneven-aged Release Treatment Areas.

(Larger circles represent larger trees remaining on site)

1.7.4 Non-key Issue/Element D: Heritage Resources

There are no expected adverse direct, indirect, or cumulative effects with implementation of either of these alternatives. No ground disturbing activities will take place as part of the herbicide site preparation and release activities and thus no impacts to known heritage sites would occur.

On the proposed Chinese privet control/eradication study, mechanical removal of the privet will occur. This will result in surface soil disturbance on sites that have post settlement erosion deposition to such a depth that a professional archaeologist determined that impacts are unlikely to occur.

1.7.5 Non-key Issue/Element E: Soil Resources

This issue is non-key because herbicide applications and subsequent behavior do not disturb the soil. Effects on soil productivity and water quality from herbicide use are addressed in the VMEIS (Vol. II, Appendix C) and by Neary & Michael, 1988. Herbicide application does not have direct effects on soils when treatments are properly implemented with BMPs. Minimal indirect effects may occur with some temporary loss of ground cover, however, research has shown that a good litter layer is usually left intact with herbicide application, which mitigates raindrop impact, promotes infiltration, and greatly reduces erosion.

Soil types within the proposed treatment areas generally have sandy or loamy surface horizons underlain by clay loam, clay or loam subsurface horizons. Two of the herbicides proposed for application (active ingredients – Glyphosphate and Triclopyr) are formulated as not soil active, applied to the plants selected for treatment. These herbicides can wash off the plants and move into the soil, however they bind to soil particles or organic matter. The result is minimal translocation or leaching to water zones in these soil types. A third herbicide proposed for use (active ingredient – Imazapyr) is classified as soil active at certain times of the year, pulled into the selected plant through the roots. This herbicide is adsorbed by the soil, therefore leaching is usually not a problem.

1.7.6 Non-key Issue/Element F: Scenery Resources

Herbicide related activities may adversely affect scenic resources.

The use of herbicides may affect visual resources as vegetation browns up after treatment. However, this issue is non-key because the effect is only temporary and only a portion of the stands will be treated. All areas proposed for treatment would meet assigned Scenic Integrity Objectives.

1.7.7 Non-key Issue/Element G – Air Quality

Prescribed fire is the only vegetation management method that emits substantial amounts of gases and particulates to the atmosphere. This issue is non-key because the proposals do not include the use of prescribed fire.

1.7.8 Non-key Issue H – Other Areas of Concern

Harvest activities may adversely affect park lands, prime farmlands, wetlands, wild and scenic rivers, ecologically critical areas, or local law or requirements imposed for the protection of the environment.

This project does not propose actions within park lands, prime farmlands, wetlands (as per 1977 Executive Orders 11988 and 11990), wild or scenic rivers, or ecologically critical areas. It also would not violate local law or requirements imposed for the protection of the environment.

1.8 Project Record

This EA incorporates by reference the project record (40 CFR 1502.21). The project record contains specialist reports and other technical documentation used to support the analyses and conclusions in this EA.

Relying on specialist reports and the project record helps implement the CEQ Regulations' provision that agencies should reduce NEPA paperwork (40 CFR 1500.4), and that NEPA documents be analytic rather than encyclopedic, kept concise, and no longer than absolutely necessary (40 CFR 1502.2). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere. The project record is located at the Oconee Ranger District Office in Eatonton, GA.

CHAPTER TWO

2.0 Alternatives

Chapter 2 is the “heart” of the EA (40 CFR 1502.14) and describes alternatives the Forest Service considered in addition to the proposed action. It also summarizes each alternative’s effects on the issues introduced in Chapter 1.

2.1 Range of Alternatives

The range of alternatives developed and analyzed by the interdisciplinary team was driven by the purpose and need underlying the proposed action, and by the key issues responding to the proposed action. An alternative to the proposed action must (1) reasonably respond to the purpose and need, and (2) address one or more key issues. The only exception is the No-Action Alternative, which is required under Council on Environmental Quality (CEQ) regulation 40 CFR 1502.14(d).

The interdisciplinary team (IDT) considered four alternatives. Following internal review, three alternatives were developed in detail and one was eliminated from detailed study. Each of the alternatives developed in detail complies with the standards identified in the Forest Plan.

Individual alternative descriptions follow, along with estimates of the activities to take place.

2.2 Alternatives Considered but Eliminated from Detailed Study

2.2.1 Alternative 1 – The exclusive use of prescribed fire to accomplish site preparation and release was considered but dropped from detailed study. In many locations, fuel loadings are too heavy to warrant the safe use of prescribed fire for site preparation. In addition, there is no control over species selectivity with the use of fire in a release treatment. With the limited number of available burning days, it would be difficult to implement the proposals in a timely manner.

If feasible, prescribed fire may be considered in some locations to accomplish site preparation objectives but these proposals would be analyzed under a separate environmental analysis.

2.3 Alternatives Analyzed in Detail

Three alternatives were developed by the IDT in response to the issues and concerns regarding the proposed action; Alternative A – No-Action, Alternative B – Proposed Action, and Alternative C- Manual Methods. The action alternatives fulfill the specific purpose and need for these actions. Mitigation measures for activities in each action alternative and features common to them are also described in this chapter.

The following table summarizes management activities within each of the alternatives.

Table 2-1: Management Activities for Action Alternatives

Activity	Alternative		
	A	B	C
Site Preparation with Herbicides	0 acres	360 acres	0 acres
Site Preparation – Manual Methods	0 acres	0 acres	360 acres
Herbicide Release (TSI) if Needed	0 acres	48 acres	0 acres
Manual Release	0 acres	0 acres	48 acres
Privet Control/Eradication Study	0 acres	20 acres	0 acres

2.3.1 Alternative A – No Action

Under this alternative, the projects described in the proposed action would not be accomplished. No management actions would be taken to improve the existing condition of the environment in the project area. There would be no release or site preparation done in stands with large southern pine beetle mortality, and no wildlife habitat restoration or improvements would occur. The privet control study would not be undertaken. This alternative serves as the environmental baseline for analysis of effects.

2.3.2 Alternative B – Proposed Action

This alternative was developed to improve existing stand conditions. Specific activities and locations are displayed in Table 2-2 and in the maps located in Appendix F.

The following table summarizes activities proposed in Alternative B:

Table 2-2: Stands Proposed for Treatment – Alternative B

Compartment -Stand	Acres	Pre Treatment Forest Type	Post Treatment Forest Type	Site Preparation (1)	Release (2)	Forest Plan Management Prescription
5-06	18	Loblolly Pine	Longleaf	X	X	3.B
5-50	10	Loblolly Pine	Longleaf	X	X	3.B
6-08	3	Loblolly Pine	Longleaf	X	X	3.B
6-11	5	Loblolly Pine	Longleaf	X	X	3.B
6-07	15	Loblolly Pine	Longleaf	X	X	3.B
7-05	5	Loblolly Pine	Longleaf	X	X	3.B
8-08	2	Loblolly Pine	Longleaf	X	X	3.B
8-08	5	Loblolly Pine	Oak Hickory	X	X	3.B
8-52	5	Loblolly Pine	Longleaf	X	X	3.B
9-03	4	Loblolly Pine	Longleaf	X	X	3.B
9-08	3	Loblolly Pine	Longleaf	X	X	3.B
9-12	4	Loblolly Pine	Longleaf	X	X	3.B
9-13	20	Loblolly Pine	Longleaf	X	X	3.B

Compartment -Stand	Acres	Pre Treatment Forest Type	Post Treatment Forest Type	Site Preparation (1)	Release (2)	Forest Plan Management Prescription
9-14	7	Loblolly Pine	Longleaf	X	X	3.B
9-16	3	Loblolly Pine	Longleaf	X	X	3.B
107-22	5	Loblolly Pine	Oak Hickory	X	X	8.D.1
107-24	10	Loblolly Pine	Lob/Oak	X	X	8.D.1
1115-18	10	Loblolly Pine	Longleaf		X	8.D.1
115-32	7	Loblolly Pine	Longleaf/Oak	X	X	8.D.1
115-32	10	Loblolly Pine	Lob/Oak		X	8.D.1
115-35	10	Loblolly Pine	Oak Hickory	X	X	8.D.1
115-37	10	Loblolly Pine	Lob/Oak		X	8.D.1
115-37	15	Loblolly Pine	Lob/Oak	X	X	8.D.1
119-01	7	Loblolly Pine	Lob/Oak		X	8.D.1
125-04	7	Loblolly Pine	Lob/Oak	X	X	8.D
141-06	7	Loblolly Pine	Lob/Oak	X	X	8.D
144-07	15	Loblolly Pine	Lob/Oak	X	X	8.D
144-35	10	Loblolly Pine	Lob/Oak	X	X	8.D
144-37	7	Loblolly Pine	Lob/Oak		X	8.D
150-01	30	Loblolly Pine	Lob/Oak	X	X	8.D
152-10	15	Loblolly Pine	Lob/Oak	X	X	8.D
153-01	25	Loblolly Pine	Lob/Oak	X	X	8.D
153-02	15	Loblolly Pine	Lob/Oak	X	X	8.D
153-19	10	Loblolly Pine	Lob/Oak	X	X	8.D
154-01	20	Loblolly Pine	Lob/Oak	X	X	8.D
157-02	10	Loblolly Pine	Lob/Oak	X	X	8.D
157-12	10	Loblolly Pine	Lob/Oak	X	X	8.D
161-02	10	Loblolly Pine	Lob/Oak	X	X	8.D
166-30	5	Oak/Willow	Privet Control	X	X	3.B
166-31	5	Oak/Willow	Privet Control	X	X	3.B
170-62	10	Sweetgum/Pop	Privet Control	X	X	4.E.1
172-05	4	Loblolly Pine	Oak		X	9.H
176-01	10	Loblolly Pine	Lob/Oak	X	X	9.H
180-10	10	Loblolly Pine	Lob/Oak	X	X	9.H
Total Acres	428					

1 Treatment of stump sprouts and single stems of selected species for site preparation is proposed using one of the following application methods 1) basal stem spraying (for trees and shrubs less than 3 inches in diameter) with an herbicide with the active ingredient triclopyr (ester formulation); and 2) hack and squirt method (for trees and shrubs between 3 and 8 inches in diameter) with an herbicide with the active ingredient triclopyr (amine formulation) or glyphosate, depending on the time of year of application. 3) Cutting trees and then treating the cut stumps with an herbicide with the active ingredient triclopyr (amine) or glyphosate to prevent stump sprouts from the cut trees from becoming established. Treatment of species such as red maple and sweetgum would occur throughout the stand. The objective is to control competing vegetation to allow species such as oak, hickory, loblolly and longleaf to re-establish themselves or for artificial regeneration to survive.

2 Release of planted and natural oak, hickory, loblolly and longleaf trees would occur with a spot foliar treatment with an herbicide mixture containing the active ingredients triclopyr (ester) and imazapyr.

2.3.3 Alternative C – Manual Methods

This alternative proposes the same areas for treatments but would use manual methods exclusively, either through a Forest Service contract or with Forest Service employees, to site prepare and release planted and native seedlings. Manual release methods would require a minimum of two or three follow up treatments because of continuous sprouting and re-sprouting of the competing vegetation.

The Chinese privet control/eradication study would not take place under this alternative

2.4 Mitigation Measures for the Action Alternatives

Mitigation is defined as measures designed to reduce or prevent undesirable effects that could be caused by an action. Mitigation can include avoiding an effect, minimizing the effect by limiting the action, rectifying the effect, reducing the effect through maintenance, or compensating for the effect. The mitigation measures listed here are designed to prevent or reduce adverse effects resulting from alternative implementation. The following mitigation measures are required for Alternatives B or C (see also Appendix D – Biological Evaluation and Appendix A – Standard Mitigations for Herbicide Use:

- All herbicide, mechanical release (hand felling), and tree planting activities will comply with Forest Plan standards and Georgia Best Management Practices.
- Stocking surveys will be completed, prior to release activities to determine if treatment is needed on the entire area proposed for treatment or only smaller sub areas.
- Survival surveys will be conducted the first and third year after planting.

In addition, an Emergency Spill Plan has been prepared for this project that outlines what will be done in the event of a spill. A copy of this plan is located in Appendix C.

The following table compares environmental effects by alternative:

Table 2-3: Comparison of Environmental Effects in the Project Area by Key Issue

Issues	Indicators	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (Manual Methods)
Issue 1: Protection of Human Health and Safety	Human Health Protected (YES/NO)	YES	YES	YES, but less so than Alt A or Alt B
Issue 2: Protection of Threatened, Endangered, or Rare Species	PETS Protected (YES/NO)	YES	YES	YES
Issue 3: Manual vs. Herbicide method	Estimated Cost	\$7800	\$66,798	\$142,000

CHAPTER THREE

3.0 Environmental Impacts

This chapter forms the scientific and analytical basis for the comparison of alternatives as required by the National Environmental Policy Act (NEPA). Included in this chapter are disclosures of direct, indirect, and cumulative effects of the alternatives on the different resources relevant to the key issues. Direct and indirect effects occur at, or near the same time and place as a result of the action [40 CFR 1508 (a) and (b)]. They have been combined in this chapter, as it is difficult to completely separate between the two effects. Cumulative effects result “...*from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time*” (40 CFR 1508.7). Reports from different resource specialists supplied information for portions of this analysis.

Effects analyses are disclosed by key issue in this chapter. The three key issues associated with this proposed project were identified through a public participation process, which included input from Forest Service natural resource specialists, other government agencies, organizations, and individuals (see Section 1.6, Chapter 1). The key issues were determined to be relevant to the decision to be made concerning this project. Other resources and issues (non-key issues) were eliminated from discussion in this chapter (see Section 1.7, Chapter 1).

3.1 Effects Related to Key Issue/Element #1; Health and Safety

Issue Statement: *The proposed action may adversely affect human health and safety*

Measurements: Human Health and Safety Protected?

Boundary of Analysis: The boundary for this key issue is the immediate area of the project where the herbicides will be applied and the period of time is the length of time the herbicide would be active in the environment.

3.1.1 Alternative A – No Action

Existing Condition

Currently there are no activities in the project areas that create special health and safety concerns. General health and safety concerns are those commonly associated with being in a forested environment including exposure to poisonous plants, insects, walking on uneven surfaces, and possible exposure to inclement weather.

3.1.2 Environmental Effects of Alternative B on Health and Safety

Effects of all herbicides have been assessed in the Final Environmental Impact Statement for Vegetation Management in the Coastal Plain/Piedmont (VMEIS). For all herbicides considered, an additional risk analysis was completed using methodology developed for the Forest Service by Syracuse Environmental Research Associates (SERA). In the risk assessments, there are two terms not used in the VMEIS. These are Reference Dose (RfD) and Hazard Quotient (HQ).

- **RfD** - Derived by USEPA, this is the maximum dose in mg of herbicide active ingredient (a.i.) per kg of body weight per day that is not expected to cause injury over a lifetime of exposure. In other words, it is, in EPA’s opinion, a “safe” lifetime daily dose. This is a conservative estimate, and is designed to be protective.
- **HQ** - This is the ratio of the estimated exposure dose to the RfD. A HQ of 1 reflects an exposure to amounts of a.i. equal to the RfD; HQs less than 1 reflect exposures to amounts of a.i. less than the RfD, while HQs greater than 1 reflect exposures to amounts of a.i. greater than the RfD. *HQs of 1.0 or less reflect exposure levels that are not of concern.* HQs greater than 1.0 reflect exposures to possible effects to be examined more closely to see if the projected exposures need to be further mitigated or need to be avoided. For the effects on wildlife, one must remember that these effects are constructed for individuals and not populations.

For Alternative B, the spill plan in Appendix C would be in place. Alternative B also assumes that all of the mitigation measures in Appendix A and section 2.4 of this document would be followed, as would mitigation measures in the VMEIS. Published analyses of environmental effects in the VMEIS are not duplicated in this document. However, information published subsequent to the VMEIS encountered in the open literature that is both relevant to this analysis and demonstrates a potential for significant effect on the conclusions drawn in the VMEIS has been included in the current analysis.

The following tables show the basis for estimated application rates that are used in the risk analysis:

Table 3-1 Herbicide Application Rate Assumptions

Cut or severed stems for all applications

Herbicide	Lbs ai/gal	% (fraction) in solution	Gallons of spray/acre	Lbs ai/acre
Glyphosate	5.4	50.0%	0.65	1.8
Triclopyr (amine)	3.0	50.0%	2.5	3.75
Triclopyr (ester)	4.0	20%	1.0	0.8*

*see results for triclopyr ester at 1.4 lbs/ac

Foliar Spray Applications

Herbicide	Lbs ai/gal	% (fraction) in solution	Gallons of spray/acre	Lbs ai/acre
Triclopyr (ester)	4.0	2.0%	15	1.4
Imazapyr	2.0	0.39%	15	0.1

For each herbicide, hazard quotients are developed that summarize risk characteristics for workers, the general public, terrestrial animals and aquatic species. (see section 3.2, effects related to Key

Issue #2, for discussion on terrestrial animals and aquatic species). The hazard quotients are calculated for a central or typical exposure level as well as for upper and lower exposure levels which are projections of the lowest and highest probable use-rate scenarios. For this analysis, hazard quotients derived from spill scenarios into ponds have been set to zero. The reason is that the project has mitigation measures in place (Appendix A) that make such spills so unlikely that such an analysis would be irrelevant. In addition, in the unlikely event this should occur, expedited clean up and exclusion from use are required until clean up has been accomplished. These scenarios include:

- acute/accidental exposure, contaminated water consumed by a child
- Hazard quotients for the general public involving direct spray exposures to the entire body or lower legs are considered so unlikely as to be irrelevant. These values have also been set to zero.

Following is a summary of the findings from this assessment for values over 1.0. A complete summary of results of the risk assessment is in Appendix B of this document.

Direct and Indirect Effects of Alternative B on Human Health and Safety

The most important hazard quotient is the general exposure HQ for workers. These are the people most likely to have direct exposure to herbicides. According to the Forest Service Southern Region Pesticide Specialist, the central HQ best reflects a realistic upper exposure and risk for workers using required personal protective equipment and employing proper washing and hygiene habits.

Results of the risk assessment for typical exposures of glyphosate at 1.8 lbs/acre are well under 1.0 (see process record).

For imazapyr, none of the hazard quotients calculated for risks to workers or the general public, were above 1.0.

For both the amine and ester formulation of triclopyr, results of the risk assessment found that typical exposures of workers to directed ground spray (backpack) were 1.0 or less. Although *upper* exposures were calculated above 1.0 for general exposure of workers using a backpack and for a spill on the lower legs to a worker (triclopyr amine), the central HQ best reflects a realistic upper exposure and risk for workers using appropriate personal protective equipment and employing proper washing and hygiene habits according to the Forest Service Southern Region Pesticide Specialist.

For the amine formulation of triclopyr, results of the hazard quotients calculated for chronic/long term exposure of a woman to contaminated fruit is above 1.0 at an *upper* bound. Typical exposures are less than 1.0. The upper bound exposures are most unlikely for the following reasons:

- Herbicide application areas are signed to preclude accidental exposure.
- The scenario assumes that for a long term exposure to occur contaminated fruit is eaten 90 days in a row.

- Blackberries, the only types of fruit likely to be available in any substantial quantity, would not continue to ripen for more than approximately one week after treatment. After that time, they would be unavailable to berry foragers.

For both the amine and ester formulation of triclopyr, typical results of the hazard quotients for vegetation contact of an adult female in shorts and a t-shirt are above 1.0. Lower levels are at or below 1.0. However, herbicide application areas are signed to preclude accidental exposure and the scenario assumes that contact occurs while the vegetation is still wet.

Accidental exposure of a worker to contaminated gloves shows a typical HQ of 1.1 triclopyr (ester formulation) at 1.4 lbs/acre. This is unlikely to occur because the scenario assumes that the contaminated glove will be left on the skin for 1 hour. Labeling instructions and worker protection standards require proper hygiene. Contaminated gloves should be removed immediately and both the contaminated skin and gloves should be washed with soap and water.

The use of protective clothing can substantially reduce worker doses. Protective clothing can reduce worker exposures by 27 to 99 percent, as shown in a number of field studies of worker exposure (VMEIS, Volume II, Appendix A, page 5-35). Workers would be required to wear all personal protective and safety equipment required by labeling. A change of clothes as well as soap, wash water, eyewash bottles and first aid equipment would also be provided on-site.

While workers are more likely to be exposed to the herbicide than the general public, the risk to workers (systemic and reproductive) from ground based spraying application of these herbicides at typical rates is low (VMEIS, Volume 1, Chapter IV, page IV-18).

As a result of these analyses, and given that Forest Plan Standards, project mitigation, and assumptions are met, there should be no significant negative effect to human health or safety as a result of implementing Alternative B.

Cumulative Effects of Alternative B on Human Health and Safety

The use of herbicides carries some risks to human health and safety, particularly to the applicator. This risk is reduced by requiring the applicator to be trained in safety precautions, proper use, and handling of herbicides. Other factors reducing the risk of herbicide use to human health and safety is the low level of active ingredient per acre and placement of notice signs posted in areas where herbicide has been applied. The signs include information on the herbicide used, when it was applied, and who to contact for additional information (see also Appendix A, Standard Mitigation Measures for Herbicide Use).

All applicable mitigation measures contained in the Vegetation Management in the Coastal Plain/Piedmont (VMEIS) issued in January 1989 will be followed. An Emergency Spill Plan that outlines procedures to be followed in the event of an accidental spill is included in Appendix C. The Emergency Spill Plan also contains information on providing care to persons who are exposed to a spill.

In cut surface treatment, herbicide is applied directly to a freshly cut stump in an amount that will not run off. The herbicide is rapidly absorbed into the stump and is dry within an hour of treatment. When applied at the required typical rate, these herbicides pose an insignificant risk (systemic and reproductive) to the public either from dietary exposure (water, fish, meat, vegetable, foraged berry) or dermal exposure (on-site or drift) (VMEIS, Volume 1, IV-16). To mitigate any possible contact with the public, dye is added to the herbicide and warning signs are placed in all treatment areas.

Cumulative effects that might result from the use of herbicides on private land are difficult to assess. The use of herbicides on private land is generally for the control of woody plants near homes. No other herbicide use is currently proposed within the project area or anticipated to occur within the near future. In addition, proposed treatments for release or timber stand improvement will only occur if determined to be needed after stocking checks are completed. Some sights may not require treatment, thus the proposed treatments represent the maximum, not the actual, number of acres that will be treated. The treatments are also proposed for implementation over a 3 –5 year period of time. For these reasons and because the effects to human health and safety are likely to be small, Alternative B will result in few or no cumulative impacts to human health and safety.

3.1.3 Environmental Effects of Alternative C on Health and Safety

Where manual methods are used, repeated treatments on sites with high numbers of competing stems are necessary in order to successfully release or precommercially thin pine and hardwood seedlings or saplings due to the rapid growth of single and multiple sprouts on most cut hardwood stems.

The VMEIS presents data which shows conclusively that manual methods of vegetation control, including chainsaw felling, brush axe cutting, and other handtools, have by far the greatest frequency of accidents and pose the highest risk of serious injury or death to forest or contract workers (VMEIS Volume I, table IV-7).

Elimination of herbicides slightly improves public health and safety. However, increased use of manual methods to treat the same number of acres would cause a net increase in risk to worker safety with negligible human health risk reduction. (VMEIS IV-153).

3.2 Effects Related to Key Issue/Element #2, Impacts to Threatened, Endangered and Rare Species

Issue Statement: *The proposed treatments may adversely affect rare species in the project area including Federally Threatened and Endangered Species, Regional Forester's Sensitive Species, and Forest Concern species.*

Measurements:

- PETS protected?

Boundary of Analysis

The boundary for this key issue will be the immediate area of the project where the herbicides will be applied and the period of time is the length of time the herbicide would be active in the environment.

Also included in this section is a discussion of Locally Rare Species as this is not covered elsewhere in the document. Additional detailed analysis on wildlife habitat is disclosed in Appendix D, Biological Evaluation (BE), and Appendix E, Management Indicator Species (MIS).

Existing Condition (Threatened and Endangered (TE) and Locally Rare Species (LR))

Many of the stands proposed for herbicide treatment are densely stocked, pine stands killed by southern pine beetle (SPB). Plant inventories conducted across the Forest since 1991 have shown that these pine stands provide little in the way of habitat for federally listed Proposed, Endangered, Threatened, or Regional Forester Sensitive (TES) plants or for locally rare (LR) plants. Log fern, dwarf palmetto and Carolina windflower are the only locally rare plants within the general vicinity of the project area. However, implementation of Alternative B would not affect these species because they are not found within the dense pine stands proposed for treatment. No rare plants are known to occur in these sites (see Table 2-2)

Removal of vegetation by mechanical treatments and herbicide use can degrade stream water quality by increasing sediment and nutrient runoff input to streams. Removal of vegetation can also affect the quantity of surface water runoff. Vegetation provides erosion control through water infiltration and uptake, reducing runoff to streams, and through soil stabilization. Overall, surface water runoff, erosion, and sedimentation impacts from vegetation control would be short-term, lasting only until understory vegetation in site prep and released areas begins to grow again. More sunlight would reach the forest floor, which would encourage and increase the amount and growth rate of understory plants. This understory vegetation would increase rainfall infiltration, reducing surface water runoff and soil erosion in the area, and thus reducing adverse impacts on water quality and TES species.

Hardwood stands proposed for herbicide treatment to control or eradicate privet were inventoried for rare plants in 2005 by Lisa Kruse. No TES or LR plants were found during the inventories.

During the summer, males of the Forest Sensitive Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) roost as solitary individuals in old buildings and hollow trees (Harvey et al, 1999). Solitary individuals could therefore be potentially present in hollow trees, if such trees occurred in the sites. The four-toed salamander is known to inhabit swamps, boggy streams and ponds and wet woods within or adjacent to the project area. However, implementation of Alternative B would not effect these areas due to the presence of riparian buffer strips and streamside management zones. Alternative B would have no effect on these species. There are no known occurrences of rare terrestrial animals or insects in these stands.

Most of the streams in these proposed treatment sites are within headwater reaches. From aquatic surveys of mussels and fish across the forest since the 1950's, these headwater streams do not provide the necessary habitat for federally listed Proposed, Endangered, Threatened, or Regional Forester Sensitive (TES) fish or mussels. Alternative B would have no effect on these species.

The following fish species utilize large river habitats such as the Ocmulgee, Oconee, Murder Creek and Apalachee Rivers.

Altamaha Shiner (fish)	Sensitive
Inflated Floater (mussel)	Sensitive
Ocmulgee Shiner (fish)	Sensitive
Robust Redhorse (fish)	Sensitive

None of these species is known to occur near proposed treatment sites. The application of Forest Plan standards and BMP's would limit any potential impact to aquatic species. The site where the locally rare Georgia elephant-ear and the Atamaha pocketbook were found is approximately 5 miles south of the southernmost project area. Alternative B would have no effect on these species.

There are no federally listed crayfish or aquatic insects on the Oconee National Forest. Crayfish and aquatic insects surveys conducted in 2003 by Chris Skelton were to determine the distribution and to resurvey sites from past surveys where sensitive insect species were collected.

3.2.1 Environmental Effects of Alternative A on T&E and Rare Species

There would be no direct, indirect, or cumulative effects to any TES or locally rare species with implementation of the no action alternative, Alternative A. Species composition would vary over time depending on the overall stand composition and structure resulting from loss of the pines. Historical communities such as pine-oak savannas and oak woodlands along with their associated species would not be easily established in this alternative. Important RCW nesting habitat would not be established under this alternative.

3.2.2 Environmental Effects of Alternative B on T&E and Rare Species

The proposed alternative would consist of herbicide application to site prepare or release oaks and shortleaf pines in areas previously affected by the southern pine beetle. TES and LR species addressed here and in the BE were chosen due to known occurrences and/or presence of habitat for the species in susceptible SPB host types. This was determined by: (1) consulting 14 years of U.S. Forest Service (FS) plant inventory records, (2) consulting Georgia Natural Heritage Program (GNHP) records, (3) reviewing U.S. Fish and Wildlife Service (USFWS) county lists for potential species, (4) ongoing discussions with GNHP, FS, and other agency biologists and (5) past aquatic surveys on the forests targeted towards aquatic TES, and (6) various scientific references such as technical manuals, herbarium records, NatureServe information, and others.

Assessments of herbicide effects are discussed in detail in the Vegetative Management FEIS (VMEIS) Volume II (USFS 1988). An additional site for detailed herbicide assessment may be found at: www.fs.fed.us/foresthealth/pesticide/work.shtml.

Federally listed and Regional Forester sensitive species:

Table 3-1 lists federally listed species and Table 3-2 lists Regional Forester sensitive species, with potential to occur on the Chattahoochee-Oconee National Forest in areas affected by the SPB and proposed for herbicide treatment.

Table 3-1: The following federally listed terrestrial species have potential to occur in or in close proximity to proposed project areas.

Common Name	Scientific Name	Federal Status
BIRDS		
Bald eagle (nests)	<i>Haliaeetus leucocephalus</i>	T
Red-cockaded woodpecker	<i>Picoides borealis</i>	E
FISH		
Altamaha Shiner	<i>Cyprinella xaenura</i>	E
PLANTS		
Relict trillium	<i>Trillium reliquum</i>	E

Table 3-2: The following Regional Forester sensitive species have potential to occur in or in close proximity to proposed project areas.

Common Name	Scientific Name	Status
BIRDS		
Bachman's sparrow	<i>Aimophila aestivalis</i>	S
Loggerhead Shrike (migrant)	<i>Lanius ludovicianus migrans</i>	S
MAMMALS		
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	S
FISH		
Ocmulgee shiner	<i>Cyprinella callisema</i>	S
Altamaha shiner	<i>Cyprinella xaenura</i>	S
Robust redhorse	<i>Moxostoma robustum</i>	S
MUSSEL		
Inflated floater	<i>Pygandon gibbosa</i>	S
INSECTS		
None within 100 miles		

Direct and indirect effects to TES plants are not likely due to the fact herbicide will be applied to specific targeted plants either by application to the cut stump or to the leaves and stems of specific individuals. No herbicide may be applied within 60 feet of any federally listed or sensitive species, per Forest Plan standard FW- 019. Plant inventories have been conducted in high-risk sites such as hardwood habitat, prior to implementation of any herbicide treatments. No TES plants were found within the project areas listed in Table 2-2. Other Forest Plan standards also prevent impacts to non-target vegetation, such as weather restrictions to prevent drift of herbicide found in standard FW-13, and nozzle size restrictions found in FW-14. In addition, Imazapyr, the only herbicide proposed that has some degree of soil activity (only in the spring), will be applied from late June to mid September when the chemical has little or no evidence of soil mobility. This will further protect non-targeted vegetation, including rare plants, from any direct or indirect impacts.

According to the VMEIS Volume II (USFS 1988), the herbicides analyzed, including the 3 considered here, were rapidly eliminated from the systems of animals studied. In addition, the animals showed low tissue retention of the herbicides. For these reasons, glyphosate, imazapyr, and triclopyr present a very low risk of bioaccumulation.

Potential indirect effects could also occur from the herbicide destruction of plants necessary for the animals' survival. However, this should not be a problem due to the fact these nectar and larval host plants are not targeted for herbicide spray, and because the standards discussed above (FW-13 and 14) will prevent drift to these plants.

For aquatic species, there should be no significant adverse affect from the Alternative B. Because of the expected effect of the herbicide treatments on water quality and the use of mitigation measures, it is not likely that the use of herbicides would have a significant adverse effect on fisheries. Monitoring of Garlon (active ingredient triclopyr) on the Ouachita National Forest, where application techniques and mitigation measures were similar to ones proposed in Alternative B, found that of 216 samples analyzed, 51 (23.6%) had detectable levels of the herbicide. None of the levels detected were of a high enough concentration to negatively affect fisheries (Clingenpeel, 1993).

There should be no direct, indirect or cumulative effects upon any fish species, from the application of herbicides to treatment areas when proper protocols are followed. Additional discussion on aquatic habitat can be found in Section 1.7.2, Impacts to Water Quality and Aquatic Habitat.

The effects to TES species of herbicide application (Alternative B), as well as mitigation measures that will take place to prevent adverse impacts to these species are discussed in detail in the Biological Evaluation for the project.

Locally rare species:

In addition to the above TES species, several locally rare (LR) species have potential to occur in habitats proposed for herbicide release. Locally rare species for the Chattahoochee-Oconee are those that are secure throughout their distributional range (global ranks of G4 = apparently secure globally, or G5 = demonstrably secure globally), but which are rare in Georgia. Often, this rarity is due to the

species being on the southern limits of their range in Georgia. Chattahoochee-Oconee Forest LR species and possible impacts from herbicide release are as follows:

Birds: No known locally rare bird species occur with the proposed project areas.

Mammals: *No known locally rare mammal species occur with the proposed project areas*

Reptiles and Amphibians:

Four toed salamander (*Hemidactylium scutatum*)

The four-toed salamander is known to inhabit swamps, boggy streams and ponds and wet woods within or adjacent to the project area. However, implementation of Alternative B would not effect these areas due to the presence of riparian buffer strips and streamside management zones.

Plants:

The following LR plants have potential to occur in or in close proximity (i.e. within the influence of restoration activities) to sites that could be targeted for restoration with use of herbicides:

SHINING INDIGO BUSH	<i>Amorpha nitens</i>
CAROLYNA ANEMONE	<i>Anemone carolinianna</i>
DWARF PALMETTO	<i>Sabal minor</i>

Possibility of impacts to non-targeted plants from drift of the herbicide during foliar application is highly unlikely due to the fact droplets instead of a fine mist will be used. Cut surface application would not result in drift to non-target plants. Rare plants will be further protected by the 60 foot minimum buffer required by the Forest LMP and for the other reasons discussed above for TES plants. These mitigation measures in addition to the standard mitigation measures for herbicide use listed in Appendix A will all prevent direct and indirect impacts to locally rare plants.

Fish: No locally rare fish species are known to occur near the project sites.

Mussels: The site where the locally rare Georgia elephant-ear and the Atamaha pocketbook were found is approximately 5 miles south of the southernmost project area. Alternative B would have no effect on these species.

Crayfish: No locally rare crayfish are known to occur near the project sites.

Cumulative Effects

Implementation of the standard herbicide mitigation measures, Forest Plan Standards protecting rare species, and Riparian Corridor Standards all assist in avoiding adverse cumulative effects to TES and locally rare species. Adherence to Forest Plan Standards also assists in protecting and maintaining habitat for TES and locally rare species at the Forest level. Surveys have been and continue to be

conducted in portions of the Forest to determine presence and distribution of various small mammals, birds, amphibians and reptiles, aquatic species, and TES and locally rare plants. The Georgia National Heritage Program records are checked for known occurrences of TES and locally rare species in project areas, and close contact is maintained between the Heritage biologists and Forest Service biologists for sharing of new information. Forest Service records and other agencies' biologists and records (in addition to GNHP) are also consulted for occurrences. Future management activities and project locations will be analyzed utilizing any new information available on TES and locally rare species. Effects to federally listed species will be avoided. For Forest sensitive and locally rare species, mitigating measures will be implemented where needed to maintain habitat for these species on the Forest, and to prevent future listing under the Endangered Species Act.

Herbicide use is currently proposed within the project area and is anticipated to occur within the near future, in RCW foraging and nesting habitat located in adjacent areas. The distance from the scheduled sites along with limited soil mobility makes transport of herbicide to the treatment site improbable and thus no cumulative effects are probable.

For the reasons discussed above, past, present, and reasonably foreseeable future actions in the project area are not expected to result in any adverse cumulative effects to TES or locally rare plants, or to terrestrial vertebrate or invertebrate species.

Proposed treatments for release or timber stand improvement will only occur if determined to be needed after stocking checks are completed. Some sights may not require treatment, thus the proposed treatments represent the maximum, not the actual, number of acres that will be treated.

Results of Risk Assessment:

Following is a summary of findings from the risk assessment (see also Section 3.1.2, Chapter 3) that was completed for effects to wildlife and aquatic species. Only hazard quotients over 1.0 are described below; Appendix B of this document contains more detailed information.

Hazard quotients associated with applications of glyphosate and imazapyr for wildlife are less than 1.0.

Typical hazard quotients associated with triclopyr amine formulations are greater than 1.0 for the chronic/long-term exposure from the consumption of contaminated vegetation by a large mammal or large bird. However, with a directed foliar application, the amount of non-target vegetation subject to spray deposition is very small. In addition, chronic/long term exposure of consumption of contaminated vegetation by a large mammal or large bird is not likely to occur because:

- There are no large mammal or large bird threatened or endangered species on these sites. In addition, large bird species of interest such as wood storks and bald eagles, do not consume vegetation. Large game species such as the wild turkey's diet consist mostly of insects, and hard and soft mast.
- The scenario assumes a diet composed of 100% contaminated vegetation from the site. Large mammals and large birds typically have fairly large home ranges. The scenario also assumes

that such vegetation will be consumed from the same sites for 90 consecutive days. The rate at which treated vegetation becomes unappetizing and then unavailable to foraging birds following treatment make the assumptions proposed for this scenario quite unrealistically conservative for the project area.

- These HQs deal with individuals, not wildlife populations. Although an individual may be effected, there won't be significant effects to the population. As noted above, there are no large mammal or large bird T/E species that this is likely to affect on site.

Although there are *upper* values above 1 for triclopyr amine for exposure to a small mammal eating a contaminated insect or a large mammal eating grass; and for triclopyr ester for exposure of a large mammal or large bird eating contaminated vegetation, typical values are more likely and the central HQ calculations are all under 1.0.

In addition to the effects described above, direct effects to birds or mammals are unlikely since these species are likely to move from the area when project activities are implemented. Although direct effects to amphibians are more likely since contact with herbicide could be absorbed through the skin and effect metabolic activity, amphibians are likely to be under logs, rocks or leaves, making direct contact with chemicals less likely. Direct effects to other non-target plants occurring in these habitats could occur. Application methods, including direct application to target foliage or freshly cut stumps, would minimize the possibility for spills and/or direct contamination to non-target species.

Hazard quotients for glyphosate for acute exposure to fish, aquatic invertebrates and aquatic macrophytes for accidental spills had calculated values greater than 1.0. However, such risks are most unlikely because glyphosate is strongly adsorbed to (bound to the surface of) both organic matter and clay particles. Therefore it is very immobile in the environment, and unlikely to reach aquatic habitat. Even in the unlikely event that it might reach such habitat, it would probably be quickly bound to sediment or organic matter in the stream. With the provision of riparian buffer strips on stream zones, the risk of herbicide spills or movement into stream zones is further reduced.

Results of the risk assessment for triclopyr amine and ester formulation had calculations greater than 1.0 for aquatic plants and algae from accidental spills. Exposure to fish for triclopyr ester was also above 1.0 for an accidental spill. No effect will likely occur because:

- Triclopyr is relatively strongly adsorbed to (bound to the surface of) both organic matter and clay particles. Therefore it is fairly immobile in the environment, and unlikely to reach aquatic habitat. Even in the unlikely event that it might reach such habitat, it would probably be quickly bound to sediment or organic matter in the stream.
- With the provision of riparian buffer strips around streams, the risk of herbicide spills or movement into streams is further reduced.

Results of the risk assessment for imazapyr for exposure of aquatic plants and algae is above 1.0. While imazapyr does have the potential to reach aquatic areas through runoff, such actual exposure and risk are mostly unlikely for imazapyr for the following reasons:

- Directed foliar sprays using imazapyr should be done in July or August when material washed off leaves tends not to be picked up by roots of non-target plants, allowing good selectivity.

Imazapyr appears to bind loosely to clay particles and organic matter. It has relatively low soil mobility; soil activity expresses itself during the period of spring leaf expansion but applications made from late June through mid September produce little or no evidence of soil activity.

- With the provision of riparian buffer strips on streams, the risk of herbicide spills or movement into streams is further reduced. Herbicides might be able to move through the buffer, but are subject to dilution and mixing in transit. In addition, no herbicide will be applied within 100 horizontal feet of lakes, wetlands, or perennial or intermittent streams or within 100 horizontal feet of any public or domestic water source. Exclusion zones will be clearly marked before herbicide application so applicators can easily see and avoid them.
- There are no threatened or endangered aquatic plants in or near the project area.

Hazard quotients for exposure of sensitive terrestrial plants from runoff for imazapyr and for exposure of terrestrial plants from runoff of triclopyr (ester and amine) have hazard quotients greater than 1.0. These values vary depending on the average annual rainfall in a given area and the scenarios assume that rain falls every 10 days. However, all proposed herbicide applications are to be applied directly to the targeted vegetation; therefore by correctly following application procedures, impacts to non-targeted species would be minimal. In addition, Imazapyr, the only herbicide proposed that has some degree of soil activity (only in the spring), will be applied from late June to mid September when the chemical has little or no evidence of soil mobility. This will further protect non-targeted vegetation, including rare plants, from any direct or indirect impacts. Although some loss of terrestrial plants could possibly occur, there are mitigation measures already in place to protect sensitive species so overall effects should be minimal.

For drift exposure from a low boom application of glyphosate, hazard quotients for terrestrial plants are above 1.0 for species that are directly sprayed. This type of application may be used to eradicate privet and other invasive species to restore other more desirable species. The effects of the direct spray on the privet is the desired outcome of this treatment.

3.2.3 Effects of Alternative C on TES/LR species

There would be no direct, indirect, or cumulative effects to any TES or locally rare species with implementation of Alternative C. Historical communities such as pine-oak savannas and oak woodlands along with their associated species would be more difficult to restore in this alternative.

3.3 Effects Related to Key Issue/Element #3, Cost Effectiveness of Herbicide vs. Manual Methods

Issue Statement: *The cost effectiveness of treating areas manually rather than using herbicides needs to be examined.*

Measurement: *Estimated Treatment Cost*

Alternative A (No Action). There are no future costs under this alternative.

Alternative B and C. In most of the stands there is sufficient competition from species such as sweetgum, poplar, and maple that would compete heavily with the pine or oak trees desired on the site. Manual treatments will do nothing to retard hardwood sprouting. Without the use of herbicides prolific sprouters would prevail on many sites at the detriment of desired oak and pine trees. As a consequence, stand species composition will shift towards more aggressive colonizing species such as sweetgum. Alternative B would not allow regrowth of the treated stems which are competing with desired species. However, under alternative C because of the re-sprouting of the treated stems the treatment would need to be repeated every two years, at least three times.

The total cost for conducting the timber stand improvement work by herbicide is less than half of the estimated cost of doing the work by chainsaw. Following is a summary of the costs associated with each alternative:

Table 3-3 Estimated Costs Associated with each Alternative

Item	Alternative		
	A	B	C
Cost of EA: (30 days @ \$260/day)	7800	7800	7800
Cost of Herbicide:			
\$68.50/acre @ 428 acres Assume that the most expensive treatment is a 50% triclopyr amine solution applied at 2.5 gallons of solution per acre (or 1.25 gallons of herbicide per acre and Product cost = \$54.80/gallon)	0	29,318	0
Cost of Herbicide Contract (\$60/acre)	0	25,680	0
Cost of Chainsaw Contract (\$100/acre – min of 3 treatments)	0	0	122,400
Contract Adiministation @ \$4,000/contract	0	4,000	12,000
Total treatment Cost:	\$7800	\$66,798	\$142,000

Release using handtools tends to be more expensive and less effective over time than does release using herbicide. The likelihood of additional treatments being required more than doubles the cost of manual treatments over the herbicide treatments.

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Other Forest Service Personnel Providing Input

Name	Title
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Others Providing Input

Affiliation	Name

APPENDIX A ---

Standard Mitigation Measures for Herbicide Use

APPENDIX A

STANDARD MITIGATION MEASURES FOR HERBICIDE USE

1. Herbicides are applied according to labeling information and the site-specific analysis done for projects. This labeling and analysis are used to choose the herbicide, rate, and application method for the site. They are also used to select measures to protect human and wildlife health, non-target vegetation, water, soil, and threatened, endangered, proposed, and sensitive species. Site conditions may require stricter constraints than those on the label, but labeling standards are never relaxed.
2. Only herbicide formulations (active and inert ingredients) and additives registered by EPA and approved by the Forest Service for use on national forests are applied.
3. Public safety during such uses as viewing, hiking, berry picking, and fuelwood gathering is a priority concern. Method and timing of application are chosen to achieve project objectives while minimizing effects on non-target vegetation and other environmental elements. Selective treatment is preferred over broadcast treatment.
4. Areas are not prescribed burned for at least 30 days after herbicide treatment.
5. A certified pesticide applicator supervises each Forest Service application crew and trains crew members in personal safety, proper handling and application of herbicides, and proper disposal of empty containers.
6. Each Contracting Officer's Representative (COR), who must ensure compliance on contracted herbicide projects, is a certified pesticide applicator. Contract inspectors are trained in herbicide use, handling, and application.
7. Contractors ensure that their workers use proper protective clothing and safety equipment required by labeling for the herbicide and application method.
8. Notice signs (FSH 7109.11) are clearly posted, with special care taken in areas of anticipated visitor use.
9. Triclopyr is not ground-applied within 60 feet, of known occupied gray, Virginia big-eared, or Indiana bat habitat. Buffers are clearly marked before treatment so applicators can easily see and avoid them.
10. No herbicide is ground-applied within 60 feet of any known threatened, endangered, proposed, or sensitive plant. Buffers are clearly marked before treatment so applicators can easily see and avoid them.
11. Application equipment, empty herbicide containers, clothes worn during treatment, and skin are not cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separate labeled containers.
12. No herbicide is ground-applied within 100 horizontal feet, of lakes, wetlands, or perennial or intermittent springs and streams. No herbicide is applied within 100 horizontal feet of any public or domestic water source. Selective treatments (which require added site-specific analysis and use of aquatic-labeled herbicides) may occur within these buffers only to prevent significant environmental damage such as noxious weed infestations. Buffers are clearly marked before treatment so that applicators can easily see and avoid them.

13. During transport, herbicides, additives, and application equipment are secured to prevent tipping or excess jarring and are carried in a part of the vehicle totally isolated from people, food, clothing, and livestock feed.
14. Only the amount of herbicide needed for the day's use is brought to the site. At day's end, all leftover herbicide is returned to storage.
15. Herbicide mixing, loading, or cleaning areas in the field are not located within 200 feet of private land, open water or wells, or other sensitive areas
16. During use, equipment to store, transport, mix, or apply herbicides is inspected daily for leaks.
17. Herbicides and application methods are chosen to minimize risk to human and wildlife health and the environment. No class B, C, or D chemical may be used on any project, except with Regional Forester approval. Approval will be granted only if a site-specific analysis shows that no other treatment would be effective and that all adverse health and environmental effects will be fully mitigated. Diesel oil will not be used as a carrier for herbicides, except as it may be a component of a formulated product when purchased from the manufacturer. Vegetable oils will be used as the carrier for herbicides when available and compatible with the application proposed.
18. Herbicides are applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human (NRC 1983) and wildlife health (EPA 1986a). Application rate and work time must not exceed levels that pose an unacceptable level of risk to human or wildlife health. If the rate or exposure time being evaluated causes the Margin of Safety (MOS) or the Hazard Quotient (HQ) computed for a proposed treatment to fail to achieve the current Forest Service R-8 standard for acceptability (acceptability requires a MOS > 100 or a HQ of < 1.0 using the most current of the SERA or Risk Assessments found on the Forest Service website). Additional risk management must be undertaken to reduce unacceptable risks to acceptable levels, or an alternative method of treatment must be used.
19. Weather is monitored and the project suspended if temperature, humidity, or wind becomes unfavorable for correct application as shown in Table 2- 1.

Table 2- 1. Weather Restrictions for Herbicide Application

Application Method	Temperatures Higher Than	Humidity Less Than	Wind (at target) Greater Than
Ground:			
Hand (cut surface)	N.A.	N.A.	N.A.
Hand (other)	98°F	20%	15 mph
Mechanical:			
Liquid	95°F	30%	10 mph
Granular	N.A.	N.A.	10 mph
Aerial:			
Liquid	90°F	50%	5 mph
Granular	N.A.	N.A.	8 mph

20. Nozzles that produce large droplets (mean droplet size of 50 microns or larger) or streams of herbicide are used. Nozzles that produce fine droplets are used only for hand treatment where distance from nozzle to target does not exceed 8 feet.

21. With the exception of treatments designed to release designated vegetation selectively resistant to the herbicide proposed for use or to prepare sites for planting with such vegetation, no soil-active herbicide is applied within 30 feet of the drip line of non-target vegetation (e.g., den trees, hardwood inclusions, adjacent stands) specifically designated for retention within or next to the treated area. Side pruning is allowed, but movement of herbicide to the root systems of non-target plants must be avoided. Buffers are clearly marked before treatment so that applicators can easily see and avoid them.
22. No herbicide is broadcast on rock outcrops or within sinkholes. No soil-active herbicide with a half-life longer than three months is broadcast on slopes over 45 percent. Such areas are clearly marked before treatment so that applicators can easily see and avoid them.
23. Pesticide mixing, loading, or cleaning areas in the field are located at least 50 feet from ephemeral streams.
24. No soil-active herbicide with a half-life longer than three months is broadcast within 25 feet of ephemeral streams. Selective treatments with aquatic-labeled herbicides are allowed. Such areas are clearly marked before treatment so that applicators can easily see and avoid them.

APPENDIX B ---

Results of Risk Assessment

APPENDIX B

Results of the risk assessment – Detailed Summary

Effects of all herbicides have been assessed in the Final Environmental Impact Statement for Vegetation Management in the Coastal Plain/Piedmont (VMEIS). For all herbicides considered, an additional risk analysis was completed using methodology developed for the Forest Service by Syracuse Environmental Research Associates (SERA). The details of the risk assessment results are available in the project record. In the risk assessments, there are two terms not used in the VMEIS. These are Reference Dose (RfD) and Hazard Quotient (HQ).

- **RfD** - Derived by USEPA, this is the maximum dose in mg of herbicide active ingredient per kg of body weight per day that is not expected to cause injury over a lifetime of exposure. In other words, it is, in EPA’s opinion, a “safe” lifetime daily dose. This is a conservative estimate, and is designed to be protective.
- **HQ** - This is the ratio of the estimated exposure dose to the RfD. A HQ of 1 reflects an exposure to amounts of a.i. equal to the RfD; HQs less than 1 reflect exposures to amounts of a.i. less than the RfD, while HQs greater than 1 reflect exposures to amounts of a.i. greater than the RfD. *HQs of 1.0 or less reflect exposure levels that are not of concern.* HQs greater than 1.0 reflect exposures to possible effects to be examined more closely to see if the projected exposures need to be further mitigated or need to be avoided. For the effects on wildlife, one must remember that these effects are constructed for individuals and not populations.

For Alternative B, the spill plan in Appendix C would be in place. Alternative B also assumes that all of the mitigation measures in section 2.4 of this document would be followed, as would mitigation measures in the VMEIS. Published analyses of environmental effects in the VMEIS are not duplicated in this document. However, information published subsequent to the VMEIS encountered in the open literature that is both relevant to this analysis and demonstrates a potential for significant effect on the conclusions drawn in the VMEIS has been included in the current analysis.

The following tables show the basis for estimated application rates that are used in the risk analysis:

Herbicide Application Rate Assumptions

Cut or severed stems for all applications

Herbicide	Lbs ai/gal	%(fraction) in solution	Gallons of spray/acre	Lbs ai/acre
Glyphosate	5.4	50.0%	0.65	1.8
Triclopyr (amine)	3.0	50.0%	2.5	3.75
Triclopyr (ester)	4.0	20%	1.0	0.8*

*See results for triclopyr ester at 1.4 lbs/ac

Foliar Spray Applications

Herbicide	Lbs ai/gal	% (fraction) in solution	Gallons of spray/acre	Lbs ai/acre
Triclopyr (ester)	4.0	2.0%	15	1.4
Imazapyr	2.0	0.39%	15	0.1

For each herbicide, hazard quotients are developed that summarize risk characteristics for workers, the general public, terrestrial animals and aquatic species. For this analysis, hazard quotients derived from spill scenarios into ponds have been set to zero. The reason is that the project has mitigation measures in place (Appendix A) that make such spills so unlikely that such an analysis would be irrelevant. These scenarios include In addition, in the unlikely event this should occur, expedited clean up and exclusion from use are required until clean up has been accomplished. These scenarios include:

- EO4 sheet, acute/accidental exposure, contaminated water consumed by a child
- Hazard quotients for the general public involving direct spray exposures to the entire body or lower legs are also considered so unlikely as to be irrelevant. These have also been set to zero.

The most important hazard quotient is the general exposure HQ for workers. These are the people most likely to have direct exposure to herbicides. According to the Forest Service Southern Region Pesticide Specialist, the central HQ best reflects a realistic upper exposure and risk for workers using required personal protective equipment and employing proper washing and hygiene habits.

The herbicides considered for use in this EA are glyphosate, triclopyr, and imazapyr. Hazard quotients were calculated for the estimated application rates for this project. HQ's over 1.0 are discussed below.

Glyphosate, injection or cut stump treatment @ 1.8 lbs/acre

Glyphosate was analyzed under two situations, with and without the use of a surfactant. Because the use of a surfactant would increase any toxicity, those results are reported here.

Results for typical exposures of glyphosate are all less than 1.0 for human health.

Wildlife G03 sheet, acute exposure hazard quotients to fish, aquatic invertebrates and aquatic macrophytes for accidental spills have calculated values over 1.0. Such exposures and risk are most unlikely for glyphosate. This is because glyphosate is strongly adsorbed to (bounds to the surface of) both organic matter and clay particles.

Therefore it is very immobile in the environment, and unlikely to reach aquatic habitat. Even in the unlikely event that it might reach such habitat, it would probably be quickly bound to sediment or organic matter in the stream. With the provision of riparian buffer strips on stream zones, the risk is further reduced.

For drift exposure from a low boom application of glyphosate, hazard quotients for terrestrial plants are above 1.0 for species that are directly sprayed. This type of application would be used to improve existing wildlife fields by spraying fescue and replanting with other more desirable species. The effects of the direct spray on the fescue is the desired outcome of this treatment.

Triclopyr (amine), cut surface application @ 3.75 lbs/acre

Human health E02 sheet, directed ground spray (backpack), general exposure for workers, *upper* bound HQ = 6.0 and *upper* bound for spill on lower legs is 1.7. Typical exposures are 1.0 or less. However, the upper bound exposure is most unlikely for the following reason:

- According to the Forest Service Southern Region Pesticide Specialist, the central HQ best reflects a realistic upper exposure and risk for workers using appropriate personal protective equipment and employing proper washing and hygiene habits. Forest Service personnel are required to follow these safety protocols whenever applying pesticides.

Human health E04 sheet, long term exposure for women, contaminated fruit, *upper* bound HQ = 1.7. Typical exposures are less than 1.0 at a value of 0.1. The upper bound exposures are most unlikely for the following reasons:

- Herbicide application areas are signed to preclude accidental exposure.
- The scenario assumes that for a long term exposure to occur contaminated fruit eaten 90 days in a row.
- Blackberries, the only types of fruit likely to be available in any substantial quantity, would not continue to ripen for more than approximately one week after treatment. After that time, they would be unavailable to berry foragers.

The typical HQ for vegetation contact of an adult female in shorts and a t-shirt is 3.0 and the lower level is 1.0. However, herbicide application areas are signed to preclude accidental exposure and the scenario assumes contact occurs while the vegetation is still wet.

Wildlife G02 sheet, consumption of contaminated vegetation by a large mammal and large bird, shows typical exposures of 1.9 and 1.5, respectively. These hazard quotients are not of significant concern because:

- With cut surface or injection application, the amount of non-target vegetation subject to spray deposition is very small
- There are no large mammal or large bird threatened or endangered species on these sites. In addition, large bird species of interest such as wood storks and bald eagles, do not consume vegetation. Large game species such as the wild turkey's diet consist mostly of insects, and hard and soft mast.
- The scenario assumes a diet composed of 100% contaminated vegetation from the site. Large mammals and large birds typically have fairly large home ranges. The scenario also assumes that such vegetation will be consumed from the same sites for 90 consecutive days. The rate at which treated vegetation becomes unappetizing and then unavailable for foraging birds following treatment make the assumptions proposed for this scenario quite unrealistically conservative for the project area.
- These HQs deal with individuals, not wildlife populations. Although an individual may be effected there won't be significant effects to the population.

Although there are upper level values above 1.0 for small mammals eating a contaminated insect and large mammals eating grass, the typical values are all less than 1.0. Typical values represent the most likely situation.

In addition to the effects described above, direct effects to birds or mammals are unlikely since these species are likely to move from the area when project activities are implemented. Although direct effects to amphibians are more likely since contact with herbicide could be absorbed through the skin and effect metabolic activity, amphibians are likely to be under logs, rocks or leaves, making direct contact with chemicals less likely. Direct effects to other non-target plants occurring in these habitats could occur. Application methods, including direct application to target foliage or freshly cut stumps, would minimize the possibility for spills and/or direct contamination to non-target species.

Wildlife G03 sheet, the exposure HQ for aquatic plants and algae are greater than 1.0 for accidental spills. These are not of concern because:

- Triclopyr is relatively strongly adsorbed to (bound to the surface of) both organic matter and clay particles. Therefore it is fairly immobile in the environment, and unlikely to reach aquatic habitat. Even in the unlikely event that it might reach such habitat, it would probably be quickly bound to sediment or organic matter in the stream.
- With the provision of riparian buffer strips around streams, the risk of herbicide spills or movement into streams is further reduced.

Hazard quotients for exposure of terrestrial vegetation from runoff of triclopyr amine have hazard quotients greater than 1.0 in areas with more than 25 inches of rainfall per year. These values vary depending on the average annual rainfall in a given area and the scenarios assume that rain falls every 10 days. The typical value for an area with 50 inches of annual rainfall is 1.4. However, all proposed herbicide applications are to be

applied directly to the targeted vegetation; therefore by correctly following application procedures, impacts to non-targeted species would be minimal. Although some loss of terrestrial plants could possibly occur, there are mitigation measures already in place to protect sensitive species so overall effects should be minimal.

Triclopyr (ester), foliar application @ 1.4 lbs/acre

This will be applied in a mix containing 3oz triclopyr ester and 0.5 oz imazapyr and is applied lightly over the top to just speckle the vegetation. This mixture uses less active ingredient per acre than a formulation containing only triclopyr. The analysis was run at an estimated maximum application rate. Typical applications would use less than 1.4 lbs/acre.

Human health E02 sheet, directed ground spray (backpack), general exposure for workers, *upper* bound HQ = 2.0. Typical exposures are less than 1.0 at a value of 0.4. However, the upper bound exposure is most unlikely for the following reason:

- According to the Forest Service Southern Region Pesticide Specialist, the central HQ best reflects a realistic upper exposure and risk for workers using appropriate personal protective equipment and employing proper washing and hygiene habits. Forest Service personnel are required to follow these safety protocols whenever applying pesticides.

Human health E02 sheet, accidental exposure of a worker to contaminated gloves shows a typical HQ of 1.1. This is unlikely to occur because the scenario assumes that the contaminated glove will be left on the skin for 1 hour. Labeling instructions and worker protection standards require proper hygiene. Contaminated gloves should be removed immediately and both the contaminated skin and gloves should be washed with soap and water skin rinsed with water if contaminated.

The typical HQ for vegetation contact of an adult female in shorts and a t-shirt is 1.9 and the lower level is less than 1.0. However, herbicide application areas are signed to preclude accidental exposure and the scenario assumes contact occurs while the vegetation is still wet.

Wildlife G02 sheet, longer term exposure (90 days) of a large bird or large mammal to contaminated vegetation on site, had *upper* level HQ's above 1.0. Typical values were less than 1.0. The upper level hazard quotient is not a concern for the following reasons:

- There are no large mammal or large bird threatened or endangered species on these sites. In addition, large bird species of interest such as wood storks and bald eagles, do not consume vegetation. Large game species such as the wild turkey's diet consist mostly of insects, and hard and soft mast.
- The scenarios assume a diet composed of 100% contaminated vegetation from the site. Large mammals and large birds typically have fairly large home ranges. The

scenario also assumes that such vegetation will be consumed from the same sites for 90 consecutive days. These assumptions make the scenario quite unlikely.

- These HQs deal with individuals, not wildlife populations. As noted above, there are no large mammal or large bird T/E species that this is likely to affect on site.

Wildlife G03 sheet, the exposure HQ for aquatic plants, algae and fish had typical values greater than 1.0. from an accidental spill. This is not of significant concern because:

- Triclopyr is fairly strongly adsorbed to (bound to the surface of) both organic matter and clay particles. Therefore it is fairly immobile in the environment, and unlikely to reach aquatic habitat. Even in the unlikely event that it might reach such habitat, it would probably be quickly bound to sediment or organic matter in the stream.
- With the provision of riparian buffer strips on streams, the risk of herbicide spills or movement into streams is further reduced.

Hazard quotients for exposure of sensitive and tolerant terrestrial plants from runoff of triclopyr ester have hazard quotients greater than 1.0 for areas which receive more than 20 inches of annual rainfall. These values vary depending on the average annual rainfall in a given area and the scenarios assume that rain falls every 10 days. However, all proposed herbicide applications are to be applied directly to the targeted vegetation; therefore by correctly following application procedures, impacts to non-targeted species would be minimal. This will further protect non-targeted vegetation, including rare plants, from any direct or indirect impacts. Although some loss of terrestrial plants could possibly occur, there are mitigation measures already in place to protect sensitive species so overall effects should be minimal.

Imazapyr, foliar treatment @ 0.1 lbs/acre

This will be applied in a mix containing 3oz triclopyr ester and 0.5 oz imazapyr and is applied lightly over the top to just speckle the vegetation. This mixture uses less active ingredient per acre than a formulation containing only triclopyr. The analysis was run at an estimated maximum application rate. Typical applications would use less than 1.4 lbs/acre.

Wildlife G03 sheet, hazard quotients to aquatic plants and algae had typical exposures greater than 1.0 for accidental spills. While imazapyr does have the potential to reach aquatic areas through runoff, such actual exposure and risk are mostly unlikely. Directed foliar sprays using imazapyr should be done in July or August when material washed off leaves tends not to be picked up by roots of non-target plants, allowing good selectivity. Imazapyr appears to bind loosely to clay particles and organic matter. It has relatively low soil mobility; soil activity expresses itself during the period of spring leaf expansion but applications made from late June through mid September produce little or no evidence of soil activity. With the provision of riparian buffer strips on stream zones, the risk of herbicide spills or movement into stream zones is further reduced. Perennial, intermittent, and ephemeral streams would be protected by 100, 100 & 25-foot buffers

respectively, within which no imazapyr would be applied. Imazapyr might be able to move through the buffer, but are subject to dilution and mixing in transit. In addition, no imazapyr will be applied within 100 horizontal feet of lakes, wetlands, or perennial or intermittent streams or within 100 horizontal feet of any public or domestic water source. Exclusion zones will be clearly marked before herbicide application so applicators can easily see and avoid them.

Hazard quotients for exposure of sensitive terrestrial plants from runoff for imazapyr are greater than 1.0 for areas that receive more than 15 inches of rainfall per year. These values vary depending on the average annual rainfall in a given area and the scenarios assume that rain falls every 10 days. However, all proposed herbicide applications are to be applied directly to the targeted vegetation; therefore by correctly following application procedures, impacts to non-targeted species would be minimal. In addition, Imazapyr, the only herbicide proposed that has some degree of soil activity (only in the spring), will be applied from late June to mid September when the chemical has little or no evidence of soil mobility. This will further protect non-targeted vegetation, including rare plants, from any direct or indirect impacts. Although some loss of terrestrial plants could possibly occur, there are mitigation measures already in place to protect sensitive species so overall effects should be minimal.

APPENDIX C

Emergency Spill Plan

APPENDIX C

PESTICIDE EMERGENCY SPILL PLAN

Field personnel transporting or working with pesticides should familiarize themselves with this plan, as well as with the labels and MSDSs of all pesticides to be used in a project. A copy of this plan is to be carried to the field by all crews working with pesticides; a copy is also to be kept in an easily accessible location near the telephone at the district dispatch or reception desk.

Emergency procedures to follow when a pesticide spill occurs at the work site:

1. PROVIDE FOR CARE OF INJURED OR CONTAMINATED PERSONNEL

Immediately determine if any personnel are injured or contaminated. Each situation may differ, but the major and immediate effort should be to assist injured personnel and minimize further contamination. Accordingly, the following must be accomplished as rapidly as possible.

- A. If a fumigant or dangerous vapor is involved, put on the appropriate respirator or breathing device. REMEMBER, this is an emergency procedure, and not intended for prolonged exposure. Since many pesticides can produce toxic fumes or vapors, always ventilate enclosed areas to prevent build-up of toxic fumes.
- B. Remove injured or contaminated personnel from the spill site to a safe area.
- C. If eyes are contaminated with a pesticide, give first priority to washing them out, using portable eyewash bottles, or if these are unavailable, any clean water. Remove contaminated clothing from affected individuals, and wash pesticides off skin with detergent and clean water. If any pesticides have been ingested, see Material Safety Data Sheet for specific first aid measures.
- D. Immediately seek medical assistance for injured and contaminated personnel. Do not leave contaminated individuals alone unless essential to secure aid. If necessary, direct a third person to stay with the injured until a physician takes charge and has been advised of the actual or possible pesticide exposure.
- E. Watch for the following symptoms of pesticide poisoning: Eye irritation, skin irritation, gastrointestinal discomfort, dizziness, headache, nausea, vomiting, diarrhea, slurred speech, muscle twitching or convulsions, or difficulty in breathing.

2. SPILL IDENTIFICATION

Determine product name(s) for the chemical(s) spilled and check the label and Material Safety Data Sheet for immediate hazards. Shut off ignition sources and stop any smoking in case chemicals may be flammable. Isolate contaminated area and keep unnecessary people away.

3. NOTIFY (Field personnel contact dispatcher/receptionist for aid)

District Pesticide Specialist: Timothy Walker
Office - 706-485-7110, ext 119
Home - 706-485-9635
District Safety Officer: Jeff Matthews
Office - 706-485-7110, ext 103
Home - 706-816-0480

Give the following information: ***Chemical name, ***location of spill, ***compartment number and ***stand number (if known), ***road name, and ***estimated size of spill in gallons.

The District Pesticide Specialist will notify other key personnel and agencies as required (see attached notification list).

4. CONTAIN SPILL

Spilled pesticides must be contained as much as possible on the site where the spill has occurred. Keep spilled pesticides from entering streams, storm drains, wells, ditches, or water systems by following these procedures:

- A. Wear appropriate protective clothing. At a minimum, this will include suitable clothing for pesticide application, plus rubber or nitrile gloves and safety glasses or goggles. In addition, use coveralls or a rain suit, rubber boots or overshoes, or a respirator if extra protection is needed.
- B. Prevent further leakage from containers by repositioning them so that the damaged part of the container is above the level of the contents, or by applying rags, tape, or other materials at hand to temporarily seal the leak.
- C. Separate leaking containers from undamaged containers.
- D. Rope or flag off the area and post warning signs to keep unprotected personnel from entering.
- E. Confine the spill to prevent it from spreading. Encircle the spill area with a dike of sand or other absorbent material; rags or similar material may be used if necessary. If spilled material may flow toward sensitive areas, divert it by ditching.
- F. If the spill involves a small watercourse, dam it up to confine the spill if possible. If available, activated charcoal may be used to filter contaminated water. For larger

waterways, a log boom or baled straw may be used to contain the spill. Dam or divert the flow of clean water around the spill if possible. Some pesticides (such as Glyphosate and Diquat) may be inactivated by muddying the water.

- G. If the pesticide spilled is a liquid, cover it with absorbent material (kitty litter is ideal). If the spilled pesticide is in a dry formulation, cover it with a secured plastic tarpaulin to prevent it from becoming wet or being blown away. (NOTE: Unless this material can be reused in accordance with the pesticide label, it must be disposed of as a toxic waste.)
- H. DO NOT flush the spill into a ditch, sewer, drain, or off a road, since this will further spread the chemical necessitating a larger cleanup effort.

Vehicle spill kits contain necessary items for containing small spills (see attached list for items needed in vehicle spill kit). Large spills may require the use of a dozer and/or additional items from the storage facility spill kit, located at the following businesses:

Contact: Charlie Mathis (heavy equipment)
Address: Route 1, Box 214A, Haddock, Georgia 31033
Phone: 478-986-3319

Contact: Bill Coleman (heavy equipment/hay bales)
Address: 1015 Main Street, White Plains, Georgia
30678
Phone: 706-467-2446

Contact: Johnny Hallman (heavy equipment)
Address: P.O. Box 3409, Eatonton, Georgia 31024
Phone: 706-485-6951

5. CLEAN-UP

Spill containment is the objective of this emergency spill plan. Clean-up and disposal procedures are covered in FSH 2109.14, Chapter 33, Project Safety Plan; in the 1993 Emergency Response Guidebook ("Orange Book"), and in the Material Safety Data Sheets for each pesticide.

6. DOCUMENTATION

Document spill type, action taken, and any needed follow-up or assistance necessary in a letter to the Forest Supervisor, with cc to Regional Pesticide Specialist.

SUMMARY OF CLEAN-UP STEPS

DRY SPILLS

- a. Immediately cover powders or dusts with plastic or a tarpaulin to prevent the pesticide from becoming airborne. A fine mist of water may also be used to dampen the dust and reduce spreading. CAUTION: Too much water may dissolve the pesticide and move it into the soil.
- b. Sweep the material together, rolling the tarp back slowly as you do.
- c. Shovel the material into plastic bags or drums.
- d. Seal the bags and label them, identifying the pesticide and other contents.
- e. Store the containers of material in the pesticide storage building until the contents can be evaluated for disposal or re-use in a manner consistent with labeling.

LIQUID SPILLS

Pump or bail as much of the spilled liquid as possible into containers, then:

- a. Use absorbent material, such as commercially bagged clay, kitty litter, or sawdust to soak up the spill. Use only enough material to absorb the spill. Begin spreading the absorbent material around the edge of the spill, and work toward the center.
- b. Shovel the absorbent material and pesticide, along with any contaminated soil, into leak-proof containers.
- c. Label all containers.
- d. Store the containers in the pesticide storage building until the contents can be evaluated for disposal or re-use in a manner consistent with labeling.

NOTIFICATION LIST OF KEY PERSONNEL AND AGENCIES

1. District Pesticide Specialist - Timothy Walker
Home 706-485-9635
Office 706-485-7110 ext 119
2. District Safety Officer - Jeff Matthews
Home 706-816-0480
Office 706-485-7110 ext 103
3. Name and phone number of local medical facility to be used in event of an emergency:

Greene County: Boswell Memorial Hospital 706-453-7331
Jasper County: Jasper memorial Hospital 706-468-6411
Putnam County: Putnam General Hospital 706-485-2711
4. Name and phone number of local fire department(s):

Greene County, City Hall: 706-453-2200
Georgia Forestry Commission: 706-486-2466
Jasper County, City Hall: 706-468-6213
Georgia Forestry Commission: 706-468-6760
Putnam County, City Hall: 706-485-2531
Georgia Forestry Commission: 706-485-4071
(911) is available in all counties
5. Names and phone numbers of county law enforcement agencies:

Greene County Sheriff: 706-435-2222
Jasper County Sheriff: 706-468-6213
Putnam County Sheriff: 706-485-8557
6. Forest Pesticide Specialist - Ron Stephens
Home: 770-983-0782
Office: 770-297-3020

(Notify if spill is larger than 5 gallons)
7. State office of emergency services - Tom Bardenwarper
Home: 770-532-0146
Office: 770-297-3077

(Notify only if assistance is necessary or if required by state law)
8. USFS Region 8 Spill Coordinator - Paul Mistretta
Office: 404-347-3369
Email: pmistrettal@fs.fed.us
9. Pesticide manufacturers
List emergency numbers of the manufacturers of pesticides used on the district. These may be found on the pesticide labels and MSDSs

10. CHEMTREC - EPA number for technical assistance - 1-800-424-9300
(NOTE: Chemicals which we normally use are generally not on EPA's hazardous list; you may not be required to contact them. Doublecheck the MSDS for requirements)
11. EPA National Emergency Response Center - 1-800-424-9346
(Notify only if spilled chemical is on CERCLA Consolidated Chemical List)
12. Pesticide Safety Team of the National Agricultural Chemicals Association (for technical assistance) - 1-513-961-4300
13. Local sources of emergency equipment and supplies

Charlie Mathis: Heavy Equipment—Route 1, Box 214A, Haddock, Georgia
31033 Phone: 478-986-3319

Bill Coleman: Heavy Equipment/Hay Bales—1015 Main Street, White Plains,
Georgia 30678 Phone: 706-467-2446

Johnny Hallman: Heavy Equipment, etc.—P.O. Box 3409, Eatonton, Georgia
31024 Phone: 706-485-6951

RECOMMENDED PESTICIDE SPILL KIT CONTENTS

Storage Facility Kit

4 pairs nitrile gloves
2 pairs unvented goggles
2 respirators and cartridges (chemical resistant)
2 pairs rubber or neoprene boots or overshoes
2 pairs of coveralls or rain suits
1 roll of flagging or engineers' tape
1 dust pan
1 shop brush
1 dozen polyethylene bags with ties
1 gallon liquid detergent
1 polyethylene or plastic tarp
100 feet of rope
10 blank labels
1 ABC-type fire extinguisher
80 lbs absorbent material
3 gallons household bleach
1 square-point "D" handled shovel
1 55-gallon open-head drum, or 50-gallon plastic trash can with lid
1 18-inch push broom with synthetic fibers
1 bung and 1 bung wrench for 2.5 inch and 0.75 inch bungs
1 drum spigot
30 ft. of .5 inch polyethylene tubing or 150 feet of garden hose

Vehicle Kit

2 pairs nitrile gloves

1 pair unvented goggles

1 respirator and cartridges

1 pair of rubber or neoprene boots

1 dust pan

1 shop brush

6 polyethylene bags with ties

1 pint liquid detergent

1 polyethylene or plastic tarp

10 blank labels

1 ABC-type fire extinguisher

10-30 lbs. absorbent material

2 eyewash bottles

1 round-point shovel

1 portable weatherproof container for storage and transport (may also be used for cleanup)

APPENDIX D

Biological Evaluation

BIOLOGICAL EVALUATION
 CHATTAHOOCHEE-OCONEE NATIONAL FOREST
 OCONEE DISTRICT
 HERBICIDE USE IN RESTORATION AREAS AFFECTED BY
 SOUTHERN PINE BEETLE

I. INTRODUCTION

The purpose of this biological evaluation (BE) is to document any potential effects of proposed herbicide use in southern pine beetle restoration areas, on Endangered, Threatened, and Regional Forester Sensitive (TES) species and to ensure that land management decisions are made with the benefit of such knowledge.

This BE is also written to ensure Forest Service actions do not contribute to loss of viability of any native or desired nonnative plant or animal species. The BE contributes to meeting viability objectives by focusing analysis on those species most at risk of losing viability, namely proposed, endangered, threatened, and sensitive species, and ensuring their habitat needs are met. Habitat to support viable populations of other more common species is provided through Forest Plan requirements related to habitat diversity.

II. Project Area and Description

The project area is located within a portion of the Oconee National Forest. The project area consists of the following areas. Alternative C would be the same sites with mechanical (hand) treatments

The following table summarizes activities proposed in Alternative B:

Table 2-2: Stands Proposed for Treatment – Alternative B

Compartment -Stand	Acres	Pre Treatment Forest Type	Post Treatment Forest Type	Site Preparation (1)	Release (2)	Forest Plan Management Prescription
5-06	18	Loblolly Pine	Longleaf	X	X	3.B
5-50	10	Loblolly Pine	Longleaf	X	X	3.B
6-08	3	Loblolly Pine	Longleaf	X	X	3.B
6-11	5	Loblolly Pine	Longleaf	X	X	3.B
6-07	15	Loblolly Pine	Longleaf	X	X	3.B
7-05	5	Loblolly Pine	Longleaf	X	X	3.B
8-08	2	Loblolly Pine	Longleaf	X	X	3.B
8-08	5	Loblolly Pine	Oak Hickory	X	X	3.B
8-52	5	Loblolly Pine	Longleaf	X	X	3.B
9-03	4	Loblolly Pine	Longleaf	X	X	3.B

Compartment -Stand	Acres	Pre Treatment Forest Type	Post Treatment Forest Type	Site Preparation (1)	Release (2)	Forest Plan Management Prescription
9-08	3	Loblolly Pine	Longleaf	X	X	3.B
9-12	4	Loblolly Pine	Longleaf	X	X	3.B
9-13	20	Loblolly Pine	Longleaf	X	X	3.B
9-14	7	Loblolly Pine	Longleaf	X	X	3.B
9-16	3	Loblolly Pine	Longleaf	X	X	3.B
107-22	5	Loblolly Pine	Oak Hickory	X	X	8.D.1
107-24	10	Loblolly Pine	Lob/Oak	X	X	8.D.1
1115-18	10	Loblolly Pine	Longleaf		X	8.D.1
115-32	7	Loblolly Pine	Longleaf/Oak	X	X	8.D.1
115-32	10	Loblolly Pine	Lob/Oak		X	8.D.1
115-35	10	Loblolly Pine	Oak Hickory	X	X	8.D.1
115-37	10	Loblolly Pine	Lob/Oak		X	8.D.1
115-37	15	Loblolly Pine	Lob/Oak	X	X	8.D.1
119-01	7	Loblolly Pine	Lob/Oak		X	8.D.1
125-04	7	Loblolly Pine	Lob/Oak	X	X	8.D
141-06	7	Loblolly Pine	Lob/Oak	X	X	8.D
144-07	15	Loblolly Pine	Lob/Oak	X	X	8.D
144-35	10	Loblolly Pine	Lob/Oak	X	X	8.D
144-37	7	Loblolly Pine	Lob/Oak		X	8.D
150-01	30	Loblolly Pine	Lob/Oak	X	X	8.D
152-10	15	Loblolly Pine	Lob/Oak	X	X	8.D
153-01	25	Loblolly Pine	Lob/Oak	X	X	8.D
153-02	15	Loblolly Pine	Lob/Oak	X	X	8.D
153-19	10	Loblolly Pine	Lob/Oak	X	X	8.D
154-01	20	Loblolly Pine	Lob/Oak	X	X	8.D
157-02	10	Loblolly Pine	Lob/Oak	X	X	8.D
157-12	10	Loblolly Pine	Lob/Oak	X	X	8.D
161-02	10	Loblolly Pine	Lob/Oak	X	X	8.D
166-30	5	Oak/Willow	Privet Control	X	X	3.B
166-31	5	Oak/Willow	Privet Control	X	X	3.B
170-62	10	Sweetgum/Pop	Privet Control	X	X	4.E.1
172-05	4	Loblolly Pine	Oak		X	9.H
176-01	10	Loblolly Pine	Lob/Oak	X	X	9.H
180-10	10	Loblolly Pine	Lob/Oak	X	X	9.H
Total Acres	428					

The majority of the area is allocated in 3.B Experimental Forest (Hitchiti is also RCW habitat in addition to 3.B) and Management Area 8.D and 8.D.1, which is managed habitat for the RCW (See pages 3-138-144). This project area was designated for RCW management due to the proximity of existing RCW cluster sites to the Piedmont National Wildlife Refuge (PNWR). The Forest Service and PNWR work jointly in the management of the RCW as a Recovery Population. A minor amount of the project area is in 9.H Management Area – Restoration of Plant Association to their Ecological Potential and 4.E.1 Cultural/Heritage Areas (Schull Shoals). See project map.

III. Proposed Action

The following is a general description of the proposed action. Maps showing site specific treatments that are proposed are included as Appendix F.

The following is a summary of the treatments proposed:

- Herbicide treatment to prepare the site for regeneration of longleaf pine in 14 stands totaling 104 acres. This would be followed by a release treatment within five years of planting, if necessary, within a portion of the following compartment and stand numbers: (Compartment/Stand) 5/06, 5/50, 6/08, 6/11, 6/07, 7/05, 8/08, 8/52, 9/03, 9/08, 9/12, 9/13, 9/14, and 9/16. All of the sites are located on the Hitchiti Experimental Forest and contain a loblolly pine over-story that was killed by Southern Pine Beetle outbreaks, and provides habitat for the Red-cockaded Woodpecker
- Herbicide treatment to prepare the site for regeneration of oak in portions of three stands totaling 20 acres. This will be followed by a release treatment within five years of planting, if needed, within a portion of the following compartment and stand numbers: (Compartment/Stand) 8/08, 107/22, 115/33, and 115/35. These sites contained offsite loblolly pine that will be restored to a mixed hardwood (oak) forest type. This proposed action will contribute to the viability of native and other desirable wildlife species. The action will provide food and shelter to many wildlife species relevant to MIS species.
- Herbicide treatment to prepare the site for regeneration of a mixture of pine and oak in portions of 18 stands totaling 236 acres. This will be followed by one release treatment within 5 years of planting, if needed, within a portion of the following compartment and stand numbers: (Compartment/Stand) 107/24, 115/32, 115/37, 125/04, 141/06, 144/07, 144/35, 150/01, 152/10, 153/01, 153/02, 153/19, 154/01, 156/02, 157/12, 161/02, 176/01, and 180/10. These stands contained a loblolly pine over-story that was killed by the Southern Pine Beetle. The proposed treatments will help to re-establish a mixed pine-oak community in

these locations. These areas will benefit wild turkey, quail, and white-tailed deer by providing hard mast. We will be meeting Forest plan objectives by restoring hardwoods and jointly improving diversity for many wildlife species.

- Herbicide treatment to release planted and natural pine and oak trees in portions of 6 areas, totaling 48 acres. The areas are located within a portion of the following compartment and stand numbers: (Compartment/Stand) 115/18, 115/33, 155/37, 119/01, 144/37 and 172/05. These areas contained a loblolly pine over-story that was killed by the Southern Pine Beetle. The proposed treatments will help desired pine and oak regeneration that is already present become re-established into a mixed pine-oak stand type. This proposed action will contribute to the viability of native and other desirable wildlife species. The action will provide food and shelter to many wildlife species relevant to MIS species.
- Herbicide treatment for a research study, by the Southern Research Station, for the efficiency of a combination of mechanical and herbicide treatments for Privet (Invasive species) control within the Schull Shoals Experimental Forest. Privet control is an important part of ecosystem restoration. The study area consists of approximately 20 acres within a portion of stand 30 and 31 in compartment 166; and stand 62 in compartment 170. This proposed treatment is an action to eradicate the privet which is on the Forest Invasive Weed list.

Treatment of stump sprouts and single stems of selected species for site preparation is proposed using one of the following application methods 1) basal stem spraying (for trees and shrubs less than 3 inches in diameter) with an herbicide with the active ingredient triclopyr (ester formulation); and 2) hack and squirt method (for trees and shrubs between 3 and 8 inches in diameter) with an herbicide with the active ingredient triclopyr (amine formulation) or glyphosate, depending on the time of year of application. 3) Cutting trees and then treating the cut stumps with an herbicide with the active ingredient triclopyr (amine) or glyphosate to prevent stump sprouts from the cut trees from becoming established. Treatment of species such as red maple, sweet gum, and various under-story brush species would occur throughout the stand. The objective is to control competing vegetation to allow species such as oak or pine to re-establish. This proposed action will help provide future foraging and nesting habitat for the RCW while providing MIS species with suitable habitat.

Release of planted and natural oak and pine trees would occur with a spot foliar treatment with an herbicide mixture containing the active ingredients triclopyr (ester) and imazapyr.

Application rates for herbicides are discussed in further detail in Chapter 3, Section 3.1.2, Environmental Effects of Alternative B on Health and Safety and in Appendix B, Results of the Risk Assessment.

Proposed treatments for release will only occur if they are determined to be needed after stocking checks are completed. Some sites may not require treatment, thus the proposed

treatments represent the maximum, not the actual, number of acres that will be released. Additional site preparation may be done using mechanical methods or prescribed fire but these treatments would be proposed on a site specific basis and covered under a separate NEPA document.

IV. Purpose and Need

The purpose and need of the Proposed Action is to:

- Improve the existing condition and composition of forested stands with Southern Pine Beetle mortality.
- Improve the existing condition of acorn mast production and wildlife habitat;
- Maintain and restore natural communities
- Restore long-term RCW habitat conditions in areas impacted by SPB mortality.

The existing condition of the proposed treatment areas has been evaluated and compared against the desired future condition for the area as described in the Forest Plan. Where resources in the project area are found to be outside the desired future condition, opportunities for moving the resources towards the desired future condition exist.

Currently, stands proposed for treatment are not meeting Forest wide goals and standards. These stands have suffered heavy over-story mortality due to Southern Pine Beetle infestations. Many of the stands proposed for treatment contained species such as offsite loblolly or sweetgum on sites that are ecologically suited to oak-pine or mixed hardwood composition. The proposed treatments will lead to re-establishment of species compositions such as oak or oak - pine in areas that have been impacted by the Southern Pine Beetle. Sites proposed for longleaf planting will help sustain needed habitat for the Red-cockaded Woodpecker. Research on Privet control (invasive species) is consistent with the management objectives for the Schull Shoals Experimental Forest and Schull Shoals Archaeological Area. Stands are proposed for treatment in order to meet the following Forest Wide Goals and Management Prescriptions:

Consultation with the USFWS was initiated on April 27th, 2004 by letter, requesting recommendations for SPB treatments within the tentative Sub-HMA areas. Recommendations were to make arrangements for treatment (See project file).

Consultation was initiated on August 24th, 2005 with USFWS, to review the project areas and agree that action was needed to prevent future loss of foraging and nesting habitat, control invasive species, and restore natural plant communities.

V. Species Evaluated

There are 116 species (26 Federally listed and 90 Sensitive) on the Chattahoochee-Oconee National Forest PETS list. List was updated for TES species from USFWS and a new Sensitive Species list was reviewed by Regional Forester on August 7, 2001. From this list, potentially affected species were identified by (1) reviewing their general habitat preferences, (2) consulting records of known locations of PETS species prepared by the Georgia Natural Heritage Program (GNHP) historical records, and (3) consultations with other agencies and universities as well as reviewing data from Neotropical Migratory Bird (NTMB) Point Samples, Department of Natural Resources Bald Eagle Flights, Breeding Bird Census Routes, PETS Risk Assessment for the Oconee National Forest, and general observations. **The following 17 species are within the range of the Oconee NF based on a review of the above sources.**

**PETS SPECIES LIST – OCONEE NATIONAL FOREST
THREATENED AND ENDANGERED SPECIES (FY2001)**

Species	Common Name	Federal Status
PLANTS:		
<i>Trillium reliquum</i>	Relict trillium	Endangered
VERTEBRATES:		
<i>Haliaeetus leucocephalus</i>	Bald eagle (nests)	Threatened
<i>Mycteria americana</i>	Woodstork (foraging habitat)	Endangered
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered

REGIONAL FORESTER’S SENSITIVE SPECIES (2001REVISION)

Common Name	Scientific Name
BIRDS	
Bachman's sparrow	<i>Aimophila aestivalis</i>
Migrant loggerhead shrike	<i>Lanius ludovicia migrans</i>
INSECTS	
Margarita river skimmer	<i>Macromia margarita</i>
Appalachian snaketail	<i>Ophiogomphus incurvatus</i>
MUSSELS	
Inflated floater	<i>Pyganodon gibbosa</i>
FISH	
Ocmulgee shiner	<i>Cyprinella callisema</i>
Bluestripe shiner	<i>Cyprinella callitaenia</i>

Altamaha shiner	<i>Cyprinella xaenura</i>
Robust redhorse	<i>Moxostoma robustum</i>
PLANTS (Vascular)	
Schwerin's false indigo	<i>Amorpha schwerinii</i>
Oglethorpe oak	<i>Quercus oglethorpensis</i>
Bay starvine	<i>Schisandra glabra</i>

Of these, all but 4 were dropped from further consideration because their range does not extend into the project area or their specific habitat requirements are not found in the areas of proposed activities. (Also, See Appendix A). The following presents the rationale for eliminating these species from further consideration for this proposed action.

Plants:

No locations of PETS plant species were identified in the GNHP database for the project area. In addition, contractor Lisa Kruse Schmidt conducted a 2004 and 2005 plant surveys on the Oconee National Forest. There were no PETS plant species found within the project areas of pine and pine-hardwood habitat, except for the Oglethorpe oak in Compartment 109. The extent of the area occupied by Oglethorpe oak is known and documented. The 1998 & 1999 Plant Survey covered a majority of the area. Previous surveys conducted reflect that information that no TES plants have been identified within 90 percent of the areas listed in Table 2.2 A plant survey conducted in the spring (2004) and summer (2005) by Lisa Kruse (Botanist contractor), provides information on the project areas and confirms there is unlikely any PETS plant species that would be adversely affected by the proposed project..

Aquatics:

The CATT (Center for Aquatic Technology Transfer) in 2002 and DNR Stream Team in 1998 surveyed several streams for fish throughout the project area. The emphasis of the CATT surveys was to discern the presence or absence of the Altamaha, Bluestripe, and Ocmulgee shiners, both listed as Forest Service sensitive species.

In addition, in 1995, surveys were conducted in a number of the compartments proposed for thinning. These compartments include: 107, 125, 137, 141 and 145. Streams sampled include: Murder Creek, tributary to Murder Creek, Rock Creek, Gladly Creek, tributary of Cedar Creek and North Creek (tributary to Little River). These are all warm water streams with fish communities in small headwaters consisting of banded sculpins, creek chubs, bluehead chubs, yellowfin shiners, blackbanded darters, Christmas darters and rosyface chubs. Surveys in lower stream sections were dominated by largemouth bass, redeye bass and redbreast sunfish. In addition, Gladly Creek had the following mussels: *Villosa delumbis* and *Elliptio lugrubris* (identification by Eugene Keferl, June 1996). Neither of these mussels is listed federally or by the state as a species of concern.

John Alderman conducted surveys within the Ocmulgee and Oconee watersheds on or near the National Forest boundaries in 2002. These tributaries included Gladys Creek, Little Gladys Creek, Murder Creek, Big Indian Creek, Cedar Creek and Big Cedar Creek (Jones County), Cedar Creek (Jasper County), Shoal Creek, Town Creek, Fishing Creek, Greenbriar Creek, Falling Creek, Beaverdam Creek, Rock Creek, Wise Creek, Little River and the main stems of the Oconee and Ocmulgee rivers. Seven species of native freshwater mussels were found in the above streams. Of these seven species, the Georgia elephant-ear (*Elliptio dariensis*) and the Altamaha pocketbook (*Lampsilis dolabraeformis*) are considered locally rare (G3) and are on the 2004 Chattahoochee-Oconee National Forest Locally Rare list. Both of these mussels were found approximately 10 miles downstream (south) of the proposed project area. The inflated floater (*Pyganodon gibbosa*), a mollusk on the Forest Service Sensitive List, was not found during these surveys. More intensive surveys of all of the available microhabitats should be sampled in the future to completely understand the mollusk community. The inflated floater lives in soft mud and in sand bars generally found in slow moving water in large rivers. This species is known to occur within the Altamaha River Drainage. The project areas to be thinned are not immediately adjacent to any large river section, the type of habitat required by the inflated floater (per conversation with Mitzi Cole, Fisheries Biologist, 2004). The Ocmulgee shiner, Bluestripe shiner, Altamaha shiner, and Inflated floater are listed as being present in the larger tributaries and creeks within the project analysis area within Jasper and Putnam Counties (See Georgia Rare Species information for Jasper and Putnam County within project file). Areas where these species have been found are not within one mile of the proposed locations. The proposed action of vegetation management would not directly impact these species. Robust Redhorse was introduced into the Ocmulgee River 2002. The robust redhorse will be further evaluated further in the document.

Terrestrial Animals:

Bald eagles occur along the seacoast and shores of large rivers and lakes. Nests are almost always located either along a shoreline or within two miles of the nearest large body of water in a live tree. Bald eagles use Lake Oconee, Lake Sinclair, and Oconee River for foraging. Some reports of eagles using the Ocmulgee River have been reported. Current observations this past March have identified a nest on the Oconee National Forest. Proper mitigations have been made to protect the site. GDNR and USFWS have been notified. No nest have been found south of I-20 on national forest. The eagle appears to be a transient resident on the Ocmulgee River and Lake Oconee, using these as areas for roosting and feeding on fish. There are nesting eagles below Wallace Dam on Lake Sinclair. Rum Creek Management Area, located west of the project area, have eagle nests on Lake Juliette located approximately 15 miles from the project area. Lake Jackson is north of the project area and is a large body of water that also hosts a nesting pair of bald eagles. Based on existing information and knowledge of habitat suitability, I conclude that suitable habitat for this species does not occur within the affected area of

this project. Therefore, existing information is adequate to conclude the project would have no effect, and no further inventories were conducted to support his analysis.

Wood storks inhabit wet meadows, swamps, marshes, ponds, and coastal shallows. They have been observed foraging on the Oconee National Forest at Dyar Pasture. The nests of wood storks are usually found in large colonies, in trees within the swamps and marshes. They are not known to use pine trees or upland forested habitat. No wood stork nest or rookeries have been observed within the area affected by this project, and none are found within the project area. Based on existing inventories, I conclude that this species is not likely to occur in areas affected by this project. Therefore, no further inventories for this species have been done in support of this project.

The loggerhead shrike is not a Neotropical migrant. There are two Georgia Populations, a year round breeding population (relatively small) and a winter population that includes the year round birds along with the birds from the north. Both are high conservation priorities (per conversation Nathan Klaus, June 2003). Point surveys have identified the species within the Jasper County area. Point count information did not reveal the presence of the species near the project area. It is likely the species could occur near the project area due to the habitat requirements. Loggerhead shrikes can be expected near agricultural landscapes where there is enough open country in the surrounding landscape to support a population. There are several acres of pasture and open country used for agriculture in the surrounding area that would support a population such as pastures and agricultural fields. The removal or cutting trees, live or dead, would not propose a threat or have a negative effect on the Loggerhead Shrike. Treatments of thinning and prescribed burning would benefit the species. Therefore, the proposed action should not impact the habitat for the species.

Rafinesque's big-eared bats are not listed on the GNHP database for the Putnam County area. This species likes caves, abandoned sheds, and snags. This species of bat has not been identified on this forest. Currently, there are no known caves, cliffs, or abandoned sheds within the area. Snags are however throughout the forest but no identification of this species has been made. A bat survey conducted by the University of Georgia in the 1980s by Josh Larem did not identify this species. A survey done in 2001 in the Greene County area by Dr. Steven Castleberry and graduate students also did not detect the species. There was limited optimal habitat available. The Lake Sinclair Area is similar to the areas that were surveyed in the Greene County area. A copy of the study and species listing is available at our district office. The sampling was done with Anabat Sensoring system. Therefore, the information that is provided shows that the species is not likely to occur within the project area and the proposed project should not impact the species.

The red-cockaded woodpecker and Bachman's sparrow are known to occur, or have suitable habitat, within the area affected by this project. They are analyzed in more detail within this document.

Insects:

Allegheny Snaketail: There is much taxonomic uncertainty in this aquatic species complex, with a great deal of intergradations among specimens (Krotzer and Krotzer 1995, Vogt 1995, Tennessen et al. 1996). For this reason, some authors have chosen to refer to this complex as *Ophiogomphus incurvatus*, Appalachian snaketail (Krotzer and Krotzer 1995). The Appalachian snaketail complex (of which the Allegheny snaketail is a subspecies) occurs in shallow riffles of low gradient streams with a sand/gravel substrate. The single Georgia record for this species was collected in 1979 near Helen, Georgia (Carle 1982) over 100 miles from this project area.

The aquatic insects are known or have potential to occur in the drainages north in the Chattahoochee National Forest. Those areas are over 100 miles away from the project area. To our knowledge and based on information discussed with the University of Georgia, DNR, and Forest Ecologist there could be subspecies of the Appalachian snaketail or Margarita River skimmer here but no identifications have been made of the insects within the Oconee National Forest. The proposed project will implement general protection and mitigations measures that will not impact the species listed. No new stream crossings will occur. Georgia State Best Management Practices will be implemented and removal of hazard trees will follow Forest Wide Standard and Guidelines in water quality to avoid and prevent adverse impacts to any aquatic species. Riparian corridor management guidelines will be used when activity takes place near any streams.

Margarita river skimmer - The Margarita river skimmer, a Forest sensitive species, inhabits shallow pools between riffles in undercut banks and leaf packs (S. Krotzer, pers. comm. with K. Wooster). It has been reported from North Carolina, South Carolina, Virginia, Georgia (Brick 1983) and Alabama (S. Krotzer, pers. comm. with K. Wooster). The Georgia record is a single 1939 report from Lumpkin County (Kormandy 1960). Suitable habitat for this species occurs in streams. There are a few perennial streams within the project area, but they will not be affected by the proposed action. According to the information obtained on this species, it is unlikely that it would occur within the project area. The project area is over one hundred miles from the Georgia record siting of the species.

VI. Status of the Species and Habitat in the Project Area and Evaluation of Effects

Oglethorpe Oak

This species occurs in Compartment 109. However, this is not near the proposed project area. Project location is 5 miles from the area where Oglethorpe oaks have been identified. This species usually occupies moist, low-lying sites, which are not usually full pine stands. The majority of the proposed areas will be pine and pine-hardwood areas that will not have the Iredell soils that reflect the possible presence of the Oglethorpe oak. Mitigations will be made if areas meet the soil requirements, or an Oglethorpe oak is present. Oglethorpe oaks would not be cut and proper procedures for release of the stems around the tree would be encouraged. Based on the plant survey

information and soil information, further surveys are not needed at this time. Recent evaluation of the areas by maps and conversations with Tom Patrick (March, 2003) provide sufficient information that the proposed action would not impact the species.

Red-cockaded Woodpecker

This species currently occupies habitat on the south end of the district and the Piedmont National Wildlife Refuge within the project area. It is most abundant on the Hitchiti Experimental Forest (14 active cluster sites) and the Piedmont National Wildlife Refuge (39 cluster sites). One active and one inactive cluster are located in Compartment 114. The areas that have had RCW use, or contain recruitment stands are Compartments 1,2, 3 5, 8, 9, 107, 113, 115, 117, 118, and 119. These are located along the boundary of the PNWR. This species uses open pinewoods, which can be longleaf, loblolly, shortleaf, or slash. Preferred habitat is generally of mature trees with little or no midstory (resembling a park-like stand). RCWs nest and roost each day in live pine trees. The dead pine trees (snags) created by the SPB infestation are an ephemeral foraging habitat, which will soon disappear. RCW are located in the project area and protection from further SPB infestation is necessary to provide for future foraging and nesting habitat. Currently there are no active cluster sites within the project area (SPB damaged stands). Several acres of potential recruitment areas for the RCW exist within the project area. The immediate effect of reducing the stems within the project area may lose some foraging habitat; however, long-term, this habitat would be lost along with a lot more if no action is taken. SPB infestations have been serious during the past couple of years. This infestation has occurred because of the lack of reducing the stems per acre. Therefore, the release and planting will result in a cumulative beneficial effect, since it would restore lost habitat. Based on the information that is within project file, RCW EIS Standards and Guidelines, general observation, and requirements of the Recovery Plan, I conclude that the species would not be adversely affected by the propose action for release and planting to improve the foraging and nesting habitat for the RCW A no action may adversely affect the species and result in a violation of the Endangered Species Action, Section 7, RCW EIS guidelines, Recovery Plan, and our current Forest Plan.

Bachman's Sparrow

This species is found within open southern pine forests subject to frequent fires. The specific habitat this species prefers is large areas of well-developed bunch grass and herb layer with limited shrub and hardwood midstory. This bird has been detected by Point counts done during the nesting season for Neotropical birds. Bird inventories are done on the forest yearly. Reports from the GDNR and the PNWR found several RCW sites in the PNWR with Bachman sparrows present last year. Bachman Sparrows have been identified in Compartment 114. Even though this species has not been reported on the Oconee National Forest in the past, it did occur within some RCW stands last year within the RCW areas. The proposed action might disturb a few individuals, but it is unlikely due to low density. Overall, it should be more beneficial for the Bachman's Sparrow to continue maintaining RCW habitat by doing some vegetation control. Therefore, the proposed activity may directly disturb a few individuals, but the short and long term cumulative effects to the habitat may benefit the species.

Robust Redhorse

According to the GDNR, the robust redhorse does not occur north of Lake Sinclair dam. Areas where the robust redhorse have been discovered are located south of Milledgeville, Georgia. Reintroduction of the species into the Ocmulgee River was done in 2002. To our knowledge and based on surveys, these are the areas where the species has been identified. The project area is south of where the reintroduction occurred. The proposed action of vegetation management would not directly impact the species due to the location of the project area. The nearest project area location (C-107) is located over one mile east of the Ocmulgee River and does have tributaries would eventually flow into the Ocmulgee River. Currently a recovery plan is being developed to help make sure the species is not listed as endangered. Robust Redhorse Conservation Committee (RRCC) and GDNR Recovery Team meet annually to discuss the locations and progress of the studies of reintroduction and management objectives. Information based on annual reports and consultation with Jimmy Evans helps support my decision that the proposed action to implement vegetation management by thinning the project areas will not impact the robust redhorse.

VII. Cumulative Effects

Implementation of Forest standards and guidelines including maximum opening size, snag/mast requirements, burn parameters, and water quality standard and guidelines all assist in avoiding adverse cumulative effects on PETS and wildlife species. Adherence to these standards and guides assist in maintaining habitat for PETS species on the Forest level. Any future action requires the appropriate analysis including cumulative effects on PETS species and their habitats.

Surveys have been completed on majority of the acres and continue to be conducted in portions of the Forest to determine presence and distribution of various wildlife and plant species (including the PETS listing of species; See Project File). Consultation between the FS Biologist and the biologist of the USFWS, GNHP, and GDNR biologist is maintained for occurrences and other records of PETS species on the Forest, refuge, wildlife management areas, and surrounding private lands. All records and information is shared between the agencies to provide information for all future management activities.

Future management activities and project locations will be analyzed utilizing any new information available on PETS species. For Sensitive species, mitigating measures will be implemented to maintain habitat for these species on the Forest, and to prevent future listing under the Endangered Species Act (ESA). The implementation of these strategies will assist in avoiding cumulative effects n PETS species and their habitats.

The analysis of risk of herbicide use to wildlife was conducted in a manner similar to the human health risk assessment. The basis for comparison, as suggested by the U.S. Environmental Protection Agency (EPA 1986) in their document on environmental risk assessment, is the species LD50 and LC50 (median lethal concentration). The Region 8 risk analysis uses laboratory toxicity data on species most closely related to a series of

representative wildlife and aquatic species of the National Forest of the Southeast (FEIS Vegetation Management in the Coastal Plain/Piedmont, Appendix A, p.1-10).

The active ingredient in Accord is glyphosate. It is generally recognized to be of low toxicity in the environment. Glyphosate used in weed and shrub control does not adversely affect deer use of treated habitat areas for at least the first year after treatment. In a study to evaluate the direct effects of glyphosate on small mammals no adverse effect on reproduction, growth or survival were observed in populations of deer mice during the year following treatment. Glyphosate is slightly toxic to birds based on the acute oral LD50 of greater than 2,000 mg/kg in bobwhite quail. Avian reproduction studies yielded no reproductive effects at dietary exposure levels of up to 1,000 ppm. Residue and metabolism studies have indicated that glyphosate is incompletely absorbed across the gastrointestinal membranes and that in the vertebrates tested, there is minimal metabolism or retention by tissue and rapid elimination of residues. It is relatively non-toxic to insects based on the 48-hour acute toxicity of greater than 100 ug/bee in honey bees (FEIS Vegetation Management in the Coastal Plain/Piedmont, Appendix A, pp. 6-8,6-9). Accord can be used around wetland areas. Rarely to herbicides reach high concentrations in aquatic systems. Glyphosate is rated moderately to slightly toxic to fish (dependent of species of fish).

Imazapyr is the active ingredient for Arsenal, used for release. It has a low order toxicity for fish and wildlife. Imazapyr is slightly toxic to mammals based on acute LD50 ranging from greater than 2,000 mg/kg in mice to greater than 5,000 mg/kg in rats. Technical imazapyr and Arsenal formulation is slightly irritating to the eyes and skin, but no teratogenic effects have been observed in rats or rabbits. Imazapyr is eliminated in the urine and feces and does not appear to accumulate in the tissues of animals. Imazapyr is characterized as practically nontoxic to birds. Acute oral LD50 of imazapyr is greater than 2,150 mg/kg (HDT) in bobwhite quail and mallards. No adverse effects have been observed at either of the doses. Imazapyr is relatively nontoxic to insects. The LD50 for honey bees are greater than 100 ug/bee (HDT), and the Arsenal formulation is greater than 25 ug/bee (HDT), no effects were observed at either of these doses (FEIS Vegetation Management in the Coastal Plain/Piedmont, Appendix A, pp. 6-9).

Triclopyr is the active ingredient on Garlon 4, used for release. It is moderately toxic to mammals based on LD50 that range from 310 mg/kg to 729 mg/kg. Based on acute oral and dietary studies, triclopyr, is slightly toxic to birds. It is relatively non-toxic to insects, based on acute contact LD50 greater than 60 ug/bee in honey bees (FEIS Vegetation management in the Coastal Plain/Piedmont, Appendix A, p.6-15).

Garlon 4 and Accord have low toxicity to wildlife and decomposes rapidly in sunlight (FEIS Vegetation Management in the Coastal Plain/Piedmont, Appendix C, Table 1, p. C-4). Method of application for both chemicals would be very selective. Effects on wildlife and their habitat would be little to none.

Overall effects of herbicide on wildlife would be small and insignificant. This is due to the physical characteristics of the herbicides and the selective method of application, according to the FEIS Vegetation Management in the Coastal Plain/Piedmont.

The immediate effect in the project area will be the establishment of shade intolerant, early successional species. The treated areas will allow sun light to reach the Forest floor, which in turn enhances understory herbaceous species and early successional woody species (grasses, forbs, shrubs, dogwoods, oaks etc.). Removal of undesirable species changes the environment by increasing the penetration of light, temperature of the mineral soil, and the availability of moisture and nutrients within the area. Use of herbicides will reduce the understory species and invasive species therefore giving the young pine trees and oaks sufficient nutrients, sunlight, and water to increase growth. This will produce a more succulent, but not highly preferred browse. The area will be regenerated to longleaf, loblolly pine and oaks. Herbicide applications can be used to maintain or modify diversity. Herbicide applications will increase the vigor and growth of trees. Canopy closure will in time decrease the amount of shade intolerant species, and favor those shade tolerant mid-to-late successional plant species. The Forest successional stages generally determine which species will inhabit that area. Because there are no known locations of any PETS plant species in the project area, there will at this time be no long term affects on any PETS species. If before or during treatment a PETS species is located, proper mitigation will take place immediately to protect that species.

VIII. Summary Of Determination of Effects

The proposed action is not likely to adversely affect the RCW. The proposed action would be beneficial for future foraging and nesting habitat. The proposed action will have no impact on the Oglethorpe oak. The Bachman sparrow should benefit from protected habitat associated from the proposed vegetation control activities that are proposed.

Plants		
Oglethorpe Oak	<i>Quercus oglethorpensis</i>	no impact
Animals		
Red-Cockaded Woodpecker	<i>Picoides borealis</i>	not likely to adversely affect
Bachman’s Sparrow	<i>Aimophila aestivalis</i>	beneficial impact
Robust Redhorse	<i>Moxostoma robustum</i>	no impact

This Biological Evaluation is based on existing available information which includes species and habitat relationships, species range and distribution, population and species occurrences derived from the past field surveys or observations. The amount, condition and distribution of suitable habitat for listed and sensitive species was also used to make determinations. This document is in compliance with guidance and direction provided in revision of the Chattahoochee-Oconee National Forest Land Management Plan, January 2004.

VIII. Data Sources

USFS Plant Inventories
GNHP Occurrence Records
University of Georgia and DNR Fisheries data
USFS/DNR Fisheries Data
District Monitoring Data
Vegetation and Timber Data
Robust Redhorse Conservation Committee

IX. Consultation With Others

William Nightingale, District Ranger
Elizabeth Caldwell, District Biologist
John Moore, Brender (Hitchiti) Forest Project Coordinator
Jimmy Rickard, USFWS Biologist Athens Office
Jimmy Evans, GDNR Fisheries Biologist
Cindy Wentworth, USFS Forest Botanist
James Wettstaed, USFS Archeologist
Leigh Ann McDougal, USFS Mussel Specialist
John Petrick, Forest Planner
Mike Hurst USFS Biologist
Bobby Bonds, GDNR Wildlife Biologist
Tim Walker, Forest Health
Ray Ellis, USFS Natural Resource Manager
Tony Wild, USFS Soils Technician
Tom Patrick, GDNR Wildlife Biologist
Nathan Klaus, Georgia Natural Resource Coordinator, GDNR Biologist
Malcom Hodges, Nature Conservancy
Melissa Anderson, Engineering Specialist
Don McGowan, Wildlife Biologist, Department of Natural Resources

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Date: August 19, 2005

APPENDIX A

The following documents the review of the PETS list for the Chattahoochee-Oconee National Forests used to determine which species would be addressed in this Biological Evaluation.

Project Name: Herbicide Use for SPB Restoration Areas and Privet Control Research Studies

Compartments

5,6,7,8,9,107,115,119,125,141,144,150,152,153,154,157,161,166,170,172,176 & 180.

Reasons species considered but eliminated from further analysis in Biological Evaluation:

1. Project area not in range of the species
2. Species habitat does not occur in the project area
3. Species not found during inventories

X = Species evaluated in BE

THREATENED AND ENDANGERED SPECIES (FY2003)

Species Reason	Common Name	Federal Status	
Plants:			
<i>Echinacea laevigata</i>	Smooth purple coneflower	Endangered	1
<i>Gymnoderma lineare</i>	Rock gnome lichen	Endangered	1
<i>Helonias bullata</i>	Swamp pink	Endangered	1
<i>Isotria medeoloides</i>	Small whorled pogonia	Threatened	1
<i>Sarracenia oreophila</i>	Green pitcher plant	Endangered	1
<i>Scutellaria montana</i>	Large flowered skullcap	Threatened	1
<i>Trillium persistens</i>	Persistent trillium	Endangered	1
<i>Trillium reliquum</i>	Relict trillium	Endangered	1
<i>Xyris tennesseensis</i>	Tennessee yellow-eyed grass	Endangered	1
Vertebrates:			
<i>Haliaeetus leucocephalus</i>	Bald eagle (nests) X,2	Threatened	
<i>Mycteria americana</i>	Woodstork (foraging habitat) X,2	Endangered	
<i>Myotis grisescens</i>	Gray bat	Endangered	1
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered	X
<i>Cyprinella caerulea</i>	Blue shiner	Threatened	1
<i>Etheostoma etowahae</i>	Etowah darter	Endangered	1
<i>Etheostoma scotti</i>	Cherokee darter	Threatened	1

<i>Percina antesella</i>	Amber darter	Endangered	1
<i>Percina aurolineata</i>	Goldline darter	Threatened	1
<i>Percina jenkinsi</i>	Conasauga logperch	Endangered	1
Mollusks:			
<i>Lampsilis altilis</i>	Fine-lined pocketbook	Threatened	1
<i>Medionidus acutissimus</i>	Alabama moccasinshell	Endangered	1
<i>Medionidus parvulus</i>	Coosa moccasinshell	Endangered	1
<i>Pleurobema decisum</i>	Southern clubshell	Endangered	1
<i>Pleurobema georgianum</i>	Southern pigtoe	Endangered	1
<i>Ptychobranhus greeni</i>	Triangular kidneyshell	Endangered	1
<i>Pleurobema perovatum</i>	Ovate Clubshell	Endangered	1

REGIONAL FORESTER'S SENSITIVE SPECIES (2001REVISION)

Common Name	Scientific Name	Reason
BIRDS		
Bachman's sparrow	<i>Aimophila aestivalis</i>	X
Peregrine falcon	<i>Falco peregrinus</i>	1
Migrant loggerhead shrike	<i>Lanius ludovicianus migrans</i>	X,3
MAMMALS		
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	1
Eastern small-footed myotis	<i>Myotis leibii</i>	1
Southern water shrew	<i>Sorex palustris punctulatus</i>	1
INSECTS		
Georgia beloneurian stonefly	<i>Beloneuria georgiana</i>	1
Diana fritillary butterfly	<i>Speyeria diana</i>	1
Cherokee clubtail dragonfly	<i>Gomphus consanguis</i>	1
Margarita river skimmer	<i>Macromia margarita</i>	X,3
Edmund's snaketail	<i>Ophiogomphus edmundi</i>	1
Appalachian snaketail	<i>Ophiogomphus incurvatus</i>	X,3
CRAYFISH		
Oconee stream crayfish	<i>Cambarus chaugaensis</i>	1
A crayfish	<i>Cambarus cymatilis</i>	1
Chickamauga crayfish	<i>Cambarus extraneus</i>	1
Little Tennessee crayfish	<i>Cambarus georgiae</i>	1
Hiawassee headwaters crayfish	<i>Cambarus parrishi</i>	1
A crayfish	<i>Cambarus speciosus</i>	1

REPTILES/AMPHIBIANS		
Bog turtle	<i>Clemmys muhlenbergii</i>	1
S. Appalachian salamander	<i>Plethodon teyahalee (=oconaluftee)</i>	1
MUSSELS		
Georgia pigtoe	<i>Pleurobema hanleyianum</i>	1
Inflated floater	<i>Pyganodon gibbosa</i>	X,3
Ridged mapleleaf	<i>Quadrula rumphiana</i>	1
Alabama creekmussel	<i>Strophitis connasaugaensis</i>	1
Alabama rainbow	<i>Villosa nebulosa</i>	1
Tennessee hillsplitter	<i>Lasmigona holstonia</i>	
FISH		
Ocmulgee shiner	<i>Cyprinella callisema</i>	X,3
Bluestripe shiner	<i>Cyprinella callitaenia</i>	1
Altamaha shiner	<i>Cyprinella xaenura</i>	X,3
Holiday darter	<i>Etheostoma brevirostrum</i>	1
Coldwater darter	<i>Etheostoma ditrema</i>	1
Trispot darter	<i>Etheostoma trisella</i>	1
Wounded darter	<i>Etheostoma vulneratum</i>	1
Lined chub	<i>Hybopsis lineapunctata</i>	1
Mountain brook lamprey	<i>Ichthyomyzon greelyi</i>	1
Robust redhorse	<i>Moxostoma robustum</i>	X,3
Popeye shiner	<i>Notropis ariommus</i>	1
Highscale shiner	<i>Notropis hypsilepis</i>	1
Frecklebelly madtom	<i>Noturus munitus</i>	1
Freckled darter	<i>Percina lenticula</i>	1
Olive darter	<i>Percina squamata</i>	1
Fatlips minnow	<i>Phenacobius crassilabrum</i>	1
PLANTS (Vascular)		
Scherwin's false indigo	<i>Amorpha schwerinii</i>	1
Georgia rockcress	<i>Arabis georgiana</i>	1
Georgia aster	<i>Aster georgianus</i>	1
Spreading yellow false foxglove	<i>Aureolaria patula</i>	1
American barberry	<i>Berberis Canadensis</i>	1
Mountain bittercress	<i>Cardamine clematitidis</i>	1
Biltmore sedge	<i>Carex biltmoreana</i>	1
Fort mountain sedge	<i>Carex communis</i> var. <i>amplisquama</i>	1
Miserable sedge	<i>Carex misera</i>	1
Radford's sedge	<i>Carex radfordii</i>	1
Roan mountain sedge	<i>Carex roanensis</i>	1
Cuthbert's turtlehead	<i>Chelone cuthbertii</i>	1
Small spreading pogonia	<i>Cleistes bifaria</i>	1

Whorled stoneroot	<i>Collinsonia verticillata</i>	1
Broadleaf tickseed	<i>Coreopsis latifolia</i>	1
Mountain witch alder	<i>Fothergilla major</i>	1
Smith's sunflower	<i>Helianthus smithii</i>	1
Harper's wild ginger	<i>Hexastylis shuttleworthii</i> var. <i>harpe</i>	1
Taylor's filmy fern	<i>Hymenophyllum tayloriae</i>	1
Butternut	<i>Juglans cinerea</i>	1
Fraser loosestrife	<i>Lysimachia fraseri</i>	1
Sweet pinesap	<i>Monotropis odorata</i>	1
Small's beardtongue	<i>Penstemon smallii</i>	1
Monkeyface orchid	<i>Platanthera integrilabia</i>	1
Tennessee leafcup	<i>Polymnia laevigata</i>	1
Oglethorpe oak	<i>Quercus oglethorpensis</i>	X,3
Rose gentian	<i>Sabatia capitata</i>	1
Piedmont ragwort	<i>Senecio millifolium</i>	1
Bay starvine	<i>Schisandra glabra</i>	1
Oconee bells	<i>Shortia galacifolia</i> var. <i>galacifolia</i>	1
Ovate catchfly	<i>Silene ovata</i>	1
Granite dome goldenrod	<i>Solidago simulans</i>	1
Ash-leaf bush pea	<i>Thermopsis mollis</i> var. <i>fraxinifolia</i>	1
Least trillium	<i>Trillium pusillum</i>	1
Southern nodding trillium	<i>Trillium rugellii</i>	1
Sweet white trillium	<i>Trillium simile</i>	1
Carolina hemlock	<i>Tsuga caroliniana</i>	1
Piedmont strawberry	<i>Waldsteinia lobata</i>	1
PLANTS (Nonvascular)		
A liverwort	<i>Drepanolejeunea appalachiana</i>	1
A liverwort	<i>Pellia X appalachiana</i>	1
A liverwort	<i>Plagiochila caduciloba</i>	1
A liverwort	<i>Plagiochila echinata</i>	1
Sharp's leafy liverwort	<i>Plagiochila sharpii</i>	1
Carolina plagiomnium	<i>Plagiomnium carolinianum</i>	1
Pringle's platyhypnidium	<i>Platyhypnidium pringlei</i>	1
A liverwort	<i>Radula sullivanti</i>	1

APPENDIX E ---

Management Indicator Species

Element - Management Indicator Species

Introduction

To help evaluate the effects of management practices on plants, animals, and fisheries, the Management Indicator Species (MIS) concept is used. Each MIS selected for the project represents many other species with similar habitat requirements. MIS have been selected because population changes to those species indicate the effects of management activities on the habitat. The recently revised Forest Plan identifies 15 MIS for the Chattahoochee-Oconee National Forests. Of these, 11 occur within or near the project area.

These species were selected because they occur in this portion of the Forest and have populations or habitats that could directly or indirectly be affected by the project. The following is a brief summary of the Forest-wide status and trends for each of these species and a discussion of the existing habitat conditions on the project area. These Forest-wide trends are useful in putting the project-level effects into perspective.

For those species that also were MIS in the original 1985 Forest Plan (e.g. Acadian flycatcher, pileated woodpecker, white-tailed deer, black bear), much of the Forest-wide population and habitat data was compiled and analyzed previously (USDA Forest Service 2003). Most of the MIS in the revised Forest Plan are birds that are monitored annually through the Forest's breeding bird surveys (USDA Forest Service 2004b).

The following is a description of MIS that occur on the Chattahoochee-Oconee National Forest and the condition of their existing habitat. These MIS species are indicative of the major forest types in the project area and respond to changes in community diversity, successional diversity and plant species diversity.

Acadian Flycatcher (*Empidonax virescens*)

The habitat for the Acadian flycatcher consists of deciduous forests near streams with a moderate understory. This bird typically constructs its nest in branches directly overhanging streams. It requires a high dense canopy with an open understory (NatureServe Explorer, 2002). Acadian flycatcher habitat is currently fairly good, with riparian areas common across the forest and in generally good condition (USFS, 2003). Population levels have been relatively stable for this species on the Forest, with surveys showing an increasing trend in abundance Statewide during the past 35 years. The quality and integrity of riparian habitat on the Forest is expected to remain constant over time (USFS, 2003).

Pileated Woodpecker (*Dryocopus pileatus*)

The pileated woodpecker is associated with mature (60+ years) and extensive hardwood and hardwood-pine forest. Deciduous forests are preferred over coniferous forests. The species is found in deep woods, swamps, river bottom forests, and open, upland forest of mixed types. The species bird forages and nests on and in dead trees (snags), with some foraging also occurring on fallen logs and other forest debris (USFS, 2003). It prefers woods with a tall, closed canopy and a high basal area (NatureServe Explorer, 2002). Bird survey data indicate that pileated woodpecker populations have remained relatively stable both on the Forest and throughout the State over the past 10 years. In addition, habitat for the species has been relatively stable over the past 15 years, and is expected to remain stable or increase in the future (USFS, 2003).

Hooded Warbler (*Wilsonia citrina*)

Hooded warblers are primarily found in mature (although young forests can also be used), mesic deciduous forests with a dense understory and midstory structure. The species nests in the understory of deciduous forests, especially along streams and ravine edges, as well as thickets in riverine forests. A dense shrub layer and scant ground cover are important to the species (NatureServe Explorer, 2002).

Field Sparrow (*Spizella pusilla*)

The field sparrow prefers old fields, brushy hillsides, overgrown and weedy pastures, thorn scrub, deciduous forest edge, untilled and idle cropland, brushy woodlands, sparse second growth, hedgerows, and fencerows. The species nests on or near ground in weed clumps or grass tufts. Woody vegetation and dense grass appear to be critical components for habitat suitability. Optimal habitat includes dense, moderately tall grass, and low to moderate shrub density (NatureServe Explorer, 2002).

Prairie Warbler (*Dendroica discolor*)

The prairie warbler is an early-successional species that is found in areas with shrubby vegetation, including brushy second growth, dry scrub, low pine-juniper, mangroves, pine barrens, burned-over areas, abandoned fields, powerline corridors, and revegetated strip-mined areas. Breeding habitats for the species are typically suitable beginning about 5 years after burning or clearing, and continuing for about 10 to 20 years. The species typically nests in a shrub, sapling, thicket, or fern clump (NatureServe Explorer, 2002).

Wood Thrush (*Hylocichla mustelina*)

The wood thrush is a forest interior species typically found in mature deciduous or mixed forests with a dense tree canopy and a fairly well-developed deciduous understory. Bottomlands and other rich hardwood forests are optimal habitats. The species is also found in pine forests with a deciduous understory (NatureServe Explorer, 2002).

Scarlet Tanager (*Piranga olivacea*)

The scarlet tanager is an MIS for the upland oak community, and is not very common on the Oconee National Forest (USFS, 2004). The species is found in deciduous forests and mature deciduous woodlands, including deciduous and mixed swamp and floodplain forests and rich moist upland forests, preferring oak trees. The species nests most commonly in areas with a relatively closed canopy, dense understory with a high diversity of shrubs, and scanty ground cover. The species also sometimes nests in wooded parks and orchards (NatureServe Explorer, 2002).

Swainson's Warbler (*Limnothlypis swainsonii*)

Swainson's warbler is found in early-successional riparian habitats in the Piedmont, and is strongly associated with canebrakes, tangles, and thick shrubby understories of open bottomland hardwoods and mixed forests. The species is found in rich, damp, deciduous floodplain and swamp forests, requiring areas with deep shade from both canopy and understory cover. The species nests in understory canes, shrubs, vine tangles, and similar sites, typically within about 200 meters of open water (NatureServe Explorer, 2002).

Pine Warbler (*Dendroica pinus*)

The pine warbler is associated with pine and pine-oak forests, generally occurring only where some pine component is present. The highest numbers of the species occur where pure stands of pine are found; the species is less abundant as the proportion of hardwood tree species increases. Optimal nesting habitat for the species is provided by pure, dense, mature pine stands that lack a tall understory (NatureServe Explorer, 2002).

Red-cockaded Woodpecker (*Picoides borealis*)

The red-cockaded woodpecker (RCW), a federally listed endangered species, currently occupies habitat on the south end of the Oconee National Forest and in the Piedmont National Wildlife Refuge, which is just outside of the project area. According to the revised RCW Recovery Plan, the Oconee National Forest and Piedmont National Wildlife Refuge together make up one secondary core recovery population of RCW, referred to as the Piedmont Recovery Unit. The plan defines a secondary core population as "a population identified in recovery criteria that will hold at least 250 potential

breeding groups at the time of and after delisting.” In 2004, the Piedmont Recovery Unit had 53 breeding pairs—14 on the Oconee National Forest (including the Hitchiti Experimental Forest) and 39 on the Piedmont National Wildlife Refuge. Under the direction of the RCW Final EIS and ROD and the ESA, the Oconee National Forest must not jeopardize endangered species and must carry out programs for their conservation (16U.S.C. 1536 (a)). Therefore, the Oconee National Forest must protect all cavity trees, protect foraging and nesting habitat, and provide future foraging and nesting habitat. The recovery objective is to create and protect enough RCW habitat to support a genetically sustainable population of 250 breeding pairs. There are currently seven inactive clusters and several acres of potential recruitment areas for the RCW on the Oconee National Forest.

The RCW uses open pinewoods, which can be longleaf (*Pinus palustris*), loblolly (*P. taeda*), shortleaf (*P. echinata*), or slash (*P. elliotti*). Habitat is generally of mature trees (80+ years) with little or no midstory (resembling a park-like conditions). RCWs nest and roost each day in cavities they excavate in live pine trees (USFS, 2001; USFWS, 2002). Currently, potential foraging habitats within the project area have thick basal areas of pine trees, which hinders RCW foraging and increases competition from other vertebrates. There is an abundance of overstocked stands of mid-successional aged pine trees (future foraging and nesting habitat) that need treatment.

White-tailed Deer (*Odocoileus virginianus*)

White-tailed deer are very adaptable and use a variety of habitat types and successional stages to meet their year-round needs. Grassed openings and closed temporary roads, along with regeneration areas, supply the early successional habitats preferred by the species. Foraging habitat is represented in all forest age classes up to 80 years.

Availability of browse and escape cover year-round and hard mast during the fall and early winter are key factors for white-tailed deer success. Riparian habitats supply much of the hard and soft mast (USFS, 2001). While there has been a slight decrease in the availability of deer browse on the Forest over the past 10 years due to a decline in early successional habitat, the white-tailed deer is very adaptable. Deer populations are higher on the Oconee (Piedmont) than in the Georgia mountains, with both populations stable to increasing. Since the deer population has been at or above carrying capacity in the Piedmont, State regulations have been liberalized to help reduce population densities to within habitat capability levels (USFS, 2003).

Environmental Consequences

Habitat alteration changes the diversity and abundance of wildlife species in a given area. Vegetation management can affect each species’ habitat in a different way, benefiting some species, while harming others. Planning regulations define diversity as “the

distribution and abundance of different plant and animal communities and species within [an] area...” (36 CFR 219.3(g)).

In general, forested areas that are in various stages of development and include periodic openings support a wide diversity of species and habitats. The maintenance of forest habitat diversity tends to increase wildlife populations and land values, since the majority of animals do not utilize a single stand or single forest type throughout their lives. Management activities that encourage layering of different types of vegetation, including thinning, increase wildlife diversity. Impacts beneficial to wildlife are typically greater with a combination of management activities versus any of the treatments separately.

Effects of Alternative A (No Action: Current Management)

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to wildlife populations or habitat are expected.

Indirect Effects - No herbicide application will occur on the proposed project area. This will result in a decrease in the District’s ability to control vegetation. Wildlife habitat management opportunities, such as vegetation control with the use of herbicides will remain limited.

Cumulative Effects – Over time the failure to reforest sites promptly will result in aggressive colonizers such as sweetgum having a more dominant role in the canopy, thereby reducing the historical composition and ecological potential on some sites. The percent of the landscape typically impacted by SPB is 3-10 percent at any one time. Therefore, no cumulative effects to wildlife or wildlife habitats are expected.

Acadian Flycatcher

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to the Acadian flycatcher are expected. Under this alternative, vegetative control and management remain limited.

Indirect Effects - This alternative will perpetuate current conditions and no indirect impacts to the Acadian flycatcher are expected.

Cumulative Effects - Mature riparian forests used by Acadian flycatchers are abundant on the Forest as a whole. Acadian flycatcher populations are expected to increase on the Forest through the implementation of the revised Forest Plan (USDA Forest Service 2004). No cumulative effects to Acadian flycatchers or their habitat are expected.

Pileated Woodpecker

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to the pileated woodpeckers are expected.

Indirect Effects - This alternative will perpetuate current conditions and no indirect impacts to the pileated woodpeckers are expected.

Cumulative Effects - Mature forest habitats used by pileated woodpeckers are abundant on the project area and Forest as a whole. Pileated woodpecker populations are tied to the availability of large snags, which are expected to increase on the Forest throughout the implementation of the revised Forest Plan (USDA Forest Service 2004). As a result, pileated woodpecker populations also are expected to increase. The revised Forest plan has several standards that ensure the retention and recruitment of snags and den trees. There are no activities planned for the project area that would affect the availability of large snags. Therefore, no cumulative effects to pileated woodpeckers or their habitat are expected.

Hooded Warbler

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to the hooded warbler are expected.

Indirect Effects - This alternative will perpetuate current conditions and no indirect impacts to the hooded warbler are expected.

Cumulative Effects - Mature mesic hardwood forests used by hooded warblers are abundant on the Forest as a whole. The revised Forest Plan has an objective to increase the structural diversity in mature mesic deciduous forests and hooded warbler populations on the Forest are expected to increase through the implementation of the Plan (USDA Forest Service 2004). There are no activities planned for the proposed project area that would affect the availability of mature mesic hardwood forests. Therefore, no cumulative effects to hooded warblers or their habitat are expected.

Field Sparrow

Direct Effects – This alternative will perpetuate current conditions and no direct impacts to the field sparrow are expected.

Indirect Effects – No habitat change is scheduled under this no action alternative. Therefore, no indirect effects to the field sparrow are expected.

Cumulative Effects – The old fields and grown up pasture along forest edge areas are not expected to be increased or decreased under this alternative. Therefore, no cumulative effects to field sparrows or their habitat are expected.

Prairie Warbler

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to the prairie warbler are expected.

Indirect Effects – Opportunities for wildlife enhancement activities will remain limited in this alternative. This alternative will perpetuate current conditions and no indirect impacts to the prairie warbler are expected.

Cumulative Effects - Early successional habitat used by the prairie warbler are limited on the overall project area. This habitat is somewhat more common on the Forest as a whole but has declined recently due to a reduction in forest management activities. However, prairie warbler populations are expected to increase on the Forest through the implementation of the revised Forest Plan (USDA Forest Service 2004). There are no activities planned for the project area that would affect the availability of early successional forests. Therefore, no cumulative effects to prairie warblers or their habitat are expected.

Wood Thrush

Direct Effects - This alternative will perpetuate current conditions with no direct impacts to the wood thrush expected.

Indirect Effects – No indirect effects to this bird species are expected since no action will take place.

Cumulative Effects – The interior forest habitat preferred by the wood thrush is fairly abundant on the forest. There are no additional actions planned for the project area that would affect habitat for this species. Therefore, no cumulative effects are expected.

Scarlet Tanager

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to the scarlet tanager are expected.

Indirect Effects - This alternative will perpetuate current conditions and no indirect impacts to the scarlet tanager are expected.

Cumulative Effects - Mature oak used by the scarlet tanager are abundant on the project area and Forest as a whole. The availability of older oak stands on the Forest is expected to increase through the implementation of the revised Forest Plan (USDA Forest Service 2004) and as a result, scarlet tanager populations also are expected to increase. There are no activities planned for the project area that would affect the availability of mature oak forests. Therefore, no cumulative effects to scarlet tanagers or their habitat are expected.

Swainson's Warbler

Direct Effects – This no action alternative would have no direct effect on the Swainson's warbler as nothing would be planned within areas where this bird is most likely to be found.

Indirect Effects – Vegetation changes within habitat preferred by this bird would not occur. Therefore, no indirect effects are expected.

Cumulative Effects – There are no additional activities planned for the canebrake habitat where this bird is likely to be found. Therefore, no cumulative effect is expected.

Pine Warbler

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to the pine warbler are expected.

Indirect Effects - This alternative will perpetuate current conditions and no indirect impacts to the pine warbler are expected.

Cumulative Effects - Pine warbler populations on the Forest are expected to increase through the implementation of the revised Forest Plan (USDA Forest Service 2004). There are no activities planned for the project area that would affect the availability of mature pine forests. Therefore, no cumulative effects to pine warblers or their habitat are expected.

RCW

Direct effects to the RCW would not occur. However, indirect effects to habitat for the RCW would occur. No action would not provide or create suitable RCW habitat under Alternative A.

SPB impacted stands on some sites would likely not achieve potential RCW foraging and nesting habitat until they are quite old without active reforestation and release from competition. Although Alternative A would not directly affect the RCW, indirect effects on potential habitat for the species would be slightly adverse due to the limited amount of habitat affected by most outbreak cycles (3-10 percent).

Under Alternative A, the abundance of overstocked stands of early- to mid-successional pine trees (potential RCW foraging and nesting habitat) would continue. Alternative A would neither be protecting existing habitat nor providing future foraging and nesting habitat for the RCW in the project area. RCW would not be able to be recruited to the project area in the future if no vegetation management activities are conducted.

Cumulatively, other treatments would not occur in the project area since habitat would not be treated or altered. Therefore, cumulative effects from continued no action would be expected to decrease habitat capability for the RCW.

White-tailed Deer

Direct Effects- This alternative will perpetuate current conditions and no direct impacts to white-tailed deer are expected.

Indirect Effects – Opportunities for wildlife enhancement activities will remain the same in this alternative. This alternative will perpetuate current conditions and no indirect impacts to white-tailed deer are expected.

Cumulative Effects - Early successional habitat and high quality permanent openings important to deer are limited on the project area. These habitats are somewhat more common on the Forest as a whole. Implementation of the revised Forest Plan is expected to provide a diversity of habitats that will benefit white-tailed deer populations on the Forest (USDA Forest Service 2004). No additional activities affecting deer habitat are planned in the project area. Therefore, no cumulative effects to white-tailed deer or their habitat are expected.

Locally Rare Species

Since no locally rare plants are known from the project area, implementation of Alternative A would not have any effect on these species. Although the four-toed salamander is known to inhabit swamps, boggy streams and ponds, and wet woods within or adjacent to the project area, Alternative A would have no affect on this habitat. Therefore, no effects on locally rare animal species or their habitat would occur as a result of Alternative A.

Effects of Alternative B: Proposed Action

Direct Effects- Actions proposed in this alternative are limited in scope and would only involve the area in, or immediately adjacent to herbicide application locations. See Table 2-2 for specific locations. All habitats proposed for treatment would likely be improved through the elimination of non-native invasive plants from the project area. The bioconcentration potential of triclopyr (Garlon3A) is low and the single dose toxicity to mammals is low. Glyphosate is not soil active and it has a low toxicity as well. Direct effects to birds and mammals are unlikely since these species are most likely to move from treatment areas when the project activities occur. Direct effects to amphibians and reptiles are possible, but these animals would most likely be under logs, rocks, leaves or ground borrows, making direct contact with herbicides unlikely. Direct effects to other non-target plants is possible. However, direct application methods should prevent non-target contaminations. Therefore, there will be no direct impacts from this alternative on wildlife habitats and populations.)

Indirect Effects - Under this alternative, wildlife habitat conditions would be expected to be improved by the control of invasive species (privet) and restoration of native tree species to SPB impacted sites. On moderate to high littleleaf disease sites longleaf pine provides numerous management benefits (lives longer, SPB & littleleaf resistant, greater sap flow and can be prescribed burned at a young age, so no additional control lines are required). Indirect effects to birds and mammals could occur if they were to ingest foliage or seeds that had been treated with any of the herbicides proposed for use. However, none of these herbicides bioaccumulate in organisms and toxicity levels are very low. Indirect effects to MIS and their habitats treated are likely to be improved or negligible, given that the applicators treat target organisms only.)

Cumulative Effects – No additional activities affecting wildlife habitat are planned in this portion of the proposed project area except for compartments 5, 6 and 8 of the Hitchiti Experimental Forest. Adjacent sites in compartments 5, 6 and 8 are proposed (RCW and Canebreak Restoration EA) for thinning and midstory control using herbicides. There may be a few cumulative effects to MIS species over time. No other herbicide projects are known to be occurring in the vicinity of the proposed action, although herbicide use on private lands is possible. Some past land use practices have resulted in the spread of non-native invasive species. Efforts to control these plants are likely to have a beneficial cumulative effect on MIS.)

Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the project area (application sites). Therefore, no cumulative effects to wildlife or wildlife habitats are expected.

Acadian Flycatcher

Direct Effects- Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the application sites. Standards provided in the Riparian Corridor Management Prescription and the Veg. Management EIS (1989)

will be followed to ensure protection of riparian habitat conditions. Therefore, there will be no direct effects from this alternative on the Acadian flycatcher.

Indirect Effects - Under this alternative, improved wildlife habitat diversity conditions would increase opportunities for some wildlife away from riparian areas. However, riparian corridor standard will be followed to ensure that no herbicides be applied in the riparian corridor. Therefore, there will be no indirect effects from this alternative on the Acadian flycatcher.

Cumulative Effects - Mature riparian forests used by the Acadian flycatcher are abundant on the proposed project area and Forest as a whole. Acadian flycatcher populations are expected to increase on the Forest through the implementation of the revised Forest Plan (USDA Forest Service 2004). There are no activities planned for the project area that would affect the availability of mature riparian hardwood forests. Riparian Corridor standards will be followed on all projects on the Forest to maintain desirable habitat conditions in the riparian corridor. Therefore, no cumulative effects to Acadian flycatchers or their habitat are expected.

Pileated Woodpecker

Direct Effects- Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the areas to be treated. Therefore, there will be no direct effects from this alternative on the pileated woodpecker.

Indirect Effects - Under this alternative, improved early successional habitat conditions would increase opportunities for some wildlife. Forest-wide standards will be followed that ensure the retention and recruitment of snags, and therefore, this proposed activity will not affect the future availability of snags. Therefore, there will be no indirect effects from this alternative on the pileated woodpecker.

Cumulative Effects - Snags used by pileated woodpeckers are abundant on the project area and Forest as a whole. Pileated woodpecker populations are tied to the availability of large snags, which are expected to increase on the Forest through the implementation of the revised Forest Plan (USDA Forest Service 2004). As a result, pileated woodpecker populations also are expected to increase. There are no activities planned for the project area that would affect the availability of snags. Forest-wide standards will be followed on vegetation management projects throughout the Forest to ensure the retention and recruitment of snags. Actions proposed in this alternative are limited in scope and would only involve the treatment area in or immediately adjacent to the application sites. Therefore, no cumulative effects to pileated woodpeckers or their habitat are expected.

Hooded Warbler

Direct Effects- Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the specific site where herbicides are applied. The hooded warbler nests and forages in a forest environment not targeted for treatments. Therefore, there will be no direct effects from this alternative on the hooded warbler.

Indirect Effects - Under this alternative, improved vegetative conditions (or altered vegetation at the grass/shrub/grass layer level) would increase opportunities for wildlife habitat diversity. However, this activities would not affect the availability of mature mesic hardwood forests. Therefore, there will be no indirect effects from this alternative on the hooded warbler.

Cumulative Effects - Mature mesic hardwood forests used by hooded warblers are abundant on the Forest as a whole. The revised Forest Plan has an objective to increase the structural diversity in mature mesic deciduous forests and hooded warbler populations on the Forest are expected to increase through the implementation of the Plan (USDA Forest Service 2004). There are no activities planned for the project area that would affect the availability of mature mesic hardwood forests. Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the treatment sites. Therefore, no cumulative effects to hooded warblers or their habitat are expected.

Field Sparrow

Direct Effects – Actions proposed in this alternative are limited in scope and would only involve the area in and around the herbicide application sites. These birds would move away from areas being treated. Therefore, there would be no direct effects from this alternative on the field sparrow.

Indirect Effects – Herbicide application under this alternative will provide some limited wildlife habitat diversity within the vicinity of the treatment areas. Field sparrows would not be expected to be feeding or foraging within the areas to be treated. Accidental ingestion of an insect or seed that has come in contact with herbicides is remote. Risk assessments have shown that the toxicity of the herbicides to be used is very low and they do not bioaccumulate in organisms. Therefore, no indirect effects are expected.

Cumulative Effects – The type of old field and grown-up pasture habitat preferred by this species is limited within the project area. There are no other activities planned for the project area that would affect the availability of habitat preferred for by the field sparrow. Therefore, no cumulative effects to this bird or its habitat are expected.

Prairie Warbler

Direct Effects- Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the application sites. Although a small amount of residual herbicide might be ingested by an individual, these birds are most likely to move away from the area where treatment occurs. The herbicides used have a very low toxicity level and they do not bioaccumulate in organisms. Therefore, there will be no direct effects from this alternative on the prairie warbler.

Indirect Effects – Herbicide application activities in this alternative will provide opportunities for limited wildlife habitat diversity in the portion of the project area. These management activities should result in minor improvements in habitat conditions for the prairie warbler.

Cumulative Effects - Early successional habitat used by the prairie warbler are limited on the proposed project area. This habitat was somewhat more common on the Forest as a whole, but has declined recently due to a reduction in forest management activities. However, prairie warbler populations are expected to increase on the Forest through the implementation of the revised Forest Plan (USDA Forest Service 2004). There are no other activities planned for the project area that would affect the availability of early successional forests. Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the application areas. Therefore, no cumulative effects to prairie warblers or their habitat are expected.

Wood Thrush

Direct Effects – The proposed action is limited in scope and would only involve the area in or immediately adjacent to the areas where herbicides are applied. The wood thrush's preferred habitat is not targeted for release work treatment. If this bird happens to be in the areas treated, they would be expected to leave the vicinity during application and no direct effects would be expected.

Indirect Effects – Although the proposed treatment would provide some limited wildlife habitat diversity, this would not increase or decrease the amount of forest interior habitat found in moist areas. In the unlikely event that this bird was to come in contact with herbicides to be used under this alternative, risk assessments show that toxicity is very low and bioaccumulation in organisms does not occur. Therefore, there should not be any indirect effects or habitat changes to where the wood thrush is found.

Cumulative Effects – Habitats used by the wood thrush should be protected and maintained under the current forest plan. There are no other activities planned within the interior forest areas that would cumulatively affect this species.

Scarlet Tanager

Direct Effects- Actions proposed in this alternative are limited in scope and would only

involve the area in, or immediately adjacent to areas where herbicides are to be applied. Therefore, there will be no direct effects from this alternative on the scarlet tanager.

Indirect Effects - Under this alternative, improved wildlife habitat would increase opportunities for wildlife that prefer early successional habitat. However, the proposed activity would not affect the availability of mature oak forests. Therefore, there will be no indirect effects from this alternative on the scarlet tanager.

Cumulative Effects - Mature oak forest used by scarlet tanagers are abundant on the project area and Forest as a whole. The availability of older oak stands on the Forest is expected to increase through the implementation of the revised Forest Plan (USDA-Forest Service 2004) and as a result, scarlet tanager populations also are expected to increase. There are no activities planned for the project area that would affect the availability of mature oak forests. Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the application sites. Therefore, no cumulative effects to scarlet tanagers or their habitat are expected.

Swainson's Warbler

Direct Effects – Actions proposed in this alternative are limited in scope and would only involve the area in, or immediately adjacent to areas where herbicides are to be applied. Therefore, there will be no direct effects from this alternative on the Swainson's warbler. The Swainson's warbler is not expected to be found where the proposed site preparation and release work is planned. If it were present, it would quickly move away from the treatment area and not be directly affected.

Indirect Effects – Since the herbicide site preparation and release work is not expected to be done within the habitat where this bird is found, no indirect habitat effects are expected. Invasive species control of privet if successfully replaced by native species such as canebrake's could potentially result in improved habitat although the acres proposed for treatment are relatively small.

Cumulative Effects – No other activity, related or unrelated to this project are expected to have a cumulative effect on the Swainson's warbler.

Pine warbler

Direct Effects- Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to application site. Habitats utilized by this species would not be targeted for treatment. Therefore, there will be no direct effects from this alternative on the pine warbler.

Indirect Effects - Under this alternative, herbicide applications should improve habitat

for species preferring early successional habitat. However, this activity would not affect the availability of mature pine forests. Therefore, there will be no indirect effects from this alternative on the pine warbler.

Cumulative Effects - Mature pine forests used by pine warblers are abundant on the Forest and within the project area. Pine warbler populations on the Forest are expected to increase through the implementation of the revised Forest Plan (USDA Forest Service 2004). There are no activities planned for the project area that would affect the availability of mature pine forests. Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the application sites. Therefore, no cumulative effects to pine warblers or their habitat are expected.

RCW

Direct effects to the RCW would not occur. However, indirect effects to habitat for the RCW would occur.

SPB impacted stands on some sites would likely not achieve potential RCW foraging and nesting habitat until they are quite old without active reforestation and release from competition. Many of these sites (104 acres) have a moderate to high risk for littleleaf disease and may never produce suitable nesting habitat without active management. Although Alternative B would not directly affect the RCW, indirect effects on potential habitat for the species would be slightly positive due to the limited amount of habitat proposed for longleaf planting.

Cumulatively, this and other treatments (see RCW Woodpecker Habitat Restoration EA and the RCW and Canebroke Restoration EA) will be working toward the recovery objectives for the Oconee National Forest. In addition, this alternative would be in keeping with the direction in the RCW Final EOS and ROD, Recovery Plan, and the ESA. Therefore, cumulative effects from the alternative would be expected to increase habitat capability for the RCW in the long-term.

White-tailed Deer

Direct Effects- Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the proposed application sites. Direct ingestion of forage with herbicide residue is possible, but unlikely. However, in the unlikely event it is ingested by deer, bioconcentration is low and single dose toxicity is also very low. Therefore, there will be no direct effects from this alternative on the white-tailed deer.

Indirect Effects – Herbicide application activities in this alternative would permit the restoration of more desirable vegetation for wildlife in general. This management should improve habitat conditions for white-tailed deer.

Cumulative Effects - Early successional habitat and high quality permanent openings important for deer are limited on the project area. These habitats are somewhat more common on the Forest as a whole. Implementation of the revised Forest Plan is expected to provide a diversity of habitats that will benefit white-tailed deer populations on the Forest (USDA Forest Service 2004). No additional activities affecting deer habitat are planned in the general project area. Actions proposed in this alternative are limited in scope and would only involve the area in or immediately adjacent to the application sites. Therefore, no cumulative effects to white-tailed deer or their habitat are expected.

Locally Rare Species

Since no locally rare plants are known from the project area, implementation of Alternative B would not have any effect on these species. Although the four-toed salamander is known to inhabit swamps, boggy streams and ponds, and wet woods within or adjacent to the project area, Alternative B would not affect these areas (due to riparian corridor restrictions). Therefore no effects on locally rare animal species or their habitat would occur as a result of Alternative B.

Effects of Alternative C

Direct Effects – Actions proposed in this alternative are limited in scope to those areas where mechanical means (hand tools, chainsaws, brush saws, etc.) would be used to remove competing vegetation. Any wildlife occupying the area where this direct treatment would be occurring would temporarily leave during the disturbance. Therefore, there would be no direct impacts from this alternative on wildlife.

Indirect Effects – Under this alternative, wildlife habitat conditions would be expected to improve slightly for some species. Removal of non-targeted trees/brush should give the preferred leave trees a better chance to survive. Oaks and other mast producers would be favored in most cases. Indirect effects to wildlife in general should improve slightly for some species or be negligible to other wildlife species.

Cumulative Effects – No additional activities affecting wildlife habitat are planned in the proposed project area, except for compartments 5, 6 and 8 of the Hitchiti Experimental Forest (RCW and Canebrake Restoration EA). All activities are consistent with the RCW Recovery Plan and Revised Forest Plan in support of the RCW recovery efforts. Actions involving the release of trees using hand tools is limited in scope, and no cumulative effects to the wildlife or their habitat are expected from this alternative.

Acadian Flycatcher

Direct Effects – Hand tool release work will not be applied within the riparian habitats of the project area. Therefore, no direct effect to the Acadian flycatcher is expected. If this bird were to be in the vicinity of the proposed treatment, it would probably move out of the area as hand tool work was taking place.

Indirect Effects – Hand tool work is not expected to take place within the habitat areas that this bird prefers. Therefore, no indirect effects on the Acadian flycatcher are expected.

Cumulative Effects – The mature riparian forest habitat that this species prefers is fairly abundant on the forest as a whole. There are no activities planned for the project area that would affect the availability of mature hardwood riparian forests. Therefore, no cumulative effects to the Acadian flycatchers or their habitat are expected.

Pileated Woodpecker

Direct Effects – Hand release work is limited in scope and would only involve the area at the treatment site. No trees or underbrush that the pileated woodpecker would prefer as habitat would be treated. If this bird were in the area during hand tool treatment, they would probably temporarily leave the area. No effects to the pileated are expected from this alternative.

Indirect Effects – Release treatment activities would not likely affect any pileated woodpecker habitat. Forest wide standards to ensure retention of snags preferred by this species are in place and will be followed. Therefore, no indirect effects are expected to this woodpecker.

Cumulative Effects – Snags and foraging habitat utilized by this large bird are abundant on the forest as a whole. There are no activities planned for the project area that would affect the pileated woodpecker or their preferred habitat. Therefore, no cumulative effects to this bird or its habitat is expected.

Hooded Warbler

Direct Effects – Since the hooded warbler utilizes habitats not normally targeted for the proposed release and planting work, no direct effects to this bird are expected.

Indirect Effects – The hand tool release work proposed would not affect the availability of mature mesic hardwood habitat. Therefore, no indirect to this bird are expected.

Cumulative Effects – Mature mesic hardwood habitat is abundant on the forest overall. No other activities are planned for the project area that would reduce preferred habitat for the hooded warbler. Therefore, no cumulative effects to this bird are expected.

Field Sparrow

Direct Effects – Actions proposed in this alternative are limited to the immediate area where the release work with hand tools is taking place. Any field sparrows that might be found within the project area would quickly move away from the area being treated. Therefore, no direct effects from this alternative are expected.

Indirect Effects – Opportunities to provide some limited wildlife habitat diversity are possible under this alternative. No change or treatment is expected to occur with the field sparrow's preferred habitat areas. Therefore, no indirect effects are expected.

Cumulative Effects – Preferred habitat for the field sparrow is not expected to be altered since these areas are not likely to be within the project area. No other actions are expected within field sparrow's preferred habitat. Therefore, no cumulative effects to the field sparrow or its habitat are expected.

Prairie Warbler

Direct Effects – Hand release work under this alternative is limited in scope and would only involve the target area and very limited adjacent area. These birds would leave the area during treat, and therefore they would not be directly affected by this alternative.

Indirect Effects – This warbler could possibility occur within the areas to be treated. Hand removal of competing vegetation would not be expected to affect this warbler. If anything, removal of the vegetation for release work might even improve habitat for this species if it happens to be in the area.

Cumulative Effects – The early successional habitat preferred by the prairie warbler is limited on the forest. There are no additional activities planned for the area that would change the availability of early successional habitat. Therefore, no cumulative effects to this warbler or its habitat are expected.

Wood Thrush

Direct Effects – Although the type of habitat where this species is expected to occur is not expected to be areas needing release and planting treatment, if it is found within the project area, it would be expected to leave during the hand tool work. No direct effect to this bird is expected under this alternative.

Indirect Effects – Vegetation control changes are not expected to occur in stands where this bird is likely to be found. Therefore, no indirect effect to this bird or its habitat is expected.

Cumulative Effects – No other activities within wood thrush habitat is expected to occur. Therefore, no cumulative effects are expected.

Scarlet Tanager

Direct Effects – Hand tool treatment areas would not likely occur within scarlet tanager habitat. If it were in the area, it would probably temporarily leave the area during treatment. Treatment areas are very limited in nature. Therefore, no direct effects to this bird are expected.

Indirect Effects – Some slight changes in the habitat diversity may occur within the affected project area, but habitat preferred by this forest bird is not expected to change. Therefore, no indirect to the scarlet tanager is expected.

Cumulative Effects – Areas preferred by this bird are abundant on the forest as a whole. There are no activities planned for the project area that would limit the availability of mature oaks. Therefore, no cumulative effects to scarlet tanagers or their habitat is expected.

Swainson's Warbler

Direct Effects – Release work performed with hand tools are limited to the areas being treated. The Swainson's warbler is not expected to be found where the proposed release work is planned. If it were present, it would quickly move away from the treatment area and not be directly affected.

Indirect Effects – Since the hand tool release work is not expected to be done within the habitat where this bird is found, no indirect habitat effects are expected.

Cumulative Effects – No other activity, related or unrelated to this project are expected to have a cumulative effect on the Swainson's warbler.

Pine Warbler

Direct Effects – Actions proposed in this alternative are limited in scope. Since the pine warbler would not be expected to be found in the areas proposed to be released and or planted, there should not be any direct effects to this species.

Indirect Effects – Hand tools release of competing trees and vegetation will not be taking place in habitats normally used by this warbler. Therefore, indirect effects on the pine warbler's habitat is not expected.

Cumulative Effects – There are no activities planned for this project area that would reduce the overall availability of mature pine habitat. Actions are limited in scope. Therefore, no cumulative effects to pine warblers or their habitat are expected.

RCW

Direct effects to the RCW would not occur. However, indirect effects to habitat for the RCW would occur.

SPB impacted stands on some sites would likely not achieve potential RCW foraging and nesting habitat until they are quite old without active reforestation and release from competition. Many of these sites (104 acres) have a moderate to high risk for littleleaf disease and may never produce suitable nesting habitat without active management. Although Alternative C would not directly affect the RCW, indirect effects on potential habitat for the species would be slightly positive due to the limited amount of habitat proposed for longleaf planting.

Cumulatively, this and other treatments (see RCW Woodpecker Habitat Restoration EA and the RCW and Canebrake Restoration EA) will be working toward the recovery objectives for the Oconee National Forest. In addition, this alternative would be in keeping with the direction in the RCW Final EIS and ROD, Recovery Plan, and the ESA. Therefore, cumulative effects from the alternative would be expected to increase habitat capability for the RCW in the long-term.

White-tailed Deer

Direct Effects – Direct effects from this proposal are limited in scope and only involve the area at the release site itself. Deer would be expected to leave the area during the actual release work. No direct effects to the white-tailed deer would be expected.

Indirect Effects – Hand release work under this alternative would permit the restoration of more desirable and more palatable vegetation for some wildlife in general. This should have a slightly beneficial effect for deer.

Cumulative Effects – Implementation of the revised Forest Plan is expected to provide a diversity of habitats that should benefit deer. No additional activities affecting the deer or its habitat are planned in project area except for RCW thinnings and regular prescribed burning. Prescribed burning and commercial thinning would benefit the white-tailed deer by encouraging available high quality browse. Actions of hand release are limited in scope and would only involve the treatment area. There are no cumulative effects to white-tailed deer or their habitat expected.

Locally Rare Species

Since no locally rare plants are known from the project area, implementation of Alternative C would not have any effect on these species. Although the four-toed salamander is known to inhabit swamps, boggy streams and ponds, and wet woods within or adjacent to the project area, Alternative C would not affect these areas (due to riparian

corridor restrictions). Therefore no effects on locally rare animal species or their habitat would occur as a result of Alternative C.

Table 1 below summarizes the effects of the alternatives on the Management Indicator Species.

Table 1 – Effects of Alternatives on Project Management Indicator Species

Management Indicator Species

	Alt. A	Alt.B	Alt. C
Acadian Flycatcher	M	M	M
Pileated Woodpecker	M	M	M
Hooded Warbler	M	M	M
Field Sparrow	M	M	M
Prairie Warbler	M	I	I
Wood Thrush	M	M	M
Scarlet Tanager	M	M	M
Swainson’s Warbler	M	M	M
Pine Warbler	M	M	M
Red-cockaded woodpecker	M	I	I
White-tailed Deer	M	I	I

I=Increase Habitat Capability, D=Decrease Habitat Capability, M=Maintain Habitat Capability.

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APPENDIX F

Maps

The following table summarizes activities proposed in Alternative B:

APPENDIX F: Stands Proposed for Treatment – Alternative B & C

Compartment -Stand	Acres	Pre Treatment Forest Type	Post Treatment Forest Type	Site Preparation (1)	Release (2)	Forest Plan Management Prescription
5-06	18	Loblolly Pine	Longleaf	X	X	3.B
5-50	10	Loblolly Pine	Longleaf	X	X	3.B
6-08	3	Loblolly Pine	Longleaf	X	X	3.B
6-11	5	Loblolly Pine	Longleaf	X	X	3.B
6-07	15	Loblolly Pine	Longleaf	X	X	3.B
7-05	5	Loblolly Pine	Longleaf	X	X	3.B
8-08	2	Loblolly Pine	Longleaf	X	X	3.B
8-08	5	Loblolly Pine	Oak Hickory	X	X	3.B
8-52	5	Loblolly Pine	Longleaf	X	X	3.B
9-03	4	Loblolly Pine	Longleaf	X	X	3.B
9-08	3	Loblolly Pine	Longleaf	X	X	3.B
9-12	4	Loblolly Pine	Longleaf	X	X	3.B
9-13	20	Loblolly Pine	Longleaf	X	X	3.B
9-14	7	Loblolly Pine	Longleaf	X	X	3.B
9-16	3	Loblolly Pine	Longleaf	X	X	3.B
107-22	5	Loblolly Pine	Oak Hickory	X	X	8.D.1
107-24	10	Loblolly Pine	Lob/Oak	X	X	8.D.1
1115-18	10	Loblolly Pine	Longleaf		X	8.D.1
115-32	7	Loblolly Pine	Longleaf/Oak	X	X	8.D.1
115-32	10	Loblolly Pine	Lob/Oak		X	8.D.1
115-35	10	Loblolly Pine	Oak Hickory	X	X	8.D.1
115-37	10	Loblolly Pine	Lob/Oak		X	8.D.1
115-37	15	Loblolly Pine	Lob/Oak	X	X	8.D.1
119-01	7	Loblolly Pine	Lob/Oak		X	8.D.1
125-04	7	Loblolly Pine	Lob/Oak	X	X	8.D
141-06	7	Loblolly Pine	Lob/Oak	X	X	8.D
144-07	15	Loblolly Pine	Lob/Oak	X	X	8.D
144-35	10	Loblolly Pine	Lob/Oak	X	X	8.D
144-37	7	Loblolly Pine	Lob/Oak		X	8.D
150-01	30	Loblolly Pine	Lob/Oak	X	X	8.D
152-10	15	Loblolly Pine	Lob/Oak	X	X	8.D
153-01	25	Loblolly Pine	Lob/Oak	X	X	8.D
153-02	15	Loblolly Pine	Lob/Oak	X	X	8.D
153-19	10	Loblolly Pine	Lob/Oak	X	X	8.D
154-01	20	Loblolly Pine	Lob/Oak	X	X	8.D
157-02	10	Loblolly Pine	Lob/Oak	X	X	8.D
157-12	10	Loblolly Pine	Lob/Oak	X	X	8.D

Compartment -Stand	Acres	Pre Treatment Forest Type	Post Treatment Forest Type	Site Preparation (1)	Release (2)	Forest Plan Management Prescription
161-02	10	Loblolly Pine	Lob/Oak	X	X	8.D
166-30	5	Oak/Willow	Privet Control	X	X	3.B
166-31	5	Oak/Willow	Privet Control	X	X	3.B
170-62	10	Sweetgum/Pop	Privet Control	X	X	4.E.1
172-05	4	Loblolly Pine	Oak		X	9.H
176-01	10	Loblolly Pine	Lob/Oak	X	X	9.H
180-10	10	Loblolly Pine	Lob/Oak	X	X	9.H
Total Acres	428					

Privet control research study would only occur in Alternative B. All other sites are the same in both Alternative B & C.

Herbicide Use in SPB Restoration Areas and Privet Control Research Studies Oconee Ranger District

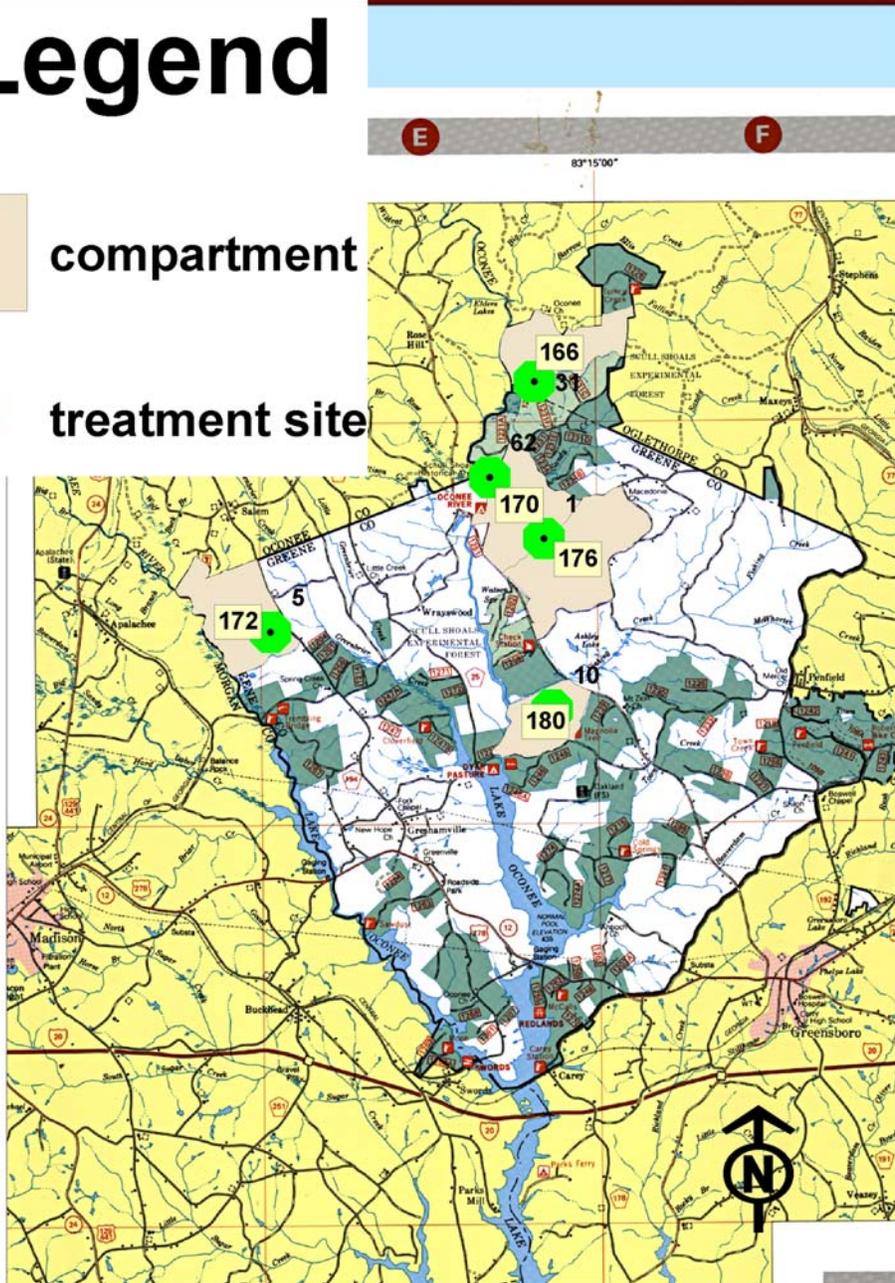
Legend



compartment



treatment site



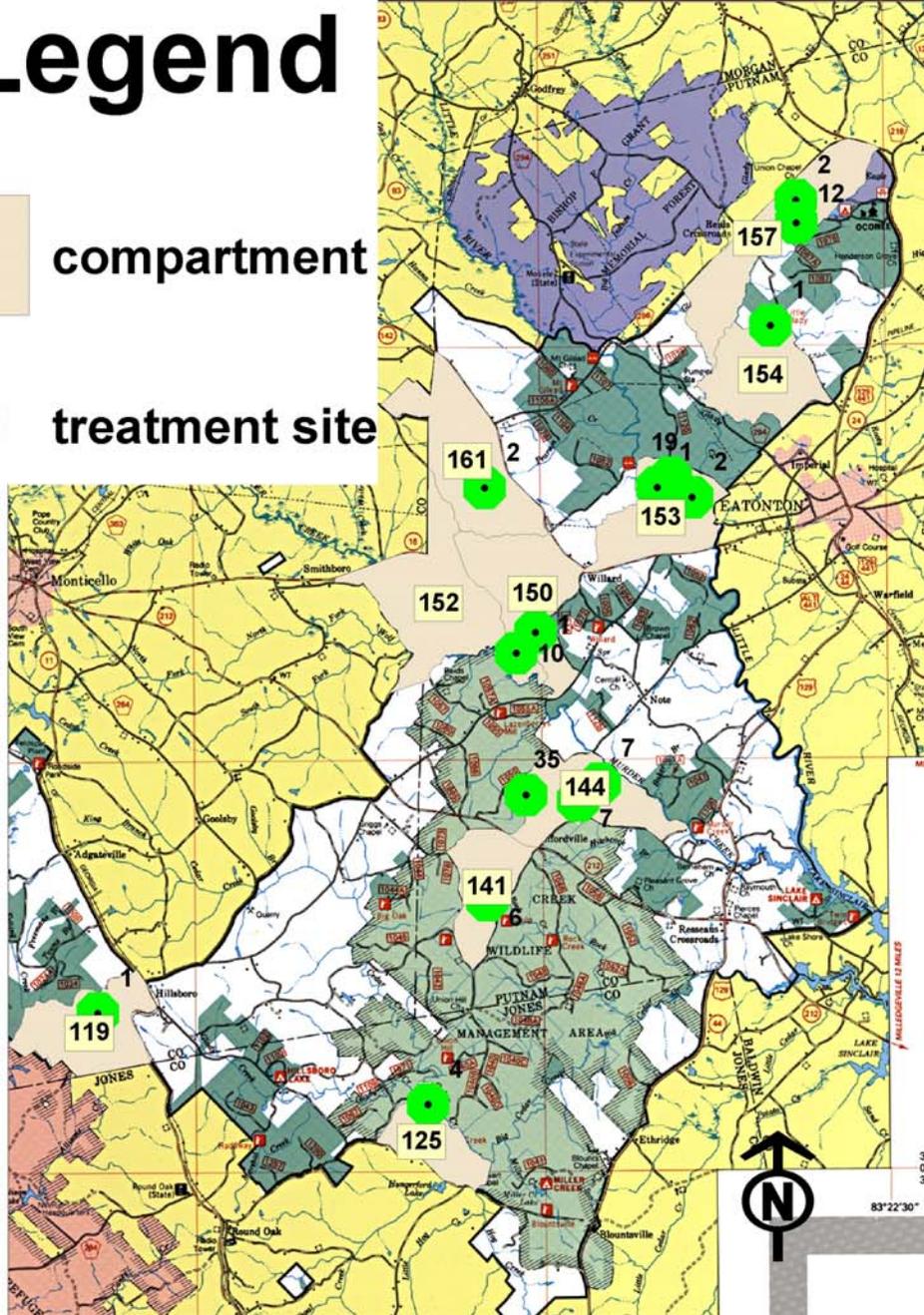
Data shown on this map are for reference only. The Forest Service strives to obtain accurate and precise data; however, there may be some errors in these data

<mapscale 1 inch = 2.8 miles>

Herbicide Use in SPB Restoration Areas and Privet Control Research Studies Oconee Ranger District

Legend

-  compartment
-  treatment site



Data shown on this map are for reference only. The Forest Service strives to obtain accurate and precise data; however, there may be some errors in these data
 <mapscale 1 inch = 2.8 miles>

Herbicide Use in SPB Restoration Areas and Privet Control Research Studies Oconee Ranger District

Legend

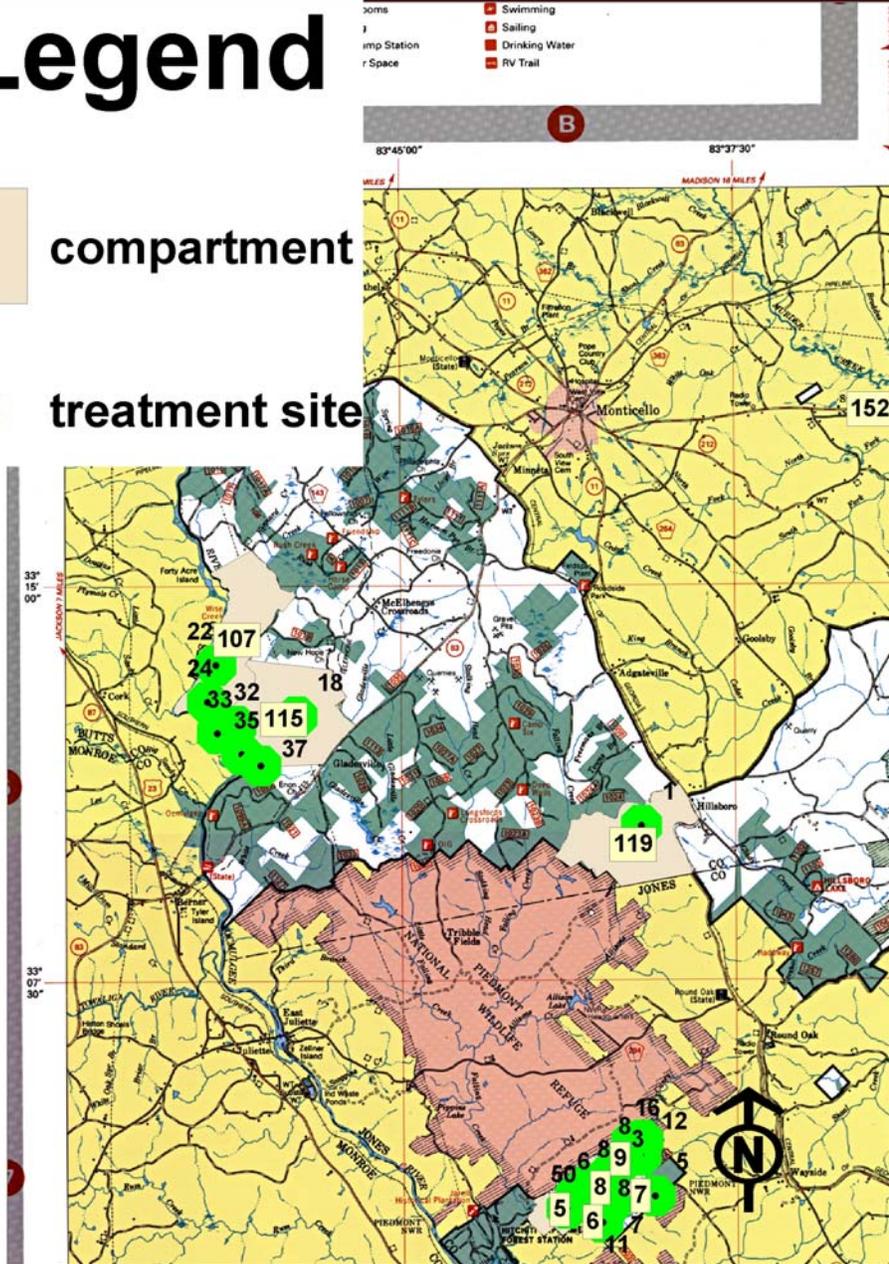
- Swimming
- Sailing
- Drinking Water
- RV Trail



compartment



treatment site



Data shown on this map are for reference only. The Forest Service strives to obtain accurate and precise data; however, there may be some errors in these data
<mapscale 1 inch = 2.8 miles>

