

## **Chapter 2 – Alternatives**

### **Introduction**

This chapter describes and compares the alternatives considered by the Forest Service for the Analysis Unit 5 Project. It includes a discussion of how alternatives were developed, a description of each alternative considered in detail, and a comparison of these alternatives focusing on the significant issues. It also identifies Alternative 6 as the Preferred Alternative, which is also the Proposed Action identified in Chapter 1. Maps of the alternatives can be found in Appendix B. Chapter 2 is intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14).

Some of the information in Chapter 2 is summarized from Chapter 3, “Affected Environment and Environmental Consequences.” Chapter 3 summarizes the scientific basis for establishing base lines and measuring the potential environmental consequences of each of the alternatives. For a full understanding of the effects of the alternatives, readers should consult Chapter 3.

### **Development of Alternatives**

The Proposed Action and each action alternative presented in this EA provides a different response to the significant issues for Analysis Unit 5 while still meeting the stated purpose and need (see Chapter 1). Each of these alternatives represents a site-specific proposal developed through Interdisciplinary Team (IDT) evaluation. Identification of management actions such as regeneration, thinning, and prescribed burning are made using resource data from silvicultural prescription plans, topographic maps, aerial photos, and data that is available in the geographic information system (GIS).

The IDT used information from the analysis of scoping comments, in conjunction with the knowledge of stand data for the Project Area, to formulate different alternative approaches (frameworks). For example, if a project issue was concern over the use of herbicides, then an alternative that used no herbicides was developed. Preliminary analysis and management direction were used to further refine the alternatives described in this chapter.

### **Direction Common to All Alternatives Analyzed in Detail**

The regeneration cut using seed trees (Alternatives 2, 3, 5, & 6) is composed primarily of mature loblolly pine as the dominant species (>70% cover) and mature hardwood as the co-dominant species (<30 %). There is a small component of shortleaf pine within the stand and individual longleaf pines may be present as well. This stand is approximately 89 years old. There would be no prescribed burning within this stand. Existing conditions are such that selection priority of pines for retention is as follows: 1) shortleaf, and 2) loblolly. Natural shortleaf and longleaf capable of producing seeds would be left. The objective is to maintain a mixed pine forest type with shortleaf pine targeted for restoration.

For alternatives with herbicides (Alternatives 2 & 3), applications are made after harvest and once again in three years. Herbicides would be used in a manner consistent with the direction identified in the FEIS for Vegetation Management in the Coastal Plain Piedmont. Herbicide treatments would include the hand tool application of sulfometuron-methyl, triclopyr-amine, triclopyr-ester, hexazinone, and imazapyr for the purposes of release and site preparation.

In all action alternatives, areas proposed for thinning (Alternatives 2-6) are predominant loblolly pine stands. Within sawtimber thinning units that are planned to receive regular prescribed fire, the objective is to grow a mixed pine forest type with shortleaf pine targeted for restoration. Outside of the prescribed burn area, the emphasis would be for management of a pine or pine/hardwood forest type.

The same monitoring and mitigations applied in the Purposed Action will be applied in all the Alternative Actions.

The removal of timber products may require three or more sales. No sale would exceed five MMBF.

All action alternatives retain the late seral component prescribed by the Forest Plan as amended. Approximately 330 acres are designated as late seral. No harvest would occur in late seral stands. Approximately 15 acres of late seral stands would be burned under the District's prescribed burn plan. Burning has been a historically common occurrence across the South, and fire is a natural component of the ecosystem within many late seral stands. Historic records indicate that fire was most likely a periodic event in Analysis Unit 5.

### **Alternatives Analyzed in Detail**

The Proposed Action (Alternative 2) and four alternatives are considered in detail. Alternative 1 is the no action alternative, under which the Project Area would have no management actions at this time, and would remain subject to natural changes only. Alternatives 3, 4, 5, and 6 represent different means of satisfying the purpose and need than the proposed action, by responding with different emphasis to the significant issues discussed in Chapter 1. Fold-out maps of all alternatives considered in detail are provided in Appendix B.

#### **Alternative 1 – No Action**

The emphasis of this alternative is to propose no management actions to promote healthy forest stands. There would be no regeneration of any method, thinning, or herbicide application. It does not preclude any possible future management activities in Analysis Unit 5. The choice of the No Action alternative represents a conscious decision to defer regeneration and sawtimber thinning for this entry. Separate analysis of minor actions and other actions not connected to this entry could be considered, such as prescribed burning. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14d) requires that a "No Action" alternative be analyzed in every EA. This alternative represents the existing condition against which all other alternatives are compared. There would be approximately 330 acres of late seral stands. The Alternative 1 (Existing Conditions) map in Appendix B shows the distribution of vegetation associated with no

new timber harvest. Implementation of the No Action alternative would not meet the purpose and need of this project, nor is it consistent with the directives of the Forest Plan.

**Alternative 2 – The Proposed Action with Mitigations**

The emphasis of this alternative is to restore stands to a healthy state of mixed pine and pine/hardwood using clearcut with reserves regeneration and modified seed tree regeneration management actions. Thinning is intended to help promote resistance to the southern pine beetle.

Alternative 2 would be accomplished through a combination of acres of clearcut with reserves regeneration and cuts using modified seed tree regeneration on approximately 294 acres. Herbicides would be applied to regeneration cut stands to control understory vegetation. Thinning would occur on approximately 850 acres with 654 acres of sawtimber thinning and 196 acres of first thinning. Prescribed burning would occur on approximately 200 acres of thinned stands. There would be 15.59 miles of road reconstruction. There would be approximately 0.76 miles of road constructed as an alternative to using right of ways. A total volume of 19,412 CCF would be harvested. Approximately 121 acres would be planted in longleaf pine at a spacing of 8 feet x 8 feet or 681 trees per acre. The remaining 173 acres, not in the burn plan or in unsuitable soil types, would be regenerated to loblolly pine by natural regeneration or planting to a spacing of 10’x10’ or 435 trees per acres. Site preparation would be accomplished using prescribed burns, herbicides, and mechanical means such as the use of chainsaws.

**Table 2.1 Summary of Alternative 2**

	Within Burn Area	Not Within Burn Area	Herbicides	Total	Volume
<b>Seed Tree Regeneration</b>		40 acres	40 acres	40 acres	1,360 CCF
<b>Clearcut w/reserves</b>	121 acres	133 acres	254 acres	254 acres	8,636 CCF
<b>Sawtimber Thinning</b>	164 acres	490 acres		654 acres	7,848 CCF
<b>First Thin</b>	36 acres	160 acres		196 acres	1,568 CCF
<b>Late Seral</b>	15 acres	315 acres		330 acres	
<b>Road Reconstruction</b>					
<b>Road Maintenance</b>					

\*all acres are approximate

**Alternative 3 – Early Seral Emphasis**

The emphasis of this alternative is to restore stands to a healthy state of mixed pine, pine/hardwood, and hardwood using regeneration with modified seed tree and clearcut with reserves management actions at a level beyond the preferred alternative (Alternative 2 – The Proposed Action). Alternative 3 represents the maximum harvest level appropriate within the constraints of the Forest Plan and emphasizes early seral habitats when compared to other alternatives. Alternative 3 would be accomplished through regeneration cuts using the modified seed tree method on one stand of 40 acres and the clearcut with reserves method on eight stands covering approximately 362 acres. Herbicides would be applied to regeneration cut stands to control understory vegetation. Thinning would occur on approximately 742 acres with 546 acres of sawtimber thinning and 196 acres of first thinning. Prescribed burning would occur on 137

acres of sawtimber thinned stands while approximately 36 acres of first thinning would be burned. There would be 15.59 miles of road reconstruction, and 0.76 miles of new road construction. A total volume of approximately 21,788 CCF would be harvested. Approximately 121 acres would be planted in longleaf pine at a spacing of 8 feet x 8 feet or 681 trees per acre. The remaining 281 acres, not in the burn plan or on unsuitable soil types, would be regenerated to loblolly pine by natural regeneration or planting to a spacing of 8 feet x 8 feet or 681 trees per acres. Site preparation would be accomplished using prescribed burns, herbicides, and mechanical means such as the use of chainsaws.

**Table 2.2 Summary of Alternative 3**

	Within Burn Area	Not Within Burn Area	Herbicides	Total	Volume
<b>Seed Tree Regeneration</b>		40 acres	40 acres	40 acres	1,360 CCF
<b>Clearcut w/reserves</b>	148 acres	214 acres	362 acres	362 acres	12,308 CCF
<b>Sawtimber Thinning</b>	137 acres	409 acres		546 acres	6,552 CCF
<b>First Thin</b>	36 acres	160 acres		196 acres	1,568 CCF
<b>Late Seral</b>	15 acres	315 acres		330 acres	
<b>Road Reconstruction</b>					
<b>Road Maintenance</b>					

\*all acres are approximate

**Alternative 4 – Thin Only**

The emphasis of this alternative is to thin stands to help promote healthy trees resistant to the southern pine beetle. There would be approximately 948 acres of sawtimber thinning and 196 acres of first thinning. There would be no clearcut with reserves or seed tree regeneration, and no herbicide applications. A total volume of 12,944 CCF would be harvested. No reforestation or site preparation treatments are planned with this alternative.

**Table 2.3 Summary of Alternative 4**

	Within Burn Area	Not Within Burn Area	Herbicides	Total	Volume
<b>Seed Tree Regeneration</b>					
<b>Clearcut w/reserves</b>					
<b>Sawtimber Thinning</b>	285 acres	663 acres		948 acres	11,376 CCF
<b>First Thin</b>	36 acres	160 acres		196 acres	1,568 CCF
<b>Late Seral</b>	15 acres	315 acres		330 acres	
<b>Road Reconstruction</b>					
<b>Road Maintenance</b>					

\*all acres are approximate

**Alternative 5 – No Herbicides**

This alternative is the same, as the Proposed Action (Alternative 2) except there would no herbicide applications. The emphasis of this alternative is to restore stands to a healthy state of mixed pine and pine/hardwood using regeneration with modified seed tree and clearcut with reserves management actions without the use of herbicides. Thinning is intended to help promote resistance to the southern pine beetle. Approximately 121 acres would be planted to

longleaf pine at a spacing of 10'x10' or 435 trees per acre. The remaining 173 acres, not in the burn plan or in unsuitable soil types, would be regenerated to loblolly pine by natural regeneration or planting to a spacing of 10'x10' or 435 trees per acres. Site preparation would be accomplished using prescribed burns and mechanical means such as the use of chainsaws.

**Table 2.4 Summary of Alternative 5**

	Within Burn Area	Not Within Burn Area	Herbicides	Total	Volume
<b>Seed Tree Regeneration</b>		40 acres		40 acres	1,360 CCF
<b>Clearcut w/reserves</b>	121 acres	133 acres		254 acres	8,636 CCF
<b>Sawtimber Thinning</b>	164 acres	490 acres		654 acres	7,848 CCF
<b>First Thin</b>	36 acres	160 acres		196 acres	1,568 CCF
<b>Late Seral</b>	15 acres	315 acres		330 acres	
<b>Road Reconstruction</b>					
<b>Road Maintenance</b>					

\*all acres are approximate

**Alternative 6 – The Modified Proposed Action with Mitigations (The Preferred Alternative)**

The emphasis of this alternative is to restore stands to a healthy state of mixed pine and pine/hardwood using clearcut with reserves regeneration and modified seed tree regeneration management actions. Thinning is intended to help promote resistance to the southern pine beetle.

Alternative 6 would be accomplished through a combination of acres of clearcut with reserves regeneration and cuts using modified seed tree regeneration on approximately 294 acres. Herbicides would be applied to regeneration cut stands to control understory vegetation. Sawtimber thinning would occur on approximately 566 acres. The Modified Proposed Action has an increased amount of first thinning over the Purposed Action. In the Modified Proposed Action approximately 972 acres of first thinning are purposed, with 137 acres occurring within the prescribe burn area. There would be 11.2 miles of road reconstruction. There would be approximately 0.5 miles of road constructed as an alternative to using right of ways. A total volume of 21,108 CCF would be harvested. Approximately 121 acres would be planted in longleaf pine at a spacing of 8 feet x 8 feet or 681 trees per acre. The remaining 173 acres, not in the burn plan or in unsuitable soil types, would be regenerated to loblolly pine by natural regeneration or planting to a spacing of 10'x10' or 435 trees per acres. Site preparation would be accomplished using prescribed burns, herbicides, and mechanical means such as the use of chainsaws.

**Table 2.1 Summary of Alternative 6\***

	Within Burn Area	Not Within Burn Area	Herbicides	Total	Volume
<b>Seed Tree Regeneration</b>		40 acres	40 acres	40 acres	1,360 CCF
<b>Clearcut w/reserves</b>	121 acres	133 acres	254 acres	254 acres	8,636 CCF
<b>Sawtimber Thinning</b>	164 acres	402 acres		566 acres	6,792 CCF
<b>First Thin</b>	137 acres	835 acres		972 acres	5,376 CCF
<b>Late Seral</b>	15 acres	315 acres		330 acres	
<b>Road Reconstruction</b>					
<b>Road Maintenance</b>					

\*all acres are approximate

### Comparison of Alternatives

This section compares outputs, objectives, and effects of the alternatives in terms of the significant issues for Analysis Unit 5. The discussions of effects are summarized from Chapter 3. The table below provides an overview comparison of information from the alternative descriptions.

**Table 2.5 Comparison of Action Alternatives by Harvest Type**

Activities	Unit of Measure	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Regen. w/Modified Seed Tree</b>							
No Burn with Herbicide	Acres	0	40	40	0	0	40
No Burn without Herbicide	Acres	0	0	0	0	40	0
DFC Mixed Pine	Acres	0	0	0	0	0	0
DFC Pine/Hardwood	Acres	0	40	40	0	40	40
Harvest Volume	CCF	0	1,360	1,360	0	1,360	1,360
# Harvest Stands	Each	0	1	1	0	1	1
<b>Clearcut w/Reserves</b>							
No Burn with Herbicide	Acres	0	133	214	0	0	133
No Burn without Herbicide	Acres	0	0	0	0	133	0
Prescribed Burning	Acres	0	121	148	0	121	121
DFC Mixed Pine	Acres	0	121	148	0	121	121
DFC Pine/Hardwood	Acres	0	133	214	0	133	133
Harvest Volume	CCF	0	8,636	12,308	0	8,636	8,636
# Harvest Stands	Each	0	5	8	0	5	5
<b>Sawtimber Thinning</b>							
No Prescribed Burning	Acres	0	490	409	663	490	402
Prescribed Burning	Acres	0	164	137	285	164	164
Harvest Volume	CCF	0	7,848	6,552	11,376	7,848	6,792
# Harvest Stands	Each	0	16	9	22	16	14
<b>First Thinning</b>							
No Prescribed Burning	Acres	0	160	160	160	160	581
Prescribed Burning	Acres	0	36	36	36	36	76
Harvest Volume	CCF	0	1,568	1,568	1,568	1,568	5,376
# Harvest Stands	Each	0	4	4	4	4	24
<b>Site Preparation</b>							

Activities	Unit of Measure	Alt. 1	Alt. 2	Alt. 3	Alt.4	Alt. 5	Alt. 6
Burning		No	Yes	Yes	No	Yes	Yes
Chainsaw		No	Yes	Yes	No	Yes	Yes
Hand Directed Pesticides		No	Yes	Yes	No	No	Yes
<b>Roads</b>							
Road Construction	Miles	0	0.43	0.43	0.43	0.43	0.5
Road Reconstruction	Miles	0	9.34	9.34	9.34	9.34	11.2
Road Maintenance	Miles	0	3.46	3.46	3.46	3.46	1.9

\*all acres and miles are approximate  
DFC=Desired Future Condition

### Issue 1: Soil Productivity

Alternative 1 has no timber harvest or new road construction, and in comparison with the other alternatives has no adverse effects to soil productivity. All action alternatives incorporate and apply Forest Plan standards and guidelines for soils. Skid trails, log roads, and decking areas are reviewed and approved by timber sale administrators. Whenever possible, skidding and decking would be limited to designated routes on ridge tops and gentle sideslopes. Harvest activities are restricted during the wet season as most soils in the forest are more prone to erosion, rutting, and compaction during heavy rainfall events. Further restrictions may be needed if rainfall is excessive during logging operations. To reduce compaction and impede soil erosion, all skid trails, bunching areas, temporary roads, and most level D roads would be revegetated and closed.

The alternatives differ in the total amount of timber harvested, by timber harvest methods, and by whether or not herbicides would be used to control understory vegetation. The Proposed Action alternative would maintain 1.2 miles of road. All alternatives contain the same burn block boundary, which encompasses a total of approximately 432 acres within the analysis area. Alternatives 2, 3, 5, and 6 have approximately 40 acres of seed tree regeneration, while Alternatives 1 and 4 have no seed tree regeneration. In Alternatives 2, 5, and 6, approximately 254 acres would be regenerated by the clearcut with reserves, and approximately 362 acres in Alternative 3. There would be no herbicides applied to regenerated stands under Alternative 5, while herbicides would be applied under Alternatives 2 and 3. Alternative 4 would be thinned only (663 acres of sawtimber and 285 acres of first thinning). There would be no seed tree regeneration and no herbicides applications under Alternative 4.

In terms of soil erosion, compaction, and nutrient loss, Alternative 4 would result in lower adverse effects than Alternatives 2, 3, 5, and 6. In Alternatives 2, 3, 5, and 6, protective canopies are removed by regeneration harvest methods and more litter displacement occurs than in thinning only. Forest canopies help to protect soils from the erosive effects of rain and runoff. All alternatives would retain a forest canopy by only removing a portion of the stands through thinning. Additionally, Alternatives 2, 3, 5, and 6 would cause more potential to compact soils than Alternative 4 due to more machinery being used in regeneration than in thinning. Alternative 4 would likely result in less erosion and soil compaction than Alternatives 2, 3, 5, and 6 due to having more understory vegetation than the other alternatives. Alternatives 2 and 3 would receive a series of herbicide applications that would reduce understory vegetation. Understory vegetation helps to protect soils from erosion. All alternatives would be impacted

the same in terms of nutrient loss caused by fire as all action alternatives burn the same amount of acreage.

### **Issue 2: Water Quality**

Alternative 1 has no timber harvest or new road construction, and in comparison with the other alternatives has no adverse effects to the existing water quality. All action alternatives incorporate and apply Forest Plan standards and guidelines for streamside areas. Streams within all action alternatives should be adequately protected from sedimentation and off-site effects by mitigation practices. Prescribed burning is prohibited in streamside areas. Mechanized equipment is generally prohibited within 33 feet of either side of the stream, and exposure of more than 10% of mineral soil within 33 feet of either side of the stream is prohibited.

Streamside buffer zones are reviewed and monitored by timber sale administrators. Whenever possible, buffer zones are expanded. Harvest activities are restricted during the wet season since more sedimentation is likely to occur during heavy rainfall events.

In terms of sedimentation, management actions such as timber harvest, road construction, and prescribed fire may result in increased sedimentation. Sedimentation may increase when vegetation is removed and bare ground is exposed. Alternative 4 would result in lower adverse effects than Alternatives 2, 3, 5, and 6. In Alternatives 2, 3, 5, and 6, regeneration cuts remove more vegetation and expose more bare ground than Alternative 4. Additionally, Alternatives 2, 3, 5, and 6 would cause more disturbances to the ground from machinery than Alternative 4, which may cause increases in sedimentation. Alternative 5 would likely result in less sedimentation than Alternative 2 as there would be no removal of the understory vegetation caused by herbicide applications.

In terms of herbicides causing reduced water quality, Alternatives 2 and 3 would cause the potential of toxic herbicides reaching streams. All alternatives, with the exception of Alternative 5, would have approximately the same amount of potential impacts.

All alternatives would be impacted the same in terms of sedimentation caused by prescribed fire due to the fact that all action alternatives burn the same amount of acreage.

### **Issue 3: Air Quality**

There is concern that management actions may negatively affect the air quality in the project area. Alternative 1 would not change the existing local air quality. Alternatives 2-6 would have the greatest impact on air quality. All alternatives would have similar impacts from equipment usage and prescribed burns.

State regulations and Federal laws that already exist govern this issue. Prescribed burns are conducted in compliance with the State of Mississippi air quality standards. Prescribed burns occur only when state issued permits are available. The permit system insures that total area pollutant outputs do not exceed the potential for dispersion of effects based on atmospheric conditions. These measures minimize impacts to local air quality and consider regional conditions. No part of the project area is expected to exceed air quality standards (NAAQS) or regulations established by the Clean Air Act of 1970.

#### **Issue 4: Vegetation**

In relation to age-class diversity, Alternatives 1 and 4 would offer the least benefits, since no new age classes would be introduced. Alternatives 2, 3, 5, and 6 would maintain a diversity of age classes through the regeneration of older stands. Alternative 3 would best accomplish this with its additional regeneration acres.

Old growth opportunities are ensured in all alternatives through the establishment of late seral stands. The Forest Plan requires that 2½% to 5% of each compartment be established as late seral (Forest Plan pg 4-6). In Analysis Unit 5, approximately 330 acres in seven stands ranging from 28 acres to 107 acres have been designated late seral.

Alternative 1 would in no way impact the issue of hardwood and pine monoculture as no management activities would occur. Alternative 4 would not affect this issue, either, as no regeneration activities would occur under this alternative. Alternatives 2, 3, 5, and 6 would increase the number of hardwoods by restoring pine/hardwood stands through the clearcut with reserves and the irregular seed tree regeneration methods. Alternative 3 would offer the most increases in the pine/hardwood forest type of all alternatives.

With no introduction of early seral stands, a decline in understory diversity associated with this age class would occur in both Alternatives 1 and 4. As for Alternatives 2, 3, and 6, understory diversity, particularly that of soft mast species, would increase due to their protection under the herbicidal application contracts. Understory diversity would be most prolific in Alternative 5 due to no herbicides being used in this alternative. Vegetation, its components, and how they are impacted by the various alternatives are further discussed in Chapter 3.

Alternatives 2, 3, 5, and 6 would likely result in more species composition than Alternative 4. These alternatives include seed tree regeneration, which is intended primarily to remove mature loblolly pine and replace it with mixed pine favoring shortleaf, as well as longleaf pine restoration.

#### **Issue 5: Forest Health**

In terms of species composition, Alternative 1 would retain the existing forest stand types. With no management activities applied to forest stands in Alternative 1, the natural processes of tree growth would occur. If stands are not thinned, trees become less vigorous and more prone to disease and southern pine beetle attacks. Whole stands could die which would result in no species composition. Even if stands do not succumb to diseases, late seral stands are subject to natural death. The loblolly pine species has an average life span of 80 years. As trees die, openings are created in the forest and it is likely that many new trees would begin to sprout. However, without vegetation management such as prescribed fire and herbicides, understory vegetation increases. Understory vegetation competes with trees for sunlight, water, and nutrients. Again, trees are subject to death from the understory competition. Due to the constant management of timber stands since the 1930s, it would be difficult to predict the successfulness of a stand without applying vegetative control.

The reduction of southern pine beetle hazard would be accomplished through any of the Action Alternatives. Alternative 1 would have a detrimental effect on the hazard reduction because no management activities would occur.

Wind firmness would not be a problem under Alternative 1 due to no management activities occurring. No problems would likely result under Alternative 4 as long as basal areas of 60 to 70 ft<sup>2</sup>/acre are maintained. Wind firmness is an issue in Alternatives 2, 3, 5, and 6. These Alternatives all include the irregular seed tree method of regeneration. The residual trees, however, should be large enough that wind firmness would not be a problem.

Alternative 1 would offer the least impacts in terms of biodiversity, specifically the cumulative and site-specific effects of logging, as no management activities would occur. Alternative 4 would be next in least impacts to biodiversity due to its less intense logging activities as compared to the other action alternatives. Alternatives 2, 3, 5, and 6 would most negatively impact biodiversity due to their intensive logging activities with the “Early Seral Emphasis” alternative impacting it the most due to its additional regeneration acres. Chapter 3 further discusses biodiversity and other aspects of forest health and how the various alternatives impact it.

Alternatives 2, 3, 5, and 6 would likely result in more species composition than Alternative 4. These alternatives include seed tree regeneration, which is intended primarily to remove mature loblolly pine and replace it with mixed pine, as well as longleaf pine restoration.

In terms of herbicides, people visiting the National Forest may be exposed to more herbicide under Alternatives 2, 3, and 6. Alternatives 4 and 5 have no herbicide applications.

#### **Issue 6: Threatened, Endangered, and Sensitive Species**

All action alternatives incorporate and apply Forest Plan standards and guidelines for TES plants and animals. However, optimum habitat for indicator species associated with early seral habitat is severely constrained by Alternatives 1 and 4, both within the immediate project area and surrounding private lands. Within the Project Area, no threatened or endangered species were confirmed to occur. There is an abandoned red-cockaded woodpecker cavity tree within the Project Area. Since this Project is outside the proposed Habitat Management Area for red-cockaded woodpeckers, no attempt would be made to reintroduce red-cockaded woodpeckers to the area. Forest Service sensitive species include the Bachman’s sparrow and javelin crayfish.

#### **Issue 7: Management Indicator Species**

All action alternatives incorporate and apply Forest Plan standards and guidelines for Management Indicator Species (MIS). Alternative 1 has no timber harvest or road construction, and in comparison with the other alternatives has no direct adverse effects to existing wildlife habitats on the National Forest. In addition, Alternatives 1 and 4 do not create any early seral habitat within the project area. Late seral habitat is maximized. Stands growing into the late seral structure over the next several entries would further emphasize late seral habitat. Alternative 3 produces the highest level of early seral habitat, approximately 402 acres, with an intermediate level of early seral habitat, approximately 294 acres, created by Alternatives 2, 5, and 6.

In terms of selected key wildlife habitat for sensitive species and MIS, negative effects may occur through direct injury or mortality, or through modification of habitat conditions that result in increased mortality or decreased reproduction and recruitment. Alternative 4 would have fewer impacts than Alternatives 2, 3, 5, and 6. Due to herbicide application in Alternatives 2, 3, and 6, Alternative 5 would likely have less impact to sensitive species.

In terms of game species, management actions may affect populations of game species (deer, turkey, squirrel, quail, and ducks) in demand by the hunting public. Alternatives 2, 3, 5, and 6 would benefit game species associated with early seral or edge habitat more than Alternative 4. Because Alternative 4 is intended to create a healthy mature forest, this alternative would benefit species associated with mature habitat more than Alternatives 2, 3, 5, and 6. For a more detailed analysis, see Chapter 3.

Within the Project Area, management activities generally occur in one concentrated area. The comparison of alternatives address fragmentation as it pertains to National Forest lands only. In terms of disturbance to nesting birds, timber harvest may disrupt nesting forest birds, many of which are Neotropical migrants, by scaring off adults or directly destroying nests, eggs, or nestlings. Alternative 4 would result in fewer disturbances to nesting birds than Alternatives 2, 3, 5, and 6.

#### **Issue 8: Local Economics**

Alternative 1 proposes no timber harvest, and thus offers no opportunity for timber-related employment or revenue. The action alternatives would result in timber related employment opportunities in direct proportion to their total harvest volumes. Alternatives 2, 3, 5, and 6 would offer approximately the same timber volume (between 13,873 CCF and 16,447 CCF) and generate potential jobs in the community. Alternative 4 would generate the least harvest volume of all action alternatives.

#### **Issue 9: Recreation**

There is concern that management actions may change recreational settings within the project area. Recreational opportunities may decrease, change, or disappear. Alternative 1 would not change the current recreational settings or opportunities. All alternatives can change recreational settings drastically. Alternatives 2, 3, 5, and 6 would all have similar effects. Alternative 4 would have the least impacts, as this alternative would thin only. Thinning would not change recreational settings as drastically as regeneration cuts.

There is concern that management actions may negatively affect the visual quality in the project area. Alternative 1 would not change the existing visual quality. Alternative 2, 3, 5, and 6 would have the greatest impacts on visual quality. Alternative 4 would have the least impacts. Alternative 4 is a thin only alternative while Alternatives 2, 3, 5, and 6 contain regeneration cuts. Thinning is generally accepted as having a more pleasing visual effect than clearcuts.

#### **Issue 10: Cultural Resources**

A field examination has been completed at this time, and all sites that may be impacted by harvest activities have been marked and designated as sites to protect. In accordance with our

Memorandum of Understanding, the sites with potential eligibility and unknown eligibility would be protected until further testing can be completed and their status confirmed. The sites will be protected and monitored according to Class I and Class II Property Avoidance Procedures outlined in Appendix E of that Memorandum of Understanding. These areas will be avoided during implementation of the proposed action or any of the action alternatives.

**Issue 12: Civil Rights**

There is concern that effects of management actions be fairly distributed among people without regard to race, color, religion, sex, national origin, age, or disability. Benefits and/or impacts should not fall disproportionately upon anyone or any group. All documents and notices related to this project were readily accessible to all segments of the public. No alternative favors one community over the other. Private land use within close proximity of the Project Area is predominantly timberland. All alternatives address this issue equally.

**Issue 13. Minerals**

Currently, Analysis Unit 5 does not have active oil wells or drilling exploration in progress, however the area is available for lease. On the Homochitto National Forest, annual oil activity and development has consisted of approximately 10-12 new wells drilled and 100 wells in production. A natural gas pipeline does exist and is currently active in the project area and bisects Forest Service land in sections 9 and 10 of T7N, R5E. There are no active gravel pits within Forest Service Lands in the Project Area; however, there may be several private gravel pits in the area. Mitigation would be applied to all action alternatives to protect any sites

To compare the various alternatives and treatments, the following table was developed and is helpful in displaying proposed actions, treatments, and consideration for each alternative discussed in detail.

**Table 2.6: Comparison of Effects**

Issue	Measure	No Action Alt. 1	Proposed Action Alt. 2	Early Seral Emphasis Alt. 3	Thin Only Alt. 4	No Herbicide Alt. 5	Modified Proposed Action Alt. 6
<b>1. Soil Productivity</b>	Acres with decreased long-term soil productivity	0	0	0	0	0	0
<b>2. Water Quality</b>	Increase in sedimentation	0	None with proper mitigation				
	Impact upon wetlands	0	None with proper mitigation				
<b>3. Air Quality</b>	Failure to meet Class II Air Quality Standards	No	No	No	No	No	No
<b>4. Vegetation</b>	Impact upon sensitive plant habitat	None	None with proper mitigation				

Issue	Measure	No Action Alt. 1	Proposed Action Alt. 2	Early Seral Emphasis Alt. 3	Thin Only Alt. 4	No Herbicide Alt. 5	Modified Proposed Action Alt. 6
<b>5. Forest Health</b>	Risk of southern pine beetle infestation	High	Low	Low	Low	Low	Low
	Risk of fire damage	High	Low	Low	Low	Low	Low
<b>6. Threatened, Endangered, and Sensitive Species</b>	Benefit to red-cockaded woodpecker habitat	None	High	High	High	High	High
	Detriment to red-cockaded woodpecker habitat	High	None with proper mitigation				
<b>7. Management Indicator Species</b>	Impact upon management indicator species habitat	None	None with proper mitigation				
<b>8. Economics*</b>	County Returns	\$0	\$254,718	\$285,895	\$134,812	\$254,717	\$248,716
	Benefit/Cost Ratio	0.0	1.61	1.55	1.55	1.52	1.48
<b>9. Recreation</b>	Benefit to recreational settings	None	Moderate	Moderate	Moderate	Moderate	Moderate
	Detriment to recreational settings	High	None with proper mitigation				
	Benefit to upon visual quality	None	Moderate	Moderate	Moderate	Moderate	Moderate
	Detriment to visual quality	None	Moderate short-term				
<b>10. Heritage Resources</b>	Impact upon archaeological sites	None	None with proper mitigation				
<b>12. Civil Rights &amp; Environmental Justice</b>	Social groups affected inequitably	None	None	None	None	None	None

\* These figures are the result of the economic analysis, which appears in Chapter 3 of this document.

## Alternatives Eliminated from Further Analysis

### No Prescribed Burning

An alternative, which would not prescribe any burning for the stands in the Analysis Unit 5 Project Area, was considered but eliminated from further analysis. As fire is a natural

component of forest ecosystems in southern Mississippi, it was determined that the elimination of any fire would limit the potential to establish interior pine forest conditions and would discourage the establishment of the historic longleaf pine component. Over time, without periodic silvicultural contracts such as midstory injection, the grass/herbaceous and low brush understory would disappear in favor of a hardwood midstory, and stands would move toward a pine/hardwood structure. Diversity would diminish as habitat for interior pine forest degraded. This alternative was eliminated from further analysis because it would not meet the purpose and need of promoting some areas of interior pine forest, and reduced the over-all health, sustainability and diversity of the analysis unit.

### **Expanded Burning Areas**

An alternative that would increase the amount of burn block area in the Analysis Unit 5 Project Area was considered but eliminated from further analysis. Current burn block boundaries are those that follow mild slopes or existing trails, roads, or streams. Expanding the burn block would require, in many cases, new fire line to be constructed in areas with steeper slopes or sensitive soils. As a result, damage from erosion would most likely cause impacts to on-site as well as off-site resources. This alternative was eliminated from further analysis because the additional fire lines could not be sustained within soil and watershed protection standards, if replowed ever 2 to 5 years for an extended period.

### **No Thinning**

An alternative that would eliminate thinning in the Analysis Unit 5 Project Area was considered but eliminated from further analysis. Overcrowding of stands is a major forest health issue. The thinning of overstocked stands would accomplish several things including the reduction in southern pine beetle vulnerability, enhancement of wildlife habitat, and maintaining the value of the trees within the stands. Sawtimber thinning in the prescribed burning area would create an open pine dominated, grass and shrub understory community which would have developed naturally had the historic fire regime been maintained. A decision not to thin would have a negative result. If forest stands are not thinned, less light is allowed to penetrate to the forest floor resulting in a decline in understory vegetation. This leads to a decline in wildlife populations including Neotropical migrants. The economic value of the stand is not optimized since a higher stand density would increase the chance for mortality and decrease the amount of growth for each tree. Any low quality hardwoods present in the stands that normally would be removed in a thinning would also remain to take up valuable growing space. This alternative was eliminated from further analysis because it would not support the purpose and need of promoting forest health, encouraging bluestem grasses, and providing wildlife habitat.

### **Natural Regeneration of all Regeneration Units**

An alternative that would require all regeneration units to be reforested naturally was considered but eliminated from further analysis. Regenerating a stand naturally has several benefits. The most recognizable is there is no cost of stand initiation. However, this type of regeneration is very risky in that it is dependent on a good seed source and seedbed preparation. There is a lack of a good seed source of longleaf pine, which is a Desired Future Condition and Purpose & Need. Regenerating by seed tree or shelterwood on stands where a longleaf pine component or pine/hardwood regeneration is the objective would also result in a very large loblolly seed source that, because of its aggressive initial growth characteristics, would rapidly dominate the site,

suppressing both longleaf pine and desirable hardwoods. By not eliminating this seed source to the extent possible, natural regeneration methods make failure to establish the mixed pine and pine/hardwood desired future conditions probable. Loblolly seedlings could be suppressed artificially, but the cost of controlling vegetation by applying herbicides or the use of mechanical equipment would be high, and the use of mechanical equipment is inappropriate for soil and slope conditions in these stands. For this reason, the alternative was eliminated from further analysis due to it not supporting the purpose and need of the project.

### **Ecosystem Restoration Without Sale of Timber**

An alternative was considered which would allow for the restoration of the native diversity and species and improve forest health without conducting a timber sale. Restoring the native longleaf pine on sites now occupied by loblolly pine requires that the overstory trees be felled to reduce loblolly seeding and provide the sunlight necessary for longleaf seedling development. Reduction of southern pine beetle risk also involves the felling of trees. To evaluate this option we assumed a cost of \$150 per MBF to fell the trees, dispose of them with a whole-tree chipper, and spread the chips evenly through the stands. Multiplying this by the approximate 7,630 MBF in the Proposed Actions produces a cost of \$1,144,500. This cost would fall entirely upon the tax payers of the United States, as well as the cost of cultural treatments needed to meet the propose of the project. These cultural treatments, such as site preparation and planting, are generally funded by the Knutson-Vandenburg Fund, which uses moneys from timber sales to reforest the sale areas. It was the intent of Congress that funds generated through the sale of timber are used for these types of projects. Such an alternative may also be outside the intent of the law, since both the National Forest Management Act (NFMA) and the Resource Planning Act (RPA) provide utilization language for timber harvested on the National Forests. For these reasons, this alternative was considered unreasonable and was eliminated from further analysis.

### **Planting Longleaf on all Suitable Soil Sites with no Consideration to Burn Block Boundaries.**

An alternative was considered which would plant longleaf pine in all soils suitable to its growth with no consideration to current burn block boundaries. Longleaf pine grows well on both Smithdale sandy loam and Providence silt loam soil types. Longleaf pine requires a higher degree of fire maintenance to suppress competition from taking over a site. Any lack of fire would reduce the amount of success a longleaf plantation would have unless manual and chemical release were used over time. This alternative was considered too costly and inefficient to implement. However, even though cost was considered, it was not the primary basis for eliminating this alternative from detailed development. Longleaf pine is planted in areas to establish the historic interior pine forest community, not to establish longleaf as a forest crop. This desired community adds to diversity within the Analysis Unit and supports a specific set of management indicator species such as the red-cockaded woodpecker. Fire is inherent to this community. Without fire, the desired future condition is not supported and the resulting community does not take full advantage of natural relationships that develop in unburned stands. The desired pine/hardwood conditions would not develop outside the burning areas.

### **Thinning Stands to a Basal Area of 80 ft<sup>2</sup>/acre**

An alternative was considered to thin stands to a basal area of 80 ft<sup>2</sup>/acre instead of 70 ft<sup>2</sup>/acre. One of the primary goals of thinning our stands is to reduce the risk of stand death by the

southern pine beetle. The goal of the Homochitto National Forest is to keep SPB risk at a low level. Using the Coastal Plains Southern Pine Beetle Hazard Rating system, a basal area of 80 ft<sup>2</sup>/acre would maintain stands at a medium level of risk. This alternative was eliminated from further analysis because it would not support the purpose and need of the project.

### **Uneven-aged Management**

Un-even aged management was considered but eliminated from further consideration because it would not meet the need for ensuring the forest health conditions needed to sustain healthy stands. Both the single tree selection and group selection method of uneven aged regeneration would produce conditions that would reduce resistance to the southern pine beetle. This alternative does not meet the direction outlined in the Forest Plan. The desired future condition, as stated in Chapter 4, page 86 of the Forest Plan, calls for a steady-state forest of relatively balanced age classes interspersed with patches of older seral stages and unregulated areas. The forest would be relatively intensively managed with small pine sawtimber-poles and large hardwood sawtimber being the end product objectives.

Uneven aged management would create a wide mix of age classes within the same stand. Since the majority of the regenerated stands in the Project Area are currently loblolly pine, it would be difficult to convert stands to mixed pine or pine/hardwood, which is a specific objective of this Environmental Assessment (see Chapter 1, Purpose and Need). Single tree selection does not produce shade conditions that favor the oak/hickory components natural to this area, and is considered inappropriate for management of these hard mast producing hardwood species identified as preferred by the public in the Forest Plan. Group selection can provide for hard mast producers, but in the presence of pine, appropriate species mixes are difficult to maintain without increased cultural treatments.

The entry cycle for most uneven-aged management activities is typically five to seven years for single tree selection, and no more than ten years for group selection. Since regeneration is established each five to ten years, areas identified for prescribed burning as a means of meeting the desired future condition for diverse wildlife habitat, could not be burned without damage to new growth. This limits the development of the historic interior pine forest community that included prescribed burning as a component. In addition, uneven-aged management does not produce distinct age classes. Therefore neither early nor late seral habitat would be a characteristic of this alternative. This does not meet the desired future condition of diversity in age classes, to include regeneration sites that support early seral communities. Large blocks of mesic sites, such as large hardwood bottoms, where species mixes favor wetland species and limit fire are not present within the project area. The basic research for uneven-aged management in loblolly pine in the southern coastal plain was conducted at the Crossett Experimental Forest. These stands were maintained by intensive herbicide treatment rather than natural forest relationships. Therefore, biological relationships do not favor uneven-aged management in the areas where activities are planned.