

United States Department of Agriculture
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Pisgah National Forest
Appalachian Ranger District

Environmental Assessment

Northside Timber Sale
and
Associated Activities

Compartments 53, 55 and 56
Yancey County, North Carolina

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INTRODUCTION

This environmental assessment (EA) documents the results of site-specific analysis concerning the proposed Northside Timber Sale on the Appalachian Ranger District. The EA discusses why the project is needed, the issues of concern, the existing condition of the project area, alternative ways to implement the project so that various interests and concerns are considered, and the expected consequences of each alternative, including a "no action" alternative.

1.0 PURPOSE AND NEED FOR THE PROPOSAL

1.1 Proposed Action

Proposed actions within the Northside project area include timber harvesting, silvicultural treatments, old growth designation, and wildlife habitat improvement. The project area of approximately 2,892 acres is located in Compartments 53, 55 and 56 in the Flattop area of Yancey County.

1.2 Purpose And Need For The Project

All actions are being proposed to achieve the goals, objectives, and desired future conditions identified in the Land and Resource Management Plan for the Nantahala and Pisgah National Forests (hereafter, the Forest Plan) issued in April 1987 and as amended. This environmental assessment (EA) is tiered to the Forest Plan and its Final Environmental Impact Statement (FEIS) and the Vegetation Management in the Appalachian Mountains (VMAM) FEIS issued in July 1989. The Forest Plan establishes general management direction for specific areas called "Management Areas". The project area is within Management Areas (MAs) 2A, 3B, 12, 14, and 18.

The purpose of the proposed actions is to provide for a sustainable, healthy forest; to achieve desired future species and age class composition; and to provide wildlife habitat diversity for game and non-game species.

A desired future condition of timber emphasis areas such as Management Area 3B is one which provides a sustainable supply of timber by regulating the growth and removal of trees through time. Harvesting in Units 2, 3a, 3b, 4 and 5 (See Appendix E) would provide wood products to the regional economy and make progress toward reaching a balanced age class distribution.

Harvesting Unit 2 would remove off-site white pine and convert this stand to a forest type suitable to the existing site conditions. Conducting site preparation in Unit 1, which suffered mortality of the pine overstory due to an infestation of Southern Pine Beetle, would allow for regeneration in this stand. These stands would be regenerated to mixed hardwood-white pine forest types, which would provide for a healthier forest that is less susceptible to insect and disease attack.

The following lists the desired future overstory species composition for the stands proposed for regeneration:

- Units 1 and 2: Desired future condition would be for a mixed cove hardwood-white pine stand, consisting of yellow poplar, northern red oak, red maple, chestnut oak, and white pine.
- Units 3a and 3b: Desired future condition is to perpetuate the same mix of species composition, especially hard mast producing species such as oaks.
- Units 4 and 5: Desired future condition is to restore and increase the quantity of oaks in these cove stands.

The desired future species composition for Unit 1 would be accomplished through site preparation. The desired future species composition for Unit 2 would be accomplished by removing the white pine overstory. Oaks and other hard mast producing species would remain where present. The existing hardwood understory would be released and the stands would develop into mixed cove hardwood-white pine stands.

Harvesting in Units 3a and 3b would create two-aged stands. The desired future species composition for Units 3a and 3b would be met in the older age class by retaining hard mast producing species such as oak and hickory as residuals wherever possible. Oak is expected to regenerate and be recruited into the future stand in Unit 3a.

The desired future species composition in Unit 5 would be accomplished by maintaining oaks and other hard mast producing species in the overstory and recruiting the existing advance oak in the understory into the new age class.

Forest-wide direction calls for a regular and sustained flow of habitats across the Forests through space and time for diversity and viability of plant and animal populations. The desired future condition of Management Area 3B is at least 5% of the area in early successional habitat to provide habitat conditions for species such as eastern wild turkey, ruffed grouse, and white-tailed deer. Harvesting Units 2, 3a, 3b, and 5 would provide early successional habitat for the next 10 to 15 years where the residual stand maintains 30 sqft/acre of basal area or less. Riparian areas in both the harvest units and the rest of the analysis area would provide mid to late successional habitat for woodpeckers, squirrels, raccoon, black bear and associated species for the next 10 to 15 years. The proposed actions would maintain and/or enhance habitat for Proposed, Endangered, Threatened, and Sensitive (PETS) species and neotropical migratory birds.

1.3 Location

The project area is located in Compartments 53, 55 and 56 in Yancey County, North Carolina. This area is approximately 11 miles northwest of Burnsville, North Carolina (See Appendix A, Compartment Map). The proposed actions are in the Spivey Creek and Big Creek drainages, which flow into the Nolichucky River. Elevation ranges from about 2,800 to 4,700 feet. The project area is bordered by the

Cherokee National Forest to the west, Flattop Mountain to the north, and the Pisgah National Forest to the south and east. US Highway 19-W passes through the project area. A description of the project area is found in the Affected Environment section of this document. The project area has about 2,892 acres, including forested and non-forested lands, in the following Management Areas:

- ❖ Management Area 2A: emphasizes visually pleasing scenery for forest visitors. Roads are generally open with the adjacent forest land managed to provide that pleasing visual experience. Timber production is permitted, but modified to meet visual quality objectives.
- ❖ Management Area 3B: emphasizes sustainable supply of timber, but with few open roads and limited disturbance associated with motorized vehicles. These areas provide for habitat needs of wildlife such as wild turkey, deer, a variety of small mammals, and other species that will benefit from a managed forest with limited motorized access. Recreationists use these areas for hiking, mountain biking, horseback riding, hunting, and other activities. The area will be managed to soften visual impacts of management activities.
- ❖ Management Area 12: lands identified as developed recreation areas providing camping, picnicking, swimming, boating, viewing of wildlife and scenery, or other recreational activities. All resource management activities are tailored to be compatible with a pleasing recreational experience for Forest visitors.
- ❖ Management Area 14: the Appalachian National Scenic Trail and its foreground as mapped through the Visual Management System. Management practices will protect the Trail for the conservation and enjoyment of the nationally significant scenic, historic, natural, and cultural qualities of the land through which the trail passes.
- ❖ Management Area 18: Riparian areas consisting of perennial streams and a 100-foot wide zone (horizontal distance) on each side of all perennial streams, unless determined otherwise by an interdisciplinary team. These areas will actively be managed to protect and enhance, where possible, the distinctive resource values and characteristics dependent on, or associated with, these systems. For example, timber management can only occur in this area if needed to maintain or enhance riparian habitat values.

See map in Appendix B for Management Areas boundaries.

The three compartments within the project area contain a total of 2,892 acres, which are allocated into five Management Areas (MAs) as follows:

Table 1: Acres in the Project Area by Compartment and Management Area

ACRES BY MANAGEMENT AREA						
Compartment #	2A	3B	12	14	18	Total
53	12	831	35	110	211	1,199
55	31	392	0	73	19	515
56	61	917	0	26	174	1,178
TOTAL	104	2,140	35	209	404	2,892

1.4 Decision to be Made

The District Ranger will use this information to decide whether or not the Forest Service will proceed with this project, and if so, how to proceed. Other government agencies, groups, individuals, and Forest Service personnel interested and concerned about the potential outcome of this project will also use this publication as a basis for critiquing the various courses of action. If an action alternative is chosen, Forest Service personnel will use this document to guide in implementation and monitoring.

1.5 Scoping

The Appalachian Ranger District coordinated with the North Carolina Wildlife Resources Commission, Appalachian Trail Conference, Carolina Mountain Club, and the Tennessee Eastman Hiking Club about a potential timber sale in the Northside project area in April of 1998.

A project proposal was presented and comments were requested in the form of letters sent by the District Ranger on September 15, 1998. Comments were requested by October 15, 1998. Written responses were received concerning the project and can be found in the project folder along with the scoping letter and the mailing lists.

Alternative 3 was identified as the preferred alternative on April 14, 2000 when the draft EA for the Northside Timber Sale Project was mailed to agencies and individuals who commented on the project proposal. A request for comments was published in the Asheville Citizen Times on April 15, 2000. The formal 30-day notice and comment period was to end on May 15, 2000; however, several groups asked that the formal notice and comment period be extended an additional two weeks. A two-week extension was granted on May 5, 2000 and the formal notice and comment period ended on May 29, 2000. A notice was published in the Asheville Citizen Times on May 9, 2000 announcing that the comment period had been extended until May 29, 2000.

On June 19, 2000 Paul Bradley signed the Decision Notice and Finding of No Significant Impact (FONSI) for the Northside Timber Sale and Associated Activities. A legal advertisement announcing the decision was published in the Asheville Citizen Times on June 20, 2000. This decision was appealed to the Regional Forester on August 8, 2000 by Wildlaw on behalf of Western North Carolina Alliance, Appalachian Voices, Southern Appalachian Biodiversity Project, and Wild South. Attempts between the Forest Service and the appellants to informally resolve the appeal were unsuccessful. The Southern Multiple-Use Council submitted comments to the Regional Forester as an Interested Party to the appeal.

The Regional Forester upheld the decision on the Northside Timber Sale on October 17, 2000. The Regional Forester, Elizabeth Estell, concluded that all issues raised in the appeal of the decision on the Northside Timber Sale were adequately addressed by the District Ranger in the Environmental Assessment and the Decision Notice and FONSI. She found that the environmental effects disclosure in the EA was appropriate and adequate for the project and supported the District Ranger's conclusion that the selected action will not have a significant impact on the quality of the human environment.

As a result of the informal resolution meetings between the Forest Service and the appellants, the Forest Service agreed to conduct additional surveys for the velvet covert snail in three of the units proposed for treatment. These additional field surveys documented the presence of the velvet covert snail on about two acres located in the south end of Unit 3a and on approximately three acres in Unit 3b above the road. No velvet covert snails were found in Unit 5. This information was documented in a Supplement to the Wildlife Analysis on November 8, 2000.

On November 28, 2000 District Ranger, Paul Bradley, withdrew his June 19, 2000 decision on the Northside Timber Sale and resource management activities in Compartments 53, 55, and 56 on the Appalachian Ranger District, Pisgah National Forest in Yancey County, North Carolina. This project decision was withdrawn due to ongoing litigation in the U.S. District Court for the Northern District of Georgia in the Sierra Club v. Estill lawsuit. Because this litigation concerned issues that were region wide in scope, he decided to withdraw his decision on the Northside timber sale until additional regional direction was established on these issues. Recently in the Sierra Club v. Estill litigation, the parties to this case agreed to a Stipulated Settlement Agreement and Dismissal Without Prejudice.

District Ranger, Paul Bradley, sent an additional scoping letter on the Northside timber sale and associated activities on October 18, 2001. The letter was mailed to all of those who had previously participated in the planning of the project and anyone who expressed interest in receiving information on projects in the proposal area. The proposal was modified from that of the decision signed in June of 2000 due to changes in conditions on the ground. One of the white pine units previously proposed for harvesting has been infested and killed by southern pine beetle. In addition, site preparation with herbicides and supplemental oak planting was added to the list of possible treatments. Comments were requested by November 19, 2001. All written responses received concerning this project can be found in the project folder along with the scoping letter and the mailing lists.

1.6 Issues

The 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, private groups and individuals. A Forest Service Interdisciplinary (ID) Team developed project alternatives based on the significant issues raised during the comment period. Issues 1-15 were determined to be significant because they were relevant to and within the scope of the proposed actions.

1.6.1 Issue #1: Effects on Soil, Geology, and Topography

Timber harvesting in the Northside project area may result in soil compaction, erosion and/or sedimentation.

Issue #1: This issue is addressed by analysis of the impact of timber harvesting on the soil resources.

1.6.2 Issue #2: Effects on Visual Resources

The visual quality of the area, especially along the Appalachian Trail, may be impacted by timber harvesting.

Issue #2: This issue is addressed by doing a visual quality analysis of the project area and implementing mitigation measures to protect the visual resource.

1.6.3 Issue #3: Effects on Heritage Resources

This project may adversely affect heritage or cultural resources located in the project area.

Issue #3: This issue is addressed by a Forest Archeologist conducting heritage surveys in the project area and requiring any needed protection measures.

1.6.4 Issue #4: Effects on Aquatic Resources

Timber harvesting may cause sediment, which may decrease water quality and adversely affect aquatic habitat.

Issue #4: This issue is addressed by analysis of the impact of harvesting on the Spivey Creek and Big Creek watersheds, the smaller watersheds within the project area, and the fisheries habitat within the area.

1.6.5 Issue #5: Effects on Air Quality

The proposed project may negatively affect air quality in and around the project area.

Issue #5: Prescribed burning 35 acres is the only treatment in this proposal that may affect air quality. This issue is addressed by analysis of the effect of prescribed burning on air quality in and around the project area.

1.6.6 Issue #6: Effects on Roads

Road construction may negatively affect wildlife by increasing mortality rates and increasing the open road density of the project area.

Issue #6: There is no new road construction associated with this project. However, the effects of roads and open road density on wildlife are discussed in the wildlife analysis section of this document.

1.6.7 Issue #7: Effects on Vegetation

The Northside project area does not currently have a balanced age class distribution, which would provide a sustainable supply of timber.

Issue #7: This issue is addressed by analysis of the current age class distribution, the age class distribution resulting from each alternative and proposing alternatives that make some progress toward attaining a balanced age class distribution.

1.6.8 Issue #8: Effects on Old Growth

Old growth opportunities should be evaluated independently of potential timber stands.

Issue #8: Protecting the currently designated future old growth and proposing additional future old growth as directed by the Forest Plan address this issue.

1.6.9 Issue #9: Effects on Botanical Resources

Timber harvesting may have a negative impact on unique plant communities and/or plant Threatened or Endangered (T & E) Species, Regional Forester’s Sensitive (S) Species, or Forest Concern (FC) Species located in the project area.

Issue #9: This issue is addressed by analysis of the botanical resources in the project area including unique plant communities and any plant T & E, S, or FC species that may be present.

1.6.10 Issue #10: Effects on Fisheries Resources

Timber harvesting may cause sediment, which may impact aquatic habitat and adversely affect fisheries and aquatic Management Indicator Species (MIS), Threatened or Endangered (T & E) Species, Regional Forester’s Sensitive (S) Species, or Forest Concern (FC) Species located in the project area.

Issue #10: This issue is addressed by analysis of the fisheries resources in the project area including aquatic MIS, T & E, S, and FC species.

1.6.11 Issue #11: Effects on Wildlife Resources

Timber harvesting may adversely affect wildlife Management Indicator Species (MIS), Threatened or Endangered (T &E) Species, Regional Forester’s Sensitive (S) Species, or Forest Concern (FC) Species located in the project area.

Issue #11: This issue is addressed by analysis of the wildlife resources in the project area including wildlife MIS, T & E, S, and FC species.

1.6.12 Issue #12: Effects on Biological Diversity

This project may result in forest fragmentation and adversely affect biodiversity.

Issue #12: This issue is addressed by analysis of the biological resources in the project area.

1.6.13 Issue #13: Effects on Economics

This proposal may result in a "below -cost" timber sale and have adverse economic impacts as a result of loss of forested acres.

Issue #13: Below-cost is most meaningful when an entire timber sale program is analyzed over a period of several years to consider all revenues and costs. The timber sale economics of this proposal is addressed by conducting a financial efficiency analysis. This analysis basically compares estimated Forest Service expenditures with estimated financial revenues.

1.6.14 Issue #14: Effects on Recreation and Leisure

Recreation uses and opportunities in the area may be impacted by the proposed timber harvesting.

Issue #14: This issues is addressed by analysis of the effect timber harvesting would have on recreational use and opportunities in the area.

1.6.15 Issue #15: Effects on Health and Safety

The proposals to implement timber harvesting and prescribed burning in the project area may impact human health and safety. The use of herbicides (glyphosate and triclopyr) may cause unknown or unwanted effects to humans and wildlife.

Issue #15: This issue is addressed by analysis of the proposed actions on the health and safety of humans and wildlife.

1.7 Issues Beyond the Scope of this Analysis

1.7.1 Logging on National Forest System Lands

Issue A: Logging is an inappropriate use of public forests

Reason this Issue is Beyond the Scope of this Analysis: Timber harvesting is a legitimate use of national forest land as set forth by laws that regulate Forest Service activities. The Forest Plan for the Nantahala and Pisgah National Forests identifies areas where timber harvesting is an appropriate activity in accordance with rules and regulations based on these laws. The decision to harvest or not harvest timber in the Northside project area at this time will be decided based on this analysis.

1.7.2 Timber Theft

Issue B: The issue of timber theft needs to be addressed.

Reason this Issue is Beyond the Scope of this Analysis: Timber theft is an illegal activity on national forest lands. The investigation of timber theft is a function of the Law Enforcement

division of the Forest Service.

2.0 ALTERNATIVES

The Alternatives Chapter is the heart of the Environmental Assessment. This chapter briefly describes Alternative 1: No Action and three action alternatives: Alternatives 2, 3, and 4.

2.1 Alternatives Considered

2.1.1 Alternative 1: No Action

This alternative serves as the no action alternative. No timber harvesting, thinning, site preparation, wildlife habitat improvement, or other management activity would take place in the project area.

2.1.2 Alternative 2

The original project proposed to the public was modified into the current Alternative 2 as more information was gathered about the project area. The boundaries of some of the units were changed to protect aquatic and archeological resources.

Proposed Treatments: Alternative 2 would improve growing conditions by thinning a stand, produce timber, provide wildlife habitat diversity by creating early successional habitat and providing for long-term hard mast production, make some progress toward a balanced age class distribution, and meet desired future species composition in Units 1, 2 and 3a. The following activities are proposed in Management Area (MA) 3B:

Table 2: Activities Proposed by Unit for Alternative 2

ALTERNATIVE 2

Unit #	Compartment/ Stand(s)	Proposed Harvests	Additional Proposed Treatments	Acres*
1	56/21	None	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	4
2	55/11, 13, 20	Two-aged harvest 15-25 sqft/acre residual BA	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	15
3a	53/2	Two-aged harvest 15-20 sqft/acre residual BA	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	15
3b	53/2	Two-aged harvest 15-20 sqft/acre residual BA -----	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	13
			Clip Individual grape stems, leaving grape arbors where designated	13
4	53/7	Thin (60-70 sqft/acre)		6
5	53/11, 14	Two-aged harvest 15-20 sqft/acre residual BA	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	16

*Acreage figures are approximate.

Alternative 2 would include harvesting Units 2, 3a, 3b, and 5 (approximately 59 acres) by the two-aged regeneration method. Unit 4 (about 6 acres) would be thinned. Specifications for residual leave trees are mast producing with large crowns and a DBH of 12 inches or greater. Residual trees will be hard mast producing species such as oak and hickory wherever possible.

Silvicultural Treatments and Monitoring: Mechanical site preparation to remove unmerchantable trees is proposed for initial establishment of the new stands in Units 1, 2, 3a, 3b, and 5. Three years following completion of harvest, the regeneration units will be inventoried and monitored for achievement of stocking level and desired species composition (primarily an oak component as defined in this document). At that time additional silvicultural treatments would be proposed, if necessary, to assure a desirable stand composition. Any future proposal would include an additional environmental analysis and public scoping effort.

Grape vine control is proposed in Unit 3b on approximately 13 acres by clipping grape vines in the spring just at leaf out. Two residual arbors of 1/4 acre in size have been designated and would be protected.

Forest Health Consideration: Southern Pine Beetle

Within the project area there are two inactive SPB infestations. The infestation in Unit 1 was first documented in a field visit on May 1, 2000. At that time, six red-topped trees were observed from High Rocks. Additional field visits in 2000 and 2001 found the entire unit to be infested. This timber is no longer merchantable. Unit 1 is being considered for site preparation only.

Unit 2 is considered high risk for SPB attack. If a SPB infestation were to occur, SPB would be controlled by cutting and removing all infested pine trees and all pine trees within 100 feet of any infested tree within the existing boundaries of this unit.

Road Construction and Maintenance: No new road construction or road reconstruction would be associated with this proposal. Approximately one mile of skid roads would be needed to access the units. All roads will remain gated to prevent public motorized access for the protection of resources. Most slopes in the activity area are less than 40%; therefore, no cable logging would be required. Skid roads and landings would be rehabilitated by applying a seed mixture desirable for wildlife and used as wildlife openings.

Old Growth Designation: In this alternative, stand 16 (110 acres) in Compartment 53 and stands 4, 7 and 13 (71 acres) in Compartment 55 would be designated as future old growth. This would meet the standards and guidelines for old growth in the Forest Plan. See Appendix C for a map of the proposed and currently designated old growth patches.

2.1.3 Alternative 3

An alternative was considered which put an emphasis on production of hard mast without the use of herbicides. Alternative 3 was developed based on this objective. This alternative proposes harvesting 49 acres in Units 2, 3a, 3b, and 5 and prescribe burning 35 acres in Unit 5. It was determined that the hard mast objective could be accomplished in combination with other objectives.

Proposed Treatments: Alternative 3 would produce timber, provide wildlife habitat diversity by creating early successional habitat and providing for long-term hard mast production, make some progress toward a balanced age class distribution, and meet desired future species composition in Units 1, 2, 3a and 5. The following activities are proposed in Management Area (MA) 3B:

Table 3: Activities Proposed by Unit for Alternative 3

ALTERNATIVE 3

Unit #	Compartment/ Stand(s)	Proposed Harvests	Additional Proposed Treatments	Acres*
1	56/21	None	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	4
2	55/11, 13, 20	Two-aged harvest 15-25 sqft/acre residual BA	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	15
3a	53/2	Two-aged harvest 15-20 sqft/acre residual BA	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals	13**
3b	53/2	Two-aged harvest 15-20 sqft/acre residual BA -----	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals ----- Clip Individual grape stems, leaving grape arbors where designated	7** ----- 13
5	53/11, 14	Two-aged harvest 15-20 sqft/acre residual BA -----	Manual Site Preparation with chainsaw felling unmerchantable trees not marked as residuals ----- Prescribed Burn for Advanced Oak Release	14** ----- 35

*Acreage figures are approximate.

** Unit 3a: Changes from Alternative 2 include dropping two acres of occupied velvet covert snail habitat from the proposed treatment area for harvest and site preparation.

Unit 3b: Changes from Alternative 2 include dropping six acres of occupied velvet covert snail habitat from the proposed treatment area for harvest and site preparation.

Unit 5: Changes from Alternative 2 include dropping two acres of suitable snail and amphibian habitat from the proposed treatment area for harvest and site preparation.

These changes also apply to Alternative 4.

Alternative 3 would include harvesting Units 2, 3a, 3b, and 5 (approximately 49 acres) by the two-aged regeneration method. Specifications for residual leave trees are mast producing with large crowns and a DBH of 12 inches or greater. Residual trees will be hard mast producing species such as oak and hickory wherever possible.

Silvicultural Treatments and Monitoring: The silvicultural treatments for these areas are the same as discussed in Alternative 2.

In addition, Alternative 3 would include prescribe burning approximately 35 acres in Unit 5 for advanced oak release of oak seedling and saplings. Monitoring plots would be established prior to prescribed burning to determine the effectiveness of the burn on releasing advanced oak saplings. Plots would be inventoried for the species and height of oak saplings and directly competing saplings before the prescribed burn, in next growing season and three years after the burn.

Forest Health Consideration: Southern Pine Beetle The forest health considerations for these areas are the same as discussed in Alternative 2.

Road Construction and Maintenance and Old Growth Designation: The roading needs and proposed future old growth designations for these areas are the same as discussed in Alternative 2.

2.1.4 Alternative 4

An alternative was considered which put an emphasis on production of hard mast with the use of herbicides. Alternative 4 was developed based on this objective. This alternative considered harvesting 49 acres in Units 2, 3a, 3b, and 5 and prescribe burning 35 acres in Unit 5. It was determined that the hard mast objective could be accomplished in combination with other objectives.

Proposed Treatments: Alternative 4 would produce timber, provide wildlife habitat diversity by creating early successional habitat and providing for long-term hard mast production, make some progress toward a balanced age class distribution, and meet desired future species composition in Units 1, 2, 3a and 5. The following activities are proposed in Management Area (MA) 3B:

Table 4: Activities Proposed by Unit for Alternative 4

ALTERNATIVE 4

Unit #	Compartment/ Stand(s)	Proposed Harvests	Additional Proposed Treatments	Acres*
1	56/21	None	Site Preparation with Herbicides ----- Supplemental Planting of northern red oaks as needed to reach desired stocking levels of hard mast species	4 ----- 4
2	55/11, 13, 20	Two-aged harvest 15-25 sqft/acre residual BA	Site Preparation with Herbicides ----- Supplemental Planting of northern red oaks as needed to reach desired stocking levels of hard mast species	15 ----- 15
3a	53/2	Two-aged harvest 15-20 sqft/acre residual BA	Site Preparation with Herbicides	13
3b	53/2	Two-aged harvest 15-20 sqft/acre residual BA -----	Site Preparation with Herbicides ----- Supplemental Planting of northern red oaks as needed to reach desired stocking levels of hard mast species ----- Clip Individual grape stems, leaving grape arbors where designated	7 ----- 7 ----- 6**
5	53/11, 14	Two-aged harvest 15-20 sqft/acre residual BA -----	Site Preparation with Herbicides ----- Supplemental Planting of northern red oaks as needed to reach desired stocking levels of hard mast species ----- Prescribed Burn for Advanced Oak Release	14 ----- 14 ----- 35

*Acreage figures are approximate.

** Unit 3b: Changes from Alternatives 2 and 3 include treating the grape stems on 7 acres harvested as part of the site preparation with herbicides and proposing to manually treat the remaining 6 acres.

Alternative 4 would include harvesting Units 2, 3a, 3b, and 5 (approximately 49 acres) by the two-aged regeneration method. Specifications for residual leave trees are mast producing with large crowns and a DBH of 12 inches or greater. Residual trees will be hard mast producing species such as oak and hickory wherever possible.

Silvicultural Treatments and Monitoring: Site preparation using herbicide is proposed for initial establishment of the new stands in Units 1, 2, 3a, 3b, and 5. Supplemental planting of improved northern red oak seedlings would take place the year following harvest. Three years following completion of harvest, the regeneration units would be inventoried and monitored for achievement of stocking level and desired species composition (primarily an oak component as defined in this document). At that time, additional follow up treatments with herbicides would be implemented if the desired composition of 20% oaks has not been attained.

Grape vine control is proposed in Unit 3b on approximately 6 acres by clipping grape vines in the spring just at leaf out. An additional 7 acres of grape vine control would be included in the site preparation with herbicides. Two residual arbors of 1/4 acre in size have been designated and would be protected.

Prescribed burning in Unit 5 (35 acres) for advanced oak release is the same as discussed under Alternative 3.

Forest Health Consideration: Southern Pine Beetle The forest health considerations for these areas are the same as discussed in Alternative 2.

Road Construction and Maintenance and Old Growth Designation: The roading needs and proposed future old growth designations for these areas are the same as discussed in Alternative 2.

2.2 Alternatives Considered But Not In Detail

Clearcutting was considered as a harvest method; however, the Forest Plan directs us to use clearcutting only where it is essential to meet specific forest plan objectives and within certain circumstances. In this project area, the purpose and need and Forest Plan objectives (see pages 1-3) can be met using other harvest methods such as the two-aged or shelterwood regeneration methods if the stands proposed for treatment remain healthy. In the case of stands infested with Southern Pine Beetle, clearcutting is essential to meet specific forest plan objectives.

In Management Area 3B we are to provide a minimum of 5% of the analysis area in early successional habitat (0-10 years old) (Forest Plan, p. III-29). The "selection" method (the removal of individual trees and leaving a closed canopy) would not meet the management area direction for early successional habitat. Therefore, individual tree selection harvesting was not considered in detail.

Another type of selection harvesting, "group selection" was also considered. This method harvests small openings (1-2 acres) which creates small early successional patches throughout the stand. In order to achieve 5% early successional habitat, approximately 505 acres would need to be entered due to the spacing of the small group openings. The acreage that would be required is not available in this analysis area due to management area designation (adjacent stands are not in management areas suitable for

timber production). One of the requirements needed in successfully prescribing the selection method is a large contiguous stand with similar characteristics. This requirement cannot be met in the analysis area due to the various ages of the existing stands and the topographical limitations of the area.

Prescribed burning to create grass/forb habitat was considered to increase the percentage of this land cover type in the analysis area; however, this cover type is not compatible with the topography, moisture regime, or soils in the areas considered for vegetative manipulation.

2.3 Mitigation Measures

The following mitigation measures apply to Alternatives 2, 3, and 4.

Mitigation measures for protection of soil and water, visual quality, recreation, vegetation, and wildlife include the Land and Resource Management Plan for the Nantahala and Pisgah National Forests (Forest Plan) 1986-2000 (as amended, Forest Plan Amendment #5, March 1994) Forest-wide direction (III-5 to III-52); and direction and standards for Management Area 2A (III-63 to III-70); Management Area 3B (III-71 to III-76); Management Area 12 (III-140 to III-143); Management Area 14 (III-148 to III-165) and Management Area 18 (III-179 to III-189). Any action alternative for the proposed project will comply with the NC Forest Practices Guidelines Related to Water Quality: 15 NCAC 11 .0100-.0200 (regulations). Application of the Forest Plan Standards (standards) is intended to meet the performance standards in the State regulations. Mitigation measures to prevent visible sedimentation in streams will be implemented. Should any practice fail to meet the regulations, additional practices or the re-application of existing measures will be implemented as soon as practical as specified by the State regulations.

Wildlife: Riparian areas will be 100 feet on either side of perennial stream channels unless specifically designated by an interdisciplinary team during a site visit.

Any gravel used to strengthen the road carrying capacity of the closed portion of FS road 278 that is currently a linear grass/forb opening will be minimal and the roaded surface will be ripped and re-seeded in grass/forb cover during the season of operation for Unit 2, once harvesting is complete.

The season of harvesting and road work activity for Unit 2 and the closed portion of FS road 278 will be outside of the November 1 - April 30 time frame to avoid disturbance during late fall and early spring.

Any skid trails required for Unit 3a and 3b will avoid crossing the velvet covert snail occupied habitat where possible. If a skid trail is necessary, the Wildlife Biologist will assist the Timber Sale Administrator in laying it out to minimize impacts on the snail population.

The prescribed burn will take place prior to turkey and grouse nesting seasons.

Aquatic Resources: Perennial springs and seeps will be marked during unit marking. Spring and seep perimeters will be clearly marked and logging equipment will not be permitted to cross these areas. These areas will join stream riparian areas if there is less than 100 feet between the two areas to protect intermittent reaches.

Intermittent springs and seeps will be mapped during unit marking. No equipment will be allowed to cross these areas when they are wet.

Trees accidentally felled across stream channels or springs will be lifted (when possible) away from the water. If this is not possible, each tree will be pulled away from the water where it fell and temporary decking will be used to support the weight of the tree as it is pulled across the channel. These removals will be perpendicular to the stream channel whenever possible to minimize stream bank disturbance. Bare soil will be seeded and mulched if native vegetation does not start to recolonize the area by the time timber removal from the unit is complete.

Visual Resources: In all regeneration units, select leave trees with well-formed crowns.

In Alternatives 2, 3, and 4:

- Leave a minimum residual basal area of 30-35 sqft. per acre in Unit 2 and assure the lower boundary is an adequate distance from US 19-W. If Unit 2 becomes infested with Southern Pine Beetle, the leave basal area mitigation for protection of visual quality will be disregarded in the interest of the cumulative effect on scenery across the forest. If active SPB infestations are not controlled by cutting, there is a high probability infestations will spread rapidly and kill many more acres of trees.
- In Unit 2 (if a SPB infestation were to occur within the unit boundaries), burn or lop and scatter slash to within 2 feet of the ground for 100 feet beyond the edge of an open road or trail.
- Leave a minimum residual basal area of 25-30 sqft. above the road in the eastern most portion of Unit 3a
- Leave a minimum residual basal area of 30-35 sqft. per acre above the 3800 foot elevation contour in Unit 5.
- The unit boundary in Unit 5 will be kept a minimum of 350 feet from the Appalachian Trail northeast of Whistling Gap.

Recreation: Lookouts would be posted along the Appalachian Trail during the implementation of the prescribed burn proposed in Alternatives 3 and 4. Hikers would only be allowed to pass when the area was safe.

Soils: All prescribed burns will be executed during the dormant season (approximately November 1 - April 15) and planned for low to moderate intensity to prevent soil scald and minimize the possibility of soil erosion.

Air Quality: Smoke Management Guidelines will be followed on the prescribed burn.

Heritage Resources: The Class II site identified by the archeologists would be protected by excluding it from the treatment area.

If during the implementation of a ground disturbing activity a previously unknown archeological or historic site is encountered, the disturbance would stop immediately. The activity would not be permitted to continue until a forest archeologist surveys and evaluates the site and makes a recommendation to permanently stop, modify, or proceed with the activity using appropriate mitigation measures.

2.4 Summary Comparison of Actions

Table 5: Summary of Proposed Activities Proposed by Alternative

SUMMARY OF TREATMENTS BY ALTERNATIVE

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Botanical Treatments				
Manual release of Butternut Trees (<i>Juglans cinerea</i>) in Unit 3a		X	X	X
Regeneration Harvesting	0 acres	59 acres	49 acres	49 acres
Thinning	0 acres	6 acres	0 acres	0 acres
Tractor Logging	0 acres	65 acres	49 acres	49 acres
Cable Logging	0 acres	0 acres	0 acres	0 acres
Supplemental Planting of Northern Red Oak	0 acres	0 acres	0 acres	40 acres
Site Preparation (Manual)	0 acres	63 acres	53 acres	0 acres
Site Preparation and Follow-up Release (Herbicide)	0 acres	0 acres	0 acres	53 acres
Manually Clip Individual Gape Stems	13 acres	13 acres	13 acres	6 acres
Prescribed Burn for Advanced Oak Release	0 acres	0 acres	35 acres	35 acres

3.0 AFFECTED ENVIRONMENT

This section gives a brief description of the existing environment in and around the project area that may be affected by the alternatives under consideration.

3.1 Soils, Geology, and Topography

Buladean-Chestnut, Ditney-Unicoi, Harmiller-Shinbone, Keener-Lostcove, Pigeonroost-Edneytown, Porters-Unaka, Saunook-Thunder, Thunder-Saunook, and Toecane-Tusquitee, are the nine soil map units found within the project area. The chart below shows which soil map units are found in each area proposed for treatment.

Table 6: Soil Map Units for the Units Proposed for Treatment

SOIL MAP UNITS	Unit 1	Unit 2	Unit 3a	Unit 3b	Unit 4	Unit 5
Buladean-Chestnut					X	
Ditney-Unicoi	X	X				
Harmiller-Shinbone	X					
Keener-Lostcove	X	X				
Pigeonroost-Edneytown			X		X	X
Porters-Unaka			X	X	X	
Saunook-Thunder			X	X	X	X
Thunder-Saunook				X		X
Toecane-Tusquitee			X			X

These loamy soils are moderately deep to very deep and well drained with moderate to severe hazard of erosion and equipment limitation, depending on degree (percent) of slope. Standard wheeled and tracked equipment can be used on these soils; however, compaction can be reduced by using low pressure ground equipment, harvesting with seasonal constraints, and avoiding equipment entry in areas with slopes greater than 40%.

The Buladean-Chestnut complex and the Toecane-Tusquitee complex are derived from felsic high-grade metamorphic or igneous rock. The Ditney-Unicoi complex, Harmiller-Shinbone complex, and the Keener-Lostcove complex are formed from low-grade metasedimentary rock. The Pigeonroost-Edneytown complex, Porters-Unaka complex, Saunook-Thunder complex, and the Thunder-Saunook complex are formed from felsic to mafic high-grade metamorphic or igneous rock.

3.2 Visual Resources

The visual resource is the natural landscape being viewed. It is composed of landforms, vegetation, rock formations, and water bodies. The character of a landscape is the overall impression created by its

unique combination of these natural features and the presence or absence of human structures or modifications.

The visual resource is best described by viewsheds. A viewshed is the total landscape that can be seen from a particular viewpoint. Field surveys and computer simulations were used to identify viewpoints and determine the visibility of proposed management activities. Travel corridors and use areas located in the project area include Highway 19-W, FS road 278, FS road 5508, the Appalachian Trail (AT), and the Spivey Gap Recreation Area.

Forest Service personnel, along with a representative of the Appalachian Trail Conference and a representative of the Tennessee Eastman Hiking Club, conducted field reviews of the project area and surrounding landscape. Six viewpoints or corridors were used in this analysis and are described below:

Viewpoint #1 is located along the AT east of Flattop Mt. Branch. Part of Unit 3 is visible in the middleground from this viewpoint. National Forest lands seen in the middleground from the AT for this project appear as a continuous hardwood forest with patches of young trees in areas of past timber management. These 8 - 12 year old clearcuts vary in size and blend in to the surrounding landscape to varying degrees. Most views from the AT would be screened by foreground vegetation during leaf-on season.

Viewpoint #2 is located on the AT at High Rocks. Units 1 and 2 are visible in the middleground from this viewpoint.

Viewpoint #3 is located along the AT west of Whistling Gap. Part of Unit 5 is visible in the middleground from this viewpoint.

Viewpoint #4 is located along US 19-W, from FS road 278 to the Tennessee state line. Unit 2 is visible in the foreground from this viewpoint. Foreground views from US 19-W are of steep slopes with mixed hardwood-conifer forests. Many areas have a dense understory of rhododendron that completely screens the surrounding forest. These foreground views also include intersections with gravel roads.

Viewpoint #5 is located at the entrance to Spivey Gap Recreation Area. Unit 2 is visible in the foreground from this viewpoint.

Viewpoint #6 is located along the AT northeast of Whistling Gap. Unit 5 is partially visible in the foreground and middleground from this viewpoint.

National forest lands are assigned visual quality objectives (VQOs) that define the degree of acceptable change to the visual resource caused by human modification. VQOs are based on Management Area designation along with the sensitivity and distance from key viewing areas. The VQO of Units 1-5 is modification except where they are visible from the Appalachian Trail where the VQO is partial retention. A modification VQO allows management activities to visually dominate but harmonize with the original characteristics of the landscape. An area has three full growing seasons after a treatment to meet a modification VQO. A partial retention VQO allows management activities to be seen; however, they should remain subordinate to the characteristic landscape. An area has two full growing seasons to meet a VQO of partial retention.

3.3 Heritage Resources

Archeologists have conducted heritage resource surveys in Units 1-5. A total of five archeological sites were located: 2 prehistoric, 1 historic and 2 prehistoric/historic. One site is rated Class II and considered potentially eligible for inclusion in the National Register of Historic Places (NRHP). Four sites are rated Class III and are not considered eligible for the NRHP.

3.4 Aquatic Resources

The proposed project is within the Big Creek and Spivey Creek watersheds (Forest Plan watersheds 47 and 19, respectively). Principal streams in the aquatic project and analysis areas are Big Creek, Little Spivey Creek, and Spivey Creek. Only headwater reaches of these streams are within the aquatic project and analysis areas.

The aquatic project area is defined as the area of potential site-specific impacts on aquatic habitat and populations and contains approximately 0.56 miles of streams within the Northside Timber Sale proposal. It is important to note that the aquatic project area includes headwater reaches of unnamed tributaries to Little Spivey and Spivey Creeks. Because of recent weather patterns, it is difficult to determine if these areas are intermittent or perennial channels. There is evidence of high flow and associated stream channel movements (such as downcutting and braiding); however, there is no aquatic habitat suitable for fish populations. There is limited aquatic habitat suitable for aquatic invertebrate populations within the aquatic project area given the apparent unstable nature of flow regimes and channel form.

The aquatic analysis area, or area of this effects analysis, includes the aquatic project area and downstream reaches to the confluence of Little Spivey and Spivey Creeks. It also includes two unnamed headwater tributaries to Big Creek from approximately 300 yards above old Forest Service road 278 downstream to Highway 19-W and Big Creek from Spivey Gap downstream to the entrance to the old hunt camp. The aquatic analysis area includes approximately 5.21 miles of intermittent and perennial streams within the Big Creek and Spivey Creek watersheds.

Existing Threats to Aquatic Habitat and Populations: Currently, runoff from Highway 19-W and riparian disturbances along power line rights-of-ways are affecting aquatic habitat and populations within Big Creek. It is reasonable to assume that sedimentation of pool habitats and thermal pollution from increased solar radiation within the power line corridors is occurring. In addition, chemical runoff from vehicle traffic and road maintenance (e.g. right-of-way maintenance using herbicides and snow and ice control using salt and other chemicals) is likely affecting aquatic communities within Big Creek since Highway 19-W parallels (and is adjacent to) the stream for most of its length.

Culverts along the Forest Service Road, the road itself, and existing old roads and skid trails are the existing threats to the headwaters of Spivey and Little Spivey Creeks. Impacts from these sources are limited to downslope movement of sediment from road runoff and culvert fills. It is suspected that sediments from these sources are deposited in the natural vegetative filters before they reach areas of perennial water since the road is closed to all but administrative and fire control traffic (i.e. road disturbance is limited). There is an area adjacent to Unit 3 where a very old skid trail is within one

branch of a headwater stream. This has resulted in the widening and braiding of the channel. Most sediment movement from this area appears to be deposited above the culvert at the system road. This is one case where a potentially undersized culvert (it stays partially blocked) may have helped downstream water quality by creating a filter and depositional area for runoff sediments.

3.5 Air Quality

The Northside project area is classified as a Class II air quality area. Class II areas are general air areas and Class I areas are specially protected areas under the Clean Air Act as amended in 1977. The closest Class I air quality areas are the Linville Gorge Wilderness Area which is located about 24 miles southeast of the project area and the Great Smoky Mountains National Park which is located approximately 43 miles southwest of the project area.

3.6 Roads

Highway 19-W provides the main access to all units. Access to Units 1 and 2 is off Forest Service Road 278. Access to Units 3a, 3b, 4 and 5 is off Forest Service Road 5508. There will be no new road construction or reconstruction. Road work may include grading and/or gravelling the existing roads. Approximately 1 mile of skid roads would be needed to provide access to the proposed treatment units.

3.7 Vegetation

The forest is composed of stands that are delineated according to age, forest type, and site conditions. Because of past land use practices, stands in this area are predominantly even-aged, meaning that the dominant and codominant trees making up each stand are approximately the same age. Age-class distribution is helpful in describing forest condition, and is shown in the table below for forested acres in Management Areas suitable for timber production.

Table 7: Age Class Distribution by Compartment-Year 2002

**ACRES BY AGE CLASS
COMPARTMENTS 53, 55 and 56
Year 2002**

Age Class	C53	C55	C56	Total	% of Area
0 - 10	0	0	37	37	1
11 - 20	97	30	105	232	9
21 - 30	25	62	69	156	6
31 - 40	0	0	16	16	1
41 - 50	0	0	0	0	0
51 - 60	47	151	43	241	9
61 - 70	312	68	61	441	17
71 - 80	52	129	791	972	37
81 - 90	389	0	0	389	15
91 - 100	91	0	10	101	4
101+	41	0	0	41	1
TOTAL	1054	440	1132	2,626	100

As indicated in the table, 1% of the analysis area is 0-10 years old, 25% is between 11 and 60 years of age, 54% is between the ages of 61 and 80, and 20% is greater than 80 years. The definition of a balanced age class distribution is a fairly even distribution of acres among all of the age classes.

The majority of the project area is hardwood forest consisting primarily of northern red oak, yellow poplar, red maple and hickory. There are small acreages of white pine mixed with hardwoods, cove hardwoods mixed with white pine and hemlock, upland hardwoods, and northern hardwoods.

There are currently two inactive Southern Pine Beetle (SPB) infestations located within the project area. One of the infestations was first documented on May 1, 2000. Six red-topped trees were observed in Unit 1 from High Rocks. A follow-up field visit on May 31, 2000 revealed that nearly the entire stand was infested (including the 100-foot buffer needed to suppress the infestation). By the winter of 2002, the spot had spread into the entire stand.

Unit 2 is not currently infested; but, with the current levels of SPB, it is considered high risk for infestation. The head and direction of spread of this infestation is within 1000 feet of Unit 2. The other SPB spot was located in Unit 3 of the Big Creek Timber Sale, within the Spivey Creek Recreation Area. The infested trees in this second infestation have being cut and removed.

The following six stands are being considered for treatment in the project area:

- Unit 1 was a 76-year-old planted white pine stand located in Management Area (MA) 3B. Southern Pine Beetle has killed 95% of all the pine timber in this unit. The existing natural

regeneration makes up the new 2-year old stand and is a mixture of white pine, hemlock, and hardwoods. Few hard mast producing species are included in the mixture except along roadsides and the edges of the stand.

- Unit 2 is a 76-year-old planted white pine stand mixed with some overstory hardwoods, mostly oaks, and is located in MA 3B. The sawtimber averages about 90 sqft/acre and a DBH of 21 inches. Site index is 80 for white pine. Advanced hardwood regeneration is present in the understory. The white pine is considered off site in this location based on the existing site conditions, including topography, soil types, and soil moisture content.
- Unit 3a is primarily in a pocket of upland hardwood approximately 81 years old on a south facing aspect. This unit is located in MA 3B. The overstory is dominated by large diameter oaks some of which may be older than 81 years, with some white pine along the ridgetops and yellow poplar on the lower portion of the slope. The sawtimber in Unit 3a has a basal area of between 90 and 100 sqft/acre and averages 19 inches DBH. This stand was thinned approximately 20 years ago. Little to no advanced regeneration has developed in this stand. Even though this unit is classified as an upland hardwood forest type it grades into cove hardwoods lower in the cove and grades into chestnut-scarlet oak forest type higher on the slope.
- Unit 3b is an 81-year-old stand consisting primarily of cove hardwoods including yellow poplar, northern red oak, red maple, chestnut oak, and white pine. This unit is classified as a cove hardwood stand; however, higher on the slope it changes into an upland hardwood forest type and grades into chestnut-scarlet oak forest type higher on the slope. This unit is located in MA 3B. The hardwood and white pine sawtimber average about 19 inches DBH and has a basal area of between 90 and 100 sqft/acre. Grape arbors and individual plants are in abundance in the stand. Grapes have entered the canopy of the portion of the stand west of the road, especially in a few hemlocks adjacent to road. Individual stems are also numerous and well developed. Little to no advanced oak regeneration is present in the understory.
- Unit 4 is a pocket of yellow poplar in a cove approximately 81 years old. The average diameter is 16 inches DBH and has a basal area of about 130 sqft/acre for sawtimber. This stand is located in MA 3B and has a site index of 120 for yellow poplar (base age 50). Little to no advanced regeneration exists in the stand.
- Unit 5 is a cove hardwood stand that contains yellow poplar, red maple, northern red oak and other mixed hardwoods. The southern most portion of the stand is basically a boulder field dominated by large stem red maple. This stand is 70 years old and located in MA 3B. The sawtimber averages about 105 sqft/acre and a DBH of 18 inches. Site index is 100 for yellow poplar. This stand was thinned approximately 20 years ago. After the thinning an understory developed of yellow poplar, sugar maple, red maple, hemlock, and oak seedlings and saplings. Some advanced regeneration oak (one and half inches diameter at root collar) is present in the stand; however, it is in direct competition with yellow poplar saplings.

3.8 Old Growth

Amendment 5 of the Forest Plan states that, the desired future condition for old growth across the forest is to have a network of small, medium, and large sized old growth areas, representative of sites, elevation, gradients and landscapes found in the Southern Appalachians and on the Forests, that are well dispersed and interconnected by forested lands. Many factors were considered in the selection of these old growth areas. More detailed information about the old growth selection process is available from the Supervisor's Office in Asheville.

Large patches identified in Appendix K of the Amendment (as amended, Forest Plan Amendment #5, March 1994), have been evaluated for future old growth management potential. The purpose of the large patches is to serve as permanent reservoirs of biological diversity, and to provide preferred habitats for forest interior birds across the landscape. The intent is to allow for the restoration of functional old growth ecosystems at the subregional, Forest and landscape levels. A large patch of old growth has been designated in the vicinity of the project area. This area, known as large patch #21, is about 4,111 acres in size and is located in compartments 59, 61, 63, 66, 67, and 69-71.

The purpose of the medium patches is to serve as permanent reservoirs of biological diversity. The intent is to allow the restoration of functioning old growth ecosystems at the landscape and Forest scale. There are no medium patches located near the project area.

The plan also calls for a minimum of 5% of each compartment that is not already part of an old growth area or "patch", to be designated for old growth management. According to the amendment, the purpose of the small patches is to increase biological diversity and provide structural components of old growth at the stand and landscape levels. Old growth is usually first described by stand age, but other factors such as location, size of trees, understory components, and adjacent stands are also considered. A small patch of 59 acres has been designated in Stand 19 of Compartment 56 in association with the Big Creek Timber Sale. It is proposed, stand 16 (110 acres, 9%) in Compartment 53 and stands 4, 7, and 13 (71 acres, 14%) in Compartment 55 be designated as future old growth. (See Appendix C, Map of Future Old Growth).

3.9 Botanical Resources

3.9.1 Introduction

The Northside activity area is contained within the upper Little Spivey Creek drainage. Most of the ridges and valleys have a northwest to southeast trend. The highest elevations in the project area are about 4700 ft. (Flat Mountain to High Rocks Mountain), which are located between the activity areas. The general elevation of the project area descends to the northwest to Little Spivey Creek (3200 ft.). The topography is typically sloped with some conspicuous flat areas along Little Spivey Creek. There are occasional flatter areas along ridges and in some coves.

A total of 76 Threatened and Endangered (T & E), Sensitive (S) and Forest Concern (FC) plant species are known to occur in Yancey County, North Carolina and were reviewed for potential occurrence in the project area. All but eighteen species were dropped from the list for further consideration and discussion for one of the following reasons:

- ❖ Lack of suitable habitat for the species in the project area
- ❖ The species has a well-known distribution that does not include the project area
- ❖ Based on field surveys of potential habitat, no suitable habitat was seen in the activity areas

Habitats, natural community types and ranges of plant T & E, S and FC species are derived from information in Classification of the Natural Plant Communities of North Carolina, the Natural Heritage Program's List of Rare Plant of North Carolina or information obtained through other botanists.

Based on habitat information, eighteen S and FC plant species could occur in the project area; however, only two sensitive and one Forest Concern species are known to occur in the project area and one Forest Concern species is likely to occur in the project area. A list of all eighteen S and FC species know or that could potentially could occur in the project area can be found in the Botanical Analysis (Appendix D).

3.9.2 Natural Plant Communities and Special Habitats

Three main natural plant communities dominate most of the area within this project area. These communities are: Chestnut Oak Forest, Montane Oak-Hickory Forest and Acidic Cove Forest. These three communities often grade into each other so that a continuum exists between these typic communities. Rich Cove Forest and Swamp Forest Bog Complex communities occur in the project area as smaller “inclusions” within the three main community types.

See the Botanical Analysis (Appendix D) for complete descriptions of these natural communities. Table 2 below displays which Natural Communities are located in the units proposed for treatment.

Table 8: Natural Communities and Plant T& E, S or FC Species by Unit

UNIT	Proposed Harvest activity(s)	NATURAL COMMUNITIES OR HABITAT	OCCURRENCE of PLANT T & E, S or FC SPECIES
Unit 1	Site Preparation Only	Acidic Cove Forest with Chestnut Oak Forests near top of unit.	No plant T& E, S or FC species known.
Unit 2	2-Aged Harvest	Acidic Cove Forest with Chestnut Oak Forests near top of unit.	No plant T& E, S or FC species known.
Units 3a and 3b	2-Aged Harvest	Acidic Cove Forest below grading Montane Oak-Hickory Forest near the top. Some element of Rich Cove and Chestnut Oak Forest Seeps at bottom of cove.	<i>Juglans cinerea</i> (S) is known to occur. All action alternatives exclude <i>Juglans cinerea</i> from direct impacts. May have beneficial indirect effects. No other plant T& E, S or FC species known to occur.
Unit 4	Thinning	Mostly Chestnut Oak Forests, Montane Oak-Hickory Forest near the top.	No plant T& E, S or FC species known.
Unit 5	2-Aged Harvest	Mostly Montane Oak-Hickory grading into Rich Cove Forest at the bottom. Stream/seep in cove. "Boulderfield forest" develops on north slope of this unit see note under Rich Cove Forest description (Botanical Analysis).	No plant T& E, S or FC species known.

An assessment of habitat changes in natural communities and special habitats is a valuable tool in evaluation of effects to Management Indicator Species (MIS). Each MIS is linked to one or more natural communities or special habitats. The MIS species selected for this project proposal are linked to the following natural communities and special habitats:

- ❖ Cove Forests
- ❖ Oak, Oak-Hickory Forests
- ❖ Shaded Rock Outcrops and Cliffs
- ❖ Forested Seep Wetlands
- ❖ Early Successional Habitat
- ❖ Soft Mast Producing Forests
- ❖ Hard Mast Producing Forests
- ❖ Mixed Pine/Hardwood Forests
- ❖ Permanent Grass/Forb Habitat

❖ Down Woody Material

3.9.3 Plant Threatened and Endangered Species

There are no known or expected plant Threatened or Endangered species in the botanical analysis or activity areas.

Table 9: Known and Potential Threatened or Endangered Plant Species

Federally Threatened or Endangered Plant Species (T & E)			
SPECIES	TYPE	NATURAL COMMUNITY OR HABITAT	OCCURRENCE
<i>None known</i>	N/A	N/A	N/A

3.9.4 Plant Sensitive Species

Two sensitive plant species (*Juglans cinerea* and *Aconitum reclinatum*) are known to occur within the botanical analysis area. *Juglans cinerea* is known to occur within Unit 3a. *Aconitum reclinatum* is known within the botanical analysis area; however, it is not known to exist within any of the areas proposed for treatment.

Table 10: Known and Potential Sensitive Plant Species

2002 Region 8 Regional Forester’s Sensitive Plant Species (S)			
SPECIES	TYPE	NATURAL COMMUNITY OR HABITAT	OCCURRENCE
<i>Aconitum reclinatum</i>	Vascular Plant	Rich Cove Forest and Northern Hardwood Forest	Occurs in the botanical analysis area, not known to occur in the activity area.
<i>Juglans cinerea</i>	Vascular Plant	Rich Coves	Occurs in Unit 3a

3.9.5 Plant Forest Concern Species

Carex woodii, a Forest Concern species, is known to occur in the botanical analysis area but not the potential activity areas. *Carex projecta* (FC) is likely to occur in the botanical analysis area but is not known to occur in the proposed activity area.

Table 11: Known and Potential Forest Concern Plant Species

Forest Concern (FC) Plant Species			
SPECIES	TYPE	NATURAL COMMUNITY OR HABITAT	OCCURRENCE
<i>Carex projecta</i>	Vascular Plant	Bogs, Swamp Forest Bog Complex	Likely to occur in botanical analysis area but not activity areas.
<i>Carex woodii</i>	Vascular Plant	Rich Cove and Slope Forests, Montane Oak Forests	Occurs in the botanical analysis area, not known to occur in the activity area.

3.10 Fisheries Resources

3.10.1 Introduction

Sheryl A. Bryan, Forest Service Fisheries Biologist, conducted aquatic habitat surveys of the proposed aquatic project and analysis areas on March 23, 1998. Mrs. Bryan revisited these areas in July 1998 while conducting aquatic invertebrate monitoring for the Big Creek Timber Sale. On September 1, 2000, Kelly Howell, Forest Service Fisheries Biologist, went back to the aquatic project and analysis areas to survey and see if there had been any change in habitat since Mrs. Bryan’s last visit. The surveys consisted of examining streams within the aquatic project area, noting habitat quality, quantity, and suitability for rare aquatic and management indicator species, as well as existing impacts and their source.

Thirty-five rare aquatic species have been listed by the North Carolina Wildlife Resources Commission (NCWRC), United States Fish and Wildlife Service (USFWS), or North Carolina Natural Heritage Program (NCNHP) as occurring or potentially occurring in Yancey County. These species are listed in Attachment 3 of the Aquatic Resource Analysis (AQUA). Of the thirty-five aquatic species included on the original list for analysis, sixteen were dropped as a result of a likelihood of occurrence evaluation based on preferred habitat elements and field survey results. Species that do not occur (based on survey results) or are not likely to occur (based on a lack of suitable habitat) are removed from the list of species considered. This process is summarized in Attachment 3 of the AQUA.

3.10.2 Fisheries Management Indicator Species

A management indicator species (MIS) is a species that the National Forests in North Carolina selected for emphasis in planning and will be monitored during Forest plan implementation to assess the effects of management on their conditions and trends and the effects on diversity and population viability of all native and desirable non-native plants and animals.

Brook trout (*Salvelinus fontinalis*) and rainbow trout (*Oncorhynchus mykiss*) are known to occur within the aquatic analysis area. Longnose (*Rhinichthys cataractae*) and blacknose dace (*Rhinichthys*

atratus) and mottled sculpin (*Cottus bairdi*) may occur within the aquatic analysis area in Tennessee. Brook and rainbow trout were chosen as project-level MIS since they are sensitive to changes in water quality and habitat condition and occur or may occur in streams within the aquatic analysis area where suitable habitat exists. Blacknose dace (*R. atratus*) and mottled sculpin (*C. bairdi*) were not chosen as project-level MIS because of their limited distribution within the aquatic analysis area.

Table MIS-5 (Appendix G) lists the all the MIS for the National Forests in North Carolina and shows which habitats they represent. In addition, an estimate of the population trend for each species is shown.

Table 12: Fisheries Management Indicator Species (MIS)

Fisheries Management Indicator Species			
SPECIES	TYPE	HABITAT	OCCURRENCE
Brook Trout (<i>Salvelinus fontinalis</i>)	Fish	Mountain Streams	Known to occur in the analysis area
Rainbow Trout (<i>Oncorhynchus mykiss</i>)	Fish	Mountain Streams	Known to occur in the analysis area

3.10.3 Fisheries Threatened and Endangered Species

There are no known or expected fisheries Threatened or Endangered species in the aquatic project or analysis areas.

Table 13: Known and Potential Threatened or Endangered Fisheries Species

Federally Threatened or Endangered Fisheries Species (T & E)			
SPECIES	TYPE	HABITAT	OCCURRENCE
<i>None known</i>	N/A	N/A	N/A

3.10.4 Fisheries Sensitive Species

There are no known or expected fisheries Sensitive species in the aquatic project or analysis areas.

Table 14: Known and Potential Sensitive Fisheries Species

2002 Region 8 Regional Forester’s Sensitive Fisheries Species (S)			
SPECIES	TYPE	HABITAT	OCCURRENCE
<i>None known</i>	N/A	N/A	N/A

3.10.5 Fisheries Forest Concern Species

There are nineteen aquatic Forest Concern species that may occur in both the project and analysis areas.

Table 15: Known and Potential Forest Concern Fisheries Species

Forest Concern (FC) Fisheries Species			
SPECIES	TYPE	HABITAT	OCCURRENCE
a caddisfly <i>Agapetus jocassee</i>	Caddisfly	Lotic - erosional	May occur in both project and analysis areas
Lenat's ceraclea <i>Ceraclea</i> species 1	Caddisfly	Lotic and Lentic	May occur in both project and analysis areas
Mount Mitchell caddisfly <i>Madeophylax altus</i>	Caddisfly	Lotic	May occur in both project and analysis areas
Tiger spiketail <i>Cordulegaster erronea</i>	Dragonfly	Lotic – depositional	May occur in both project and analysis areas
Spine-crowned clubtail <i>Gomphus abbreviatus</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Moustached clubtail <i>Gomphus adelphus</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Beaverpond clubtail <i>Gomphus borealis</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Cherokee clubtail <i>Gomphus consanguis</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Harpoon clubtail <i>Gomphus descriptus</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Splendid clubtail <i>Gomphus lineatifrons</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Piedmont clubtail <i>Gomphus parvidens</i> <i>parvidens</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Skillet clubtail <i>Gomphus ventricosus</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas
Green-faced clubtail <i>Gomphus viridifrons</i>	Dragonfly	Lotic – depositional Lentic - littoral	May occur in both project and analysis areas

Northern pygmy clubtail <i>Lanthus parvulus</i>	Dragonfly	Lotic – erosional and depostional	May occur in both project and analysis areas
Brook snaketail <i>Ophiogomphus asperes</i>	Dragonfly	Lotic – erosional and depostional	May occur in both project and analysis areas
Maine snaketail <i>Ophiogomphus mainensis</i>	Dragonfly	Lotic – erosional and depostional	May occur in both project and analysis areas
Riverine clubtail <i>Stylurus amnicola</i>	Dragonfly	Lotic – depostional Lentic - littoral	May occur in both project and analysis areas
Zebra clubtail <i>Stylurus scudderi</i>	Dragonfly	Lotic – depostional Lentic - littoral	May occur in both project and analysis areas
Spicilose serratellan mayfly <i>Serratella spicilosa</i>	Mayfly	Lotic – erosional and depostional	May occur in both project and analysis areas

3.11 Wildlife Resources

3.11.1 Introduction

A landscape analysis area was used to evaluate the effects of the proposed treatments on wildlife species. The wildlife landscape analysis area is defined by the watershed divide at Spivey Gap from the Cane River drainage to the Nolichucky River drainage as the eastern perimeter; No Business Ridge, Tennessee and Flat Top Mountain, NC as the northern perimeter; High Rocks to Little Bald as the southern perimeter; and Little Bald Creek of the Spivey Creek drainage and Big Branch Creek of the Granny Lewis Creek drainage within Tennessee as the western perimeter (Compartments 53, 55 and 56 in North Carolina (NC) and Compartments 395 and 412 in Tennessee (TN)).

The total acreage of Forest Service lands considered for wildlife habitat equals 2075 acres in TN and 2888 acres in NC. The private land ownership is found within Compartment 412 in Tennessee and is estimated to be 340 acres. In the Unaka Ranger District (Cherokee National Forest) evaluations, the private land use was reported as being small farms, residences, and forested. Therefore, the entire analysis area is 5,303 acres. While this area does not define the entire watershed, much of the remaining lands are privately owned and will be considered in this analysis only in the context of overall effects to wildlife habitat characteristics.

This watershed is representative of the age class distribution common throughout the district, with a majority of forest between 41 and 100 years of age. Approximately 42 percent of the watershed is at an optimum mast producing age. Private land is found within Compartment 412 in Tennessee concentrated along State roads. Analysis done for the Granny Lewis timber proposal on the Unaka Ranger District on the Cherokee National Forest determined that private residences were likely to increase due to the new interstate being built in the area. This private land use and State Road 19-W probably restrict wildlife

movement and reduce the quality of habitat within the southwest portion (Compartment 412) of this watershed.

Riparian areas and seeps are located throughout the watershed and the proposed harvest units. Older forests (101+ years of age) are fully represented comprising approximately 23 percent of the wildlife analysis area. Grass/forb and early successional habitats are under represented (less than 1 percent of the wildlife analysis area), even when considering recent timber sales in the watershed.

The Pisgah and Nantahala National Forests maintain lists of the current T, E & S species. These lists were used as part of the wildlife analysis for this project. Forest Concern species on the Pisgah and Nantahala National Forests were also considered in this analysis. Appendix A of the Wildlife Analysis lists the species that were dropped from further consideration based on one or more of the following reasons:

- ❖ Lack of suitable habitat in the analysis area.
- ❖ The species has a well-known distribution that does not include the analysis area.
- ❖ No state historical record exists.
- ❖ Suitable habitat is located outside the proposed project area.

One sensitive and four Forest Concern species are either:

- Known to occur within the project area.
- Likely to occur because habitat occurs within the project area and the Sensitive or Forest Concern species is/was known to occur within the analysis area.
- May occur because (a) habitat occurs within the project area that is similar to where the known Sensitive or Forest Concern species exist, and (b) because there is a known county occurrence record near the analysis area, even though they were not seen during field surveys.

3.11.2 Wildlife Management Indicator Species

Management Indicator Species (MIS) represent various native and desirable non-native vertebrate species and their habitat forest wide. Black bear, eastern wild turkey, raccoon, ruffed grouse, and Solitary Vireo were chosen as the wildlife management indicator species (MIS) representative of this watershed and the proposed activities, which are all located in Management Area 3B. In addition, ovenbird and pileated woodpecker, other MIS, were added to the analysis after they were identified in the project area during surveys. Their population changes are believed to indicate the effects of management activities on wildlife.

Table MIS-5 (Appendix G) lists the all the MIS for the National Forests in North Carolina and shows which habitats they represent. In addition, an estimate of the population trend for each species is shown.

Black Bear

Black bears require a large home range generally free from the disturbance of human activity associated with motorized vehicles and hunter access to sustain reproduction and a healthy population. It has been shown that gated or restricted vehicle access roads and temporary roads do not affect bear movement

within its home range. Traffic volume is the largest factor in bear avoidance of roads. Hunting pressure is another factor in their avoidance of roads. Brody (1984) found open gravel roads affected bears if the density reached approximately 2 mi/sq mi (1.25 km/km²).

Open road density measures the amount of disturbance presented by roads and four-wheel drive ways. Portions of the Flattop Mountain Bear Sanctuary are located within the wildlife analysis area, which has an open road density of 1.6 mi/sqmi. The open road density of the portion of the analysis area located in the Pisgah National Forest is 1.1 mi/sqmi. including Highway 19-W. The Forest Plan standard for Management Area 3B is 0.5 miles of open road per square mile. Although studies have demonstrated, on low traffic volume roads such as FS road 278, bears and their movements are not affected, this open road density exceeds the Forest Plan standard.

Bears typically require extensive, rugged country with dense thickets, swamps, bays, or rock outcrops. Steep mountains and other rugged areas provide optimum escape cover from humans and running dogs. Bears require hard mast in the form of acorns, as well as soft mast in the form of berries and grapes. Summer soft mast is available in recent regeneration cuts, while fall hard mast is relatively abundant in 50-69 year old hardwood stands since acorn production in most oaks peaks at this age. Research has shown that bear heavily utilize white oak-red oak stands and tend to avoid yellow poplar stands and pine-hardwood mixed forest types. Brush cover types containing Rubus spp., Vaccinium spp., and Prunus spp. are staple summer and early fall foods (Beeman and Pelton, 1980). The current linear grassy openings within this area are surrounded by the brushy food source plants listed above. However, some areas of thick blackberries are beginning to be replaced by woody stems.

Unit 3a is a preferred forest type, producing both a hard mast overstory and a soft mast huckleberry understory. Even with the close proximity of State Highway 19-W, site specific topography allows this stand to provide good habitat in its current condition for black bear. The stand is 81 years old and, as demonstrated by multiple research on bear habitat utilization, it is declining in use by bears as it ages. Past management of this stand type and aspect have demonstrated a high percentage of oak in the regenerating stands.

Mark Jones, Black Bear Project Leader, NC Wildlife Resources Commission, stated that their studies of reproduction, mortality, and population age structure for Yancey County and the Flat Top Bear Sanctuary indicate the population of black bear is stable and growing. The most recent update of the MIS assessment concurs with this population trend.

Eastern Wild Turkey

Eastern wild turkey utilize seeps during early spring because they provide warmer conditions and the earliest available vegetation. They rely on hard and soft mast such as acorns, small seeds, grapes and berries for survival throughout the year. A conifer component of hemlock and younger (50 years old or less) pine trees are utilized as thermal cover during winter months. Wild turkey utilizes cove hardwood sites for grape arbors, buds, and soft mast species, especially during low acorn yield years. Early successional habitat provides cover and soft mast for turkey. Older hardwood stands provide both hard and soft mast.

Permanent grass/forb openings are desirable for brooding and bugging. The analysis area contains all of the habitat components for wild turkey; however the grass/forb component is very low. Little private land is found in the area and as such, is not providing the brood habitat. The past timber sale activity in this area increased the available grass/forb component by 20 acres; however it remains below 1% and the Forest Plan standard of 3%. In the short term, the open condition of the regenerating stands, for up to 20 years, will be used by turkey broods for bug foraging and cover.

Mike Seamster, Wild Turkey Project Leader, NC Wildlife Resources Commission stated the populations of wild turkey across Yancey County are growing and healthy based on their harvest data records. The most recent update of the MIS assessment concurs with this population trend.

Ruffed Grouse

Ruffed grouse utilize much of the same habitat as wild turkey including early and mid-successional hardwood stands and brushy openings. They require the soft mast supplied by early successional habitats and also use these stands as well as linear and small grass/forb openings for cover. Joe McFee, NCWRC stated hunting and observation data indicates that Yancey County is maintaining a stable population of ruffed grouse and this analyzed area is average for the county. The most recent update of the MIS assessment concurs with this population trend.

Raccoon

Raccoons inhabit riparian areas, hard mast forest within ½ mile of streams, and older forests with an increased number of den tree availability. Their food sources around riparian communities include crayfish, hard mast, small fish, snails, and salamanders. Within an older forest community, they commonly feed on bird eggs as many interior species of birds are ground-nesting. Many other vertebrates found throughout older forests, such as wood-boring insects in decaying logs, are part of the wide variety diet of this species. Raccoons have been found to establish their dens within ½ mile of streams (Forest MIS assessment). The most recent update of the MIS assessment determined raccoon populations across the Nantahala and Pisgah National Forests to be increasing.

Solitary Vireo

Solitary Vireo is a neotropical migratory bird species that needs large mature timber for nesting. They prefer pine and mixed pine/hardwood stands above 3500' in elevation. Studies (Sauer et al 1995, BBS data) have demonstrated this species has maintained a stable population and the most recent update of the MIS assessment determined the population is increasing.

Ovenbird

Ovenbird is a neotropical migratory bird species that does not demonstrate a strong preference in forest habitat conditions; however, it is found at a slightly higher incidence in mature forests. Ovenbird does prefer forests that are multi-structured and contain vegetation of varying heights. The most recent update of the MIS assessment found the Ovenbird populations are increasing rangewide but may be decreasing locally.

Pileated Woodpecker

Pileated Woodpecker is most numerous in mature cove forests and riparian habitats; however, they also utilize seedling/sapling habitat. The most recent update of the MIS assessment found that Pileated Woodpecker populations are increasing across the Nantahala and Pisgah National Forests.

Table 16: Wildlife Management Indicator Species (MIS)

Wildlife Management Indicator Species			
SPECIES	TYPE	HABITAT(S)	OCCURRENCE
Black Bear	Mammal	Old Forest Communities Hard mast-producing species Mixed Pine/hardwood forests Contiguous areas with low disturbance Den trees (>36 dbh) Downed woody debris	Known to occur in the analysis area
Eastern Wild Turkey	Bird	Hard mast-producing species Mixed pine/hardwood forests Contiguous areas with moderate disturbance Permanent grass/forb openings	Known to occur in the analysis area
Raccoon	Mammal	Alluvial Forests Snags and dens (>22 dbh)	Known to occur in the analysis area
Ruffed Grouse	Bird	Early successional (0-10) Early successional (11-20) Downed woody debris	Known to occur in the analysis area
Solitary Vireo	Bird	Red Spruce/Fraser fir, Northern Hardwood, and Cove Forests Large Contiguous Forests Areas	Known to occur in the analysis area
Ovenbird	Bird	Large Contiguous Forest Areas	Known to occur in the analysis area
Pileated Woodpecker	Bird	Old Forest Communities Snags and dens (>22 dbh) Downed woody debris	Known to occur in the analysis area

3.11.3 Wildlife Threatened and Endangered Species

There are no known or expected wildlife Threatened or Endangered species in the wildlife analysis or activity areas.

Table 17: Known and Potential Threatened or Endangered Wildlife Species

Federally Threatened or Endangered Wildlife Species (T & E)			
SPECIES	TYPE	NATURAL COMMUNITY OR HABITAT	OCCURRENCE
<i>None known</i>	N/A	N/A	N/A

3.11.4 Wildlife Sensitive Species

Weller’s Salamander (*Plethodon welleri*)

Plethodon welleri, Weller's salamander, a Regional Forester’s Sensitive species, was observed on Flat Top Mountain in 1945. The species is thought to persist at this location and all element of occurrence records for this salamander in North Carolina are from mountain tops.

Table 18: Known and Potential Forest Sensitive Wildlife Species

2002 Region 8 Regional Forester’s Sensitive Wildlife Species (S)			
SPECIES	TYPE	HABITAT	OCCURRENCE
<i>Plethodon welleri</i>	Salamander	Spruce/fir, hemlock & yellow birch high elevation communities	Not likely to occur

3.11.5 Wildlife Forest Concern Species

Cerulean Warbler (*Dendronica cerulea*)

Cerulean Warbler, a Forest Concern species, has a potential for occurring in units 3b, 4, and 5 within the Northside TS proposal. These stands exhibit cove hardwood communities and many of the characteristics for Cerulean Warbler habitat. Due to the low number of documented populations in North Carolina, an Interim Habitat Management Policy for the National Forests in North Carolina has been initiated and states that a survey be done within a April 25 - June 15 timeframe, to assess whether this bird is present. The surveys were completed on May 20, 1999 by Dennis Helton and Sandy Florence and resulted in no Cerulean Warblers being found.

Southern Zigzag Salamander (*Plethodon ventrali*)

An element of occurrence for the Southern zigzag salamander, a Forest Concern species, has been recorded close to Units 1 and 2, on the north slopes of Big Creek. There are only 5 populations on the NC Natural Heritage program records for this salamander in the state of North Carolina; however, these records may be inaccurate and are from 15 year old or older observations. Personal communication with Dr. Petranka, University of North Carolina, Biology Department (Feb. 25, 1999), determined that this species closely resembles the redback salamander and may have been mis-identified. Dr. Petranka noted that research studies carried out in the summer and fall of 1998 by the North Carolina State Museum at the site of the historic element of occurrence found no zigzag salamanders. Due to the dry summer and fall conditions recorded that year, Dr. Petranka stated the survey carried out by the museum is not conclusive for verifying the historic occurrence without follow-up surveys during late fall, when moist, warm days cause the salamander to be its most active.

The zigzag salamander has been found in mature cove forests and these forest conditions are found in Units 3b, 4 and 5. Wildlife biologist Sandy Florence conducted surveys on April 20, 1998 for the zigzag salamander in the area immediately below Unit 2 and the closed portion of Forest Road 278. No zigzag salamanders were found as a result of these surveys. Salamander surveys of Unit 3b, below the road, and Unit 4 and were determined to have the highest potential habitat for this species. Matthew Eldridge, on May 20, 1999, surveyed both sites resulting in 4 common salamander species being found. No zigzag salamanders were found in the surveys of Units 3b and 4. The larger area of habitat found west of the units in the Spivey Creek drainage was not surveyed as it was determined to be outside of the area of potential effects by these proposed actions.

While no confirmation of *Plethodon ventralis* at the historic element of occurrence site can be made, the highest potential habitat for most salamander species can be found in the stand immediately below the existing closed portion of Forest Service road 278 that will be utilized in harvesting Unit 2 for Alternatives 2, 3, and 4.

Honey Glyph Snail (*Glyphyalinia vanattai*)

Honey glyph snail, a Forest Concern species, has been recorded in Yancey County; however, little is known regarding their populations or preferred habitat other than moist leaf litter in ravines and wooded mountain sides. Dr. R. Caldwell, Cumberland Mountain Research Center, (personal communication 3/1/99) suspects this species may be in cove hardwood forest types. With the standards and guidelines for riparian areas and seeps protection recommendation, potential habitat would be adequately protected within other forest types. Surveys of the cove forest types found in Units 4 and 3b were completed on May 5, 1999 by Matthew Eldridge and Sandy Florence. Although 14 species were identified from the surveys, no honey glyph snails were found. Follow-up surveys were completed in Unit 5, Unit 3a and 3b (above Forest Service road 5508) where an additional 17 species were identified, however no honey glyph snails were found.

Velvet Covert Snail (*Inflectarius subpalliatu*s)

Velvet Covert, *Inflectarius subpalliatu*s, a Forest Concern species, was found during the surveys to occur within Units 3a, 3b & Unit 4. There are six records in the heritage database of this species, literature and

occurrence records list the general habitat for this species as leaf litter, rocks, and logs above 2000' elevation in cove forests.

The cove and riparian conditions extend to the west of the proposed project into the Spivey Creek drainage encompassing approximately 232 acres. Forest Service road 5508 is gravel with some grass covering and is most likely acting as a barrier to the small populations and amount of habitat above the road in Unit 3b. A ridge of poor snail habitat extends between Unit 3b and the small population found in moist, rocky habitat on the south end of Unit 3a (2 acres). The high potential habitat for this snail species is found extensively further down slope in the Spivey Gap drainage.

Table 19: Known and Potential Forest Concern Wildlife Species

Forest Concern (FC) Wildlife Species			
SPECIES	TYPE	HABITAT	OCCURRENCE
Cerulean Warbler <i>Dendronica cerulea</i>	Bird	Breeds in mature forests with open understory, frequently found in and around openings of early successional/shrub habitat	May occur in the wildlife analysis area
Southern Zigzag Salamander <i>Plethodon ventralis</i>	Salamander	Moist, cool woodlands, often nears streams or cave openings	May occur in the wildlife analysis area
Honey Glyph Snail <i>Glyphyalinia vanattai</i>	Snail	Moist, cool leaf litter in ravines and cove forests	May occur in the wildlife analysis area
Velvet Covert Snail <i>Inflectarius subpalliatius</i>	Snail	Under logs and rocks in forests above 2000 feet in elevation	Known to occur in the proposed activity area

3.12 Biological Diversity

Biological diversity can be defined as the diversity of life. The issue arises from the concern that the earth's diversity of life is threatened. An appropriate yardstick for biodiversity programs is how they affect the persistence of viable populations - populations that occur with sufficient gene pools, over large enough areas, with the requisite environments to perpetuate the organisms or ecosystems (J. McMinn, 1991, Biological Diversity Research: An Analysis). The biological diversity of the project and analysis area is defined by the vegetative, wildlife, PETS species, and old growth resources. Impacts on the viability of these resources are indicators of possible impacts on the biological diversity.

3.13 Economics

In addition to Yancey County, other counties adjacent to Yancey County could be affected by a timber sale in the Flat Top area. These counties have agrarian based economies with textile and tourist industries also playing an important role. There are more than twenty mills within hauling distance of the proposed sale. They vary in size from less than 10 employees up to 100 employees.

Forest Service management activities affect a broad spectrum of industries, including tourism, trade, manufacturing, and service. Timber harvesting may affect these industries; however, information on the effect it has on industries other than timber is limited. Some recreation activities such as using scenic overlooks, hunting and wildlife viewing benefit from vegetative management activities, but it is difficult to quantify any effect.

Financial efficiency is a way to evaluate how well resources are used to produce benefits. The financial efficiency analysis for the proposed alternatives considers cost incurred and benefits accrued through the implementation of the alternatives. The measure of quantifiable benefits and costs is present net value (PNV), which is the present value of benefits less the present value of costs. The benefit/cost ratio relates the benefits derived from an activity to the cost of implementing the activity. A benefit/cost ratio equal to one has equal benefits and costs. Costs exceed benefits if the ratio is less than one and benefits exceed costs if the ratio is greater than one. The assumptions used to calculate the PNV's for all alternatives are in the Financial Efficiency Analysis and Economic Assumption report that can be found in Appendix F.

3.14 Recreation/Leisure

The Spivey Gap recreation area is a developed recreation site located in the Northside project area. Approximately 8.5 miles of the Appalachian Trail is located in the project area. Dispersed recreation, including hiking, hunting, camping and horseback riding, is the main recreation use in the project area. Summer months and hunting season are the heaviest use periods. Several woods roads exist in the three compartments, and are used for non-motorized dispersed recreation.

3.15 Health and Safety

Existing health and safety concerns for the project area are those associated with the current activities and the planned future activities. There are no current timber sales or other active management activities located in the project area. The Spivey Gap recreation area is inspected annually for hazard trees. The area will be closed during the removal of any hazard trees. After the removal of hazard trees from the recreation area, the area will be safer due to the reduced risk of falling trees during and after wind or heavy rain events.

4.0 ENVIRONMENTAL EFFECTS

This section forms the scientific and analytical basis for the comparison of alternatives that are required by the National Environmental Policy Act (NEPA). Included in this section will be disclosure of effects of the alternatives on the different resources. Reports from different resource specialists supplied information for portions of this analysis. These reports were written by a forest botanist, fisheries biologist, wildlife biologist, landscape architect, and archeologist and are located in the project file.

4.1 Soils, Geology, and Topography

With any land disturbance, such as timber harvesting, there would be temporary increases in soil loss and sediment yield in the project area. Timber harvesting would result in localized and temporary soil compaction on temporary roads and log decks.

Alternative 1 (No Action)

Under this alternative, there would be no road building or timber harvesting.

Alternatives 2, 3 and 4

Under these alternatives, timber harvesting would occur within approximately 65 acres (Alternative 2) and 49 acres (Alternatives 3 and 4) of the project area. Log landings and skid roads are located within the unit boundaries and soil disturbance created by them is accounted for within the unit acreage. The combination of log landings, skid roads and timber harvesting would occur within about 2% of the project area.

The main concern of the proposed action is on-site effects. Potential for off-site effects (sedimentation) are directly related to the nature and area of disturbance on site. With the application of Forest Plan standards and contract requirements, neither erosion nor compaction would result in long-term reductions in soil productivity. Also, nutrient loss or disruption of the nutrient cycle is not severe enough to result in a lowering of site productivity.

Roads, landings, and skid trails will be seeded for wildlife; therefore, soil erosion is not expected as a potential problem. Cumulatively, the project would not add noticeable amounts of sediment to current conditions or reduce soil productivity below current conditions.

4.2 Visual Resources

Timber harvesting would create some change in the appearance of the existing landscape. The extent to which these activities would affect its visual quality varies with their degree of contrast in form, line, color, and texture with the surrounding area. The Visual Quality Objective (VQO) of the viewshed determines the degree of change acceptable from these activities. The changes to the viewsheds from timber harvesting would be in addition to other human modifications currently seen from these viewpoints.

Two-aged regeneration harvests would provide a near-continuous forest canopy but would create a change in its density. The trees left in the harvest areas would be discernable to varying degrees, but these harvests would not create as obvious an opening in the tree canopy as the clearcut method of harvest.

Thinning would result in a forest canopy that would appear less dense than surrounding undisturbed areas. Thinned areas would appear denser than the two-aged harvest areas.

Alternative 1 (No Action)

No new harvest areas or new roads would be seen from the viewpoints analyzed as a result of this alternative. The VQOs of the project area would, therefore, be met or exceeded. Natural processes would cause any change to the existing appearance of the project area. Most natural change would be subtle, however a major wind or ice storm or insect or disease infestation could create sudden and dramatic change.

The recent infestation of Southern Pine Beetle (SPB) in Unit 1 has caused a dramatic change in the appearance of this stand. Nearly all of the white pine trees in this stand are dead, which has created a sudden change in the visual character of this stand. Unit 2 is highly susceptible to SPB attack and if attacked, infected trees will die and cause a dramatic and sudden change to its visual character similar to that of Unit 1.

Alternative 2

The following mitigation measures are recommended to help meet the assigned VQOs for various treatment areas:

- 1) In Units 2, 3a, 3b and 5 select leave trees with well-formed crowns.
- 2) In Unit 2 leave a minimum residual basal area of 30-35 sq.ft. per acre and insure the lower boundary is an adequate distance above US 19-W. If Unit 2 becomes infested with Southern Pine Beetle, the leave basal area mitigation for protection of visual quality will be disregarded in the interest of the cumulative effect on scenery across the forest.
- 3) In Unit 2 (if a SPB infestation were to occur within the unit boundaries), burn or lop and scatter slash to within 2 feet of the ground for 100 feet beyond the edge of an open road or trail.
- 4) In Unit 3a leave a minimum residual basal area of 25-30 above the road in the eastern most portion of the unit.
- 5) In Unit 5 leave a minimum residual basal area of 30-35 sq.ft. per acre above the 3800 foot elevation contour; and keep the unit boundary a minimum of 350 feet from the Appalachian Trail.

If the above mitigation measures are implemented, the activities in Unit 2 (if the stand does not become infested with SPB) and Units 3a, 3b, 4 and 5 would meet or exceed their assigned VQOs for all viewpoints analyzed. If a SPB infestation were to occur within the unit boundaries of Unit 2, the assigned VQO would not be met; however, if infestations are not controlled by cutting, there is a high probability infestations would spread rapidly, killing more acres of trees, and having a much greater visual impact.

Alternatives 3 and 4

The following mitigation measures are recommended to help meet the assigned VQOs for various treatment areas:

- 1) In Units 2, 3a, and 5 select leave trees with well-formed crowns;
- 2) Leave a minimum residual basal area of 30-35 sq.ft. per acre in Unit 2 and assure the lower boundary is an adequate distance from US 19-W. If Unit 2 becomes infested with Southern Pine Beetle, the leave basal area mitigation for protection of visual quality will be disregarded in the interest of the cumulative effect on scenery across the forest.
- 3) In Unit 2 (if a SPB infestation were to occur within the unit boundaries), burn or lop and scatter slash to within 2 feet of the ground for 100 feet beyond the edge of an open road or trail.
- 4) In Unit 3a leave a minimum residual basal area of 25-30 above the road in the eastern most portion of the unit; and
- 5) In Unit 5 leave a minimum residual basal area of 30-35 sq.ft. per acre above the 3800 foot elevation contour; and keep the unit boundary a minimum of 350 feet from the Appalachian Trail.

If the above mitigation measures are implemented, the activities in Unit 2 (if the stand does not become infested with SPB) and Units 3a, 3b, and 5 would meet or exceed their assigned VQOs for all viewpoints analyzed. If a SPB infestation were to occur within the unit boundaries of Unit 2, the assigned VQO would not be met; however, if infestations are not controlled by cutting, there is a high probability infestations would spread rapidly, killing more acres of trees, and having a much greater visual impact.

Cumulative Effects

The changes to the national forest in the viewsheds analyzed would be in addition to other timber harvests, timber mortality caused by Southern Pine Beetle (SPB), and logging roads currently visible from these viewpoints. Many of the existing harvest areas visible from the High Rocks viewpoint on the Appalachian Trail would not be noticeable to the average viewer. Recent timber harvest will need 5-15 years growth before they blend-in with the surrounding forest. Existing roads and landings will remain visible for many years, but are primarily visible during leaf-off season.

Treatment of SPB infested stands would create opening of various sizes in the forest canopy, and some new skid roads, temporary roads and landings would also be visible. Initially, treated SPB areas may

have piled trees or slash, burnt areas, visible skid trails, and little understory vegetation. Over time (4 years or more), these areas would be noticeable primarily because of the height and density of the new vegetation in comparison to the surrounding forest. To some viewers the resulting variety would be pleasing. To others who prefer a more homogeneous appearing forest, the resulting variety may not be visually acceptable. After 8 or more years, most affected stands will visually blend-in with the surrounding forest leaving little evidence of suppression treatments.

Ultimately, suppression of SPB outbreaks would have a positive net effect since untreated areas could spread rapidly and kill many more acres of forest. Cumulative scenery impacts resulting from SPB outbreaks or suppression are unpredictable, but if left untreated the impacts could be much greater due to the continued spread of the infestation.

There is a 30-acre harvest unit from the Big Creek Timber Sale that is located in the project area. Harvesting was completed in this unit in 2000. This unit can be seen from the High Rocks viewpoint; however, its narrow shape and oblique viewing angle make only small portions of the unit visible. All visual analyses for this project considered this harvest unit. The VQOs of all areas would be met or exceeded under all alternatives if the recommended mitigation measures are implemented. Over time (5 years plus) the new harvest areas would be noticeable primarily because of the change in the height and density of the vegetation compared to the surrounding forest. To some viewers the resulting variety in the landscape would be pleasing. To viewers who prefer a more homogeneous appearing forest, the resulting landscape may not be visually acceptable.

4.3 Heritage Resources

Alternative 1 (No Action)

This alternative would have no impact on heritage sites because no ground disturbing activities are proposed.

Alternatives 2, 3 and 4

Cultural resource surveys have identified four Class III archeological sites and one Class II archeological site in the proposed activity areas. The Class III sites would not be affected by the proposed activities. The Class II site identified by the archeologists would be protected by excluding it from the treatment area. If during the implementation of a ground disturbing activity a previously unknown archeological or historic site is encountered the disturbance would stop immediately. The activity would not be permitted to continue until a forest archeologist surveys and evaluates the site and makes a recommendation to permanently stop, modify, or proceed with the activity using appropriate mitigation measures. There would be no cumulative effects on heritage resources since no significant sites would be impacted.

4.4 Aquatic Resources

Alternative 1 (No Action)

Implementation of the no action alternative would perpetuate the existing condition described in Section 3.4. Aquatic habitat quality and quantity and populations would continue in their natural dynamic patterns. It is important to note that natural processes include aspects such as extinction of species and loss of habitat types.

Mitigation Measures and Rationale (None)

Cumulative Effects

Please refer to the section of the Aquatic Resource Analysis (AQUA) titled "Existing Threats to Aquatic Habitat and Populations" (Appendix D).

In addition, the Big Creek Timber Sale area is adjacent to the aquatic resource analysis area for this project. Please refer to the Big Creek Timber Sale AQUA, pages 11-15 (Bryan 1997) for a description of potential effects this forest management on Big Creek. The Big Creek Timber Sale AQUA found that implementation of that project would have no negative effects on aquatic habitat or populations within Big Creek. In fact, that project proposed aquatic habitat improvement within Pit Branch (a tributary to Big Creek) that will improve aquatic habitat condition and population stability within the area.

Angling pressure within the aquatic analysis area for this proposal is not an issue since the streams involved do not support significant fish populations. Trout fishing pressure is affecting Big and Spivey Creeks downstream of the aquatic analysis area where the streams are accessible from the road right-of-way and support catchable-sized fish.

Alternatives 2, 3 and 4

Direct Effects

Access to the proposed units is already in place except for skid trails. Riparian areas have been identified as 100 feet on either side of perennial channels. No activity, except for stream crossings can occur within this area.

There is the possibility that as trees are cut, they will cross a stream channel or spring. While large woody debris in and adjacent to stream channels is desirable for aquatic habitat diversity, it needs to be of the same scale as the channel size and type. Streams within the aquatic analysis area are small and support limited fish populations. The scales of the trees and stream channels do not match, and it is possible that leaving large tree boles in the channels and across springs could result in flow obstruction, which can lead to accelerated bank scouring and failure, and subsequently, sedimentation of local and downstream channels.

Sedimentation of aquatic habitats within the aquatic analysis area could result in the loss of clear-flowing spring habitats and valuable headwater stream origins. Aquatic species utilizing these areas (such as the dragonflies) could be locally lost. Spawning areas for fishes occupying downstream reaches (brook and rainbow trout) could also be reduced or lost to sedimentation. Stream gradients and flow regimes within the analysis areas may not be dynamic enough to rely on natural flushing to occur.

Therefore, any losses have the potential to be permanent. To avoid the potential for this habitat loss, trees accidentally felled across stream channels or springs should be removed. "Drag lanes" should not be designated for the removal of these trees to avoid severe bank disturbance. Rather, trees should be removed individually, from where they fell. It is unlikely that pulling individual trees across will result in permanent stream bank damage. Any damage done to the stream banks will most likely be temporary, as there is an abundance of herbaceous vegetation along the banks that will quickly recolonize bare soil.

In addition to implementing the direction in the Forest Plan, the following mitigation measures will be implemented for protection of water quality and aquatic habitat:

Required Mitigation Measures

1. Perennial springs and seeps will be marked during unit marking. Spring and seep perimeters will be clearly marked and logging equipment will not be permitted to cross these areas. These areas will join stream riparian areas if there is less than 100 feet between the two areas to protect intermittent reaches.
2. Intermittent springs and seeps will be mapped during unit marking. No equipment will be allowed to cross these areas when they are wet.
3. Trees accidentally felled across stream channels or springs will be lifted (when possible) away from the water. If this is not possible, each tree will be pulled away from the water where it fell and temporary decking will be used to support the weight of the tree as it is pulled across the channel. These removals will be perpendicular to the stream channel whenever possible to minimize stream bank disturbance. Bare soil will be seeded and mulched if native vegetation does not start to recolonize the area by the time timber removal from the unit is complete.

The following management recommendations, while not legally required, are actions that, when implemented, will result in improved resource condition or minimize potential effects:

Recommended Management Actions

1. Skid road layout should avoid stream crossings and paralleling perennial channels within designated riparian areas.
2. Landings and skid trails should be vegetated as soon as possible after use to avoid off-site soil movement.
3. Temporary roads (if needed) should be constructed to avoid runoff into area streams. In addition, silt fence, straw bales, or brush barriers should be placed along the length of the road where it parallels or crosses a stream as needed to control runoff and stream sedimentation.

Indirect Effects

The potential loss of clear-flowing springs and spawning habitats would result in decreased diversity of aquatic species and reduced trout spawning success. Given the very nature of these types of habitats (i.e. they naturally support a low diversity of aquatic species), and the situation that little is known about aquatic insect communities within these areas, any decreases in diversity could indicate the loss of individual species or groups of species. Within a defined area such as the aquatic analysis area, it is not known how communities relate or compare from one spring to another. A species or group of species could be lost from an impacted spring, affecting species viability locally (i.e. within that particular spring), but this may not translate into a decrease in the overall viability of the species at the larger analysis area and landscape scales. In effect, each spring is an island of suitable habitat for the associated insect and fish communities, with island biogeography principles operating at this small scale. Because so little is known about the function and composition of this type of aquatic habitat, it is extremely important to protect these "islands".

Cumulative Effects

Please refer to the cumulative effects discussion above under Alternative 1. It is very unlikely that, given the location and types of management proposed, any effects on aquatic resources will be measurable, and therefore contribute to cumulative effects. Critical aquatic resource areas were identified and dropped from the overall proposal early in the planning process.

4.5 Air Quality

Alternatives 1 (No Action) and 2

There are no activities planned in these alternatives that would affect air quality. There would be no cumulative effects on air quality since it would not be affected with these alternatives and because the current air quality meets Environmental Protection Agency standards.

Alternatives 3 and 4

The proposed activity that could affect air quality is the 35 acres of prescribed burning for advanced oak release in Unit 5. Smoke would temporarily impair local visibility, including areas of the Appalachian Trail. Smoke Management Guidelines developed in 1988 by the U.S. Forest Service and the North Carolina Forest Service would be followed if prescribed burning takes place. A burning plan including smoke management guidelines would be used to reduce smoke emissions and enhance smoke dispersal. These guidelines provide for the protection of human health and visibility on highways and roads, as well as Class I air quality areas. Special emphasis would be placed on smoke dispersal in relation to the Appalachian Trail, Highway 19-W, and neighboring property owners. By following the Smoke Management Guidelines, air quality would be affected only temporarily by this proposed activity.

4.6 Roads

All Alternatives

There are no activities that would construct or reconstruct roads in the project area. Road management would follow current management. Road closures and open road density would remain the same as existing conditions.

4.7 Vegetation

The components of the vegetative environment that could be affected in the various alternatives include a change in the tree species composition, changes in the composition and structure of the understory vegetation, and changes in the health and vigor of the forest.

Alternative 1 (No Action)

Species composition, age-class distribution, and understory vegetation would continue to change, even with no action. Existing early successional plant communities would increase in age. A change in species composition would result as shade tolerant species dominate intolerant ones, assuming the suppression of fire. As the mature trees age, they would become more susceptible to damage, disease, and insect problems, especially the ones that are already showing signs of decline. Hard and soft mast provided for wildlife would also continue to decline. Openings in the forest canopy caused by damage from insects and disease, wind, ice and snow would occur. Generally these natural openings are small and the shade tolerant plant and tree species such as maples, dogwood, and sourwood tend to dominate shade intolerant species, such as oaks, ash, and hickories. Some yellow poplar especially in the more moist sites would be able to take advantage of these openings and colonize or repopulate some sites. Protection from fire would continue, significantly reducing the potential for larger openings.

In general, this alternative would not meet the objective of a healthy sustainable forest condition because of the age class distribution of the area. As shown in the following chart, ten years from now the analysis area would have 0 acres (0%) in the 0 to 10 year age class, 17% would be between 11 and 60 years old, 26% would be between 61 and 80 years old, and 57% would be 80+ years old. The Land and Resource Management Plan directs us to provide early successional habitat across the landscape in Management Area (MA) 2A between 5 and 10% and in MA 3B between 5 and 15%. In this analysis area, there are 2,626 acres in timber suitable Management Areas. Based on the acreages in the different MAs there should be a minimum of 131 acres in the 0 to 10 age class and a maximum of 388 acres in the project area.

Table 20: Alternative 1: Age Class Distribution by Compartment Immediately After Planned Treatments

ALTERNATIVE 1 (NO ACTION)
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 and 56

Immediately After Planned Treatments

Age Class	C53	C55	C56	Total	% of Area
0 - 10	0	0	37	37	1
11 - 20	97	30	105	232	9

21 - 30	25	62	69	156	6
31 - 40	0	0	16	16	1
41 - 50	0	0	0	0	0
51 - 60	47	151	43	241	9
61 - 70	312	68	61	441	17
71 - 80	52	129	791	972	37
81 - 90	389	0	0	389	15
91 - 100	91	0	10	101	4
101+	41	0	0	41	1
TOTAL	1054	440	1132	2,626	100

Table 21: Alternative 1: Age Class Distribution by Compartment 10 Years From Present

ALTERNATIVE 1 (NO ACTION)
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 and 56

Ten Years From Present

Age Class	C53	C55	C56	Total	% of Area
0 - 10	0	0	0	0	0
11 - 20	0	0	37	37	1
21 - 30	97	30	105	232	9
31 - 40	25	62	69	156	6
41 - 50	0	0	16	16	1
51 - 60	0	0	0	0	0
61 - 70	47	151	43	241	9
71 - 80	312	68	61	441	17
81 - 90	52	129	791	972	37
91 - 100	389	0	0	389	15
101+	132	0	10	142	5
TOTAL	1054	440	1132	2,626	100

This alternative would also not meet the need of providing a sustainable flow of timber from the National Forests, because no timber would be removed.

Specific Unit Evaluation for Overstory Species Composition (Alternative 1)

Unit 1 (Forest Type: Hardwood/White Pine)

Under the no action alternative (1), this unit would meet the objective of a healthy sustainable forest condition because the previous white pine stand is in regeneration. The species composition is a mixture of hardwood and white pine. Without additional site preparation the species composition would be dominated by light intolerant species such as hemlock, birch, white pine, and red maple. For this alternative, the specific project objectives for future overstory composition, mixed cove hardwood-white pine, would most likely be met. However, regeneration could be dominated by white pine.

Unit 2 (Forest Type: White Pine)

Under the no action alternative (1), this unit would not meet the objective of a healthy sustainable forest condition because this white pine stand is located off-site and is nearly 80 years old and in an overstocked condition. Therefore, this white pine stand is susceptible to root diseases and insect infestations. For this alternative, the specific project objectives for future overstory composition, mixed cove hardwood-white pine, would not be met in this planning period because the overstory would remain in place, barring an insect attack. However, the overstory would eventually die and would be replaced by the mixed hardwood-white pine understory. This evaluation is based on no SPB activity within the unit, even though the stand is considered susceptible.

Unit 3a (Forest Type: Oak/Hickory)

Under the no action alternative (1), species composition would remain unchanged during the planning period. With no action over the longterm, the species composition is expected to remain relatively the same. Eventually, as the stand reaches biological maturity and fire continues to be suppressed in this area, individual trees will die with some more shade tolerant species such as white pine entering the canopy and some yellow poplar encroachment on the lower slopes.

Unit 3b (Forest Type: Cove Hardwood)

Under the no action alternative (1), species composition would remain unchanged during the planning period. With no action over the longterm, the species composition is expected to remain relatively the same, with some more shade tolerant species such as white pine and hemlock entering the canopy. With the suppression of fire, the recruitment of oak into the overstory as the stand reaches biological maturity is not expected. Grape will continue to develop in the portion of the stand adjacent to the road encroaching more on the existing stand through time due to maintenance of the existing road. A natural release such as a catastrophic fire or windthrow event could cause grape development.

Unit 4 (Forest Type: Yellow Poplar)

Under the no action alternative (1), species composition would remain unchanged during the planning period. With no action over the longterm, the species composition is expected to remain relatively the same, yellow poplar tends to be somewhat self-perpetuating, but some more shade tolerant species will enter the canopy. With the suppression of fire, the recruitment of oak into the overstory as the stand reaches biological maturity is not expected.

Unit 5 (Forest Type: Cove Hardwood)

Under the no action alternative (1), species composition would remain unchanged during the planning period. With no action over the longterm, the species composition is expected to remain relatively the same. There is a component of yellow birch that may increase over time. With the suppression of fire, the recruitment of oak into the overstory as the stand reaches biological maturity is not expected.

Alternative 2

Species composition, age class distribution, and understory vegetation would continue to change in stands not treated as in the no action alternative. Regeneration is proposed with the 2-age regeneration method (residual Basal Areas may be increased from original proposal for visual mitigation purposes) to achieve many of the project objectives. This method allows for the growth and development of a new age class in the understory along with the continued growth of the overstory; as a result, the stand takes on a two-aged structure. Reduced basal area would allow more sunlight for the development of regeneration. The overstory is left in place until mid rotation or later (40+ years), leaving the area undisturbed for an extended period of time. In many cases the overstory remains in place for a full rotation (80-100 years).

In general, this alternative would help to meet the objective of a healthy sustainable forest and provide a more balanced age class distribution. In the land base suitable for timber, with this alternative (10 years from now), 2% of the analysis area would be between 0 and 10 years old, 17% would be in the 11-60 year old age class, 25% would be between 61-80 years old, and 56% would be over 80 years of age.

The 59 acres of the analysis area in the early successional vegetative communities would contribute to achieving the forest plan direction of providing early successional habitat.

Table 22: Alternative 2: Age Class Distribution by Compartment Immediately After Planned Treatments

ALTERNATIVE 2
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 and 56

Immediately After Planned Treatments

Age Class	C53	C55	C56	Total	% of Area
0 - 10	44	15	37	96	4
11 - 20	97	30	105	232	9
21 - 30	25	62	69	156	6
31 - 40	0	0	16	16	1
41 - 50	0	0	0	0	0
51 - 60	47	151	43	241	9
61 - 70	284	68	61	413	15
71 - 80	36	114	791	941	36
81 - 90	389	0	0	389	15
91 - 100	91	0	10	101	4
101+	41	0	0	41	1
TOTAL	1054	440	1132	2,626	100

Table 23: Age Alternative 2: Class Distribution by Compartment 10 Years From Present

ALTERNATIVE 2
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 and 56

Ten Years From Present

Age Class	C53	C55	C56	Total	% of Area
0 - 10	44	15	0	59	2
11 - 20	0	0	37	37	1
21 - 30	97	30	105	232	9
31 - 40	25	62	69	156	6
41 - 50	0	0	16	16	1
51 - 60	0	0	0	0	0
61 - 70	47	151	43	241	9
70 - 80	284	68	61	413	16
81 - 90	36	114	791	941	36
91 - 100	389	0	0	389	15
101+	132	0	10	142	5

TOTAL	1054	440	1132	2,626	100
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The information above reflects the cumulative effects of proposed, planned and ongoing activities that would affect the age class distribution for the project area.

This alternative would help meet the objective of providing a sustainable flow of timber. The following chart depicts estimated volume by unit for this alternative. The estimated total timber yield for this alternative is 1255 CCF (sawtimber) and 192 CCF (pulpwood) for an estimated timber sale yield of 1447 CCF.

Table 24: Alternative 2: Estimated timber volume in hundred cubic feet (CCF) and million board feet (MBF) by Unit.

Unit #	Volume (CCF)	Volume (MBF)
1	0	0
2	205	113
3a	334	184
3b	309	170
4	53	29
5	546	300
Total	1447	796

This alternative is supported by the science of forest management by integrating research and management to achieve the projects objectives as outlined in the Forest plan. This alternative also emphasizes high value hardwood sawtimber as a condition and commodity, high quality hardwood species on highly productive sites and takes advantage of the forests ability to produce large trees of hardwood species such as northern red oak and black cherry. This alternative contributes toward a sustainable, healthy forest by prescribing species conversion from white pine forest type to a mixed cove hardwood-white pine forest type in Unit 2.

Specific Unit Evaluation for Overstory Species Composition (Alternative 2)

Unit 1 (Forest Type: Hardwood/White Pine)

This unit would meet the objective of a healthy sustainable forest condition because this former white pine stand is in regeneration. The species composition is a mixture of hardwood and white pine. Manual site preparation would result in white pine being less prevalent in the species composition. Regeneration would be dominated by light intolerant species such hemlock, birch, white pine, and red maple. The specific project objectives for future overstory composition, mixed cove hardwood-white pine, would be met in this planning period.

Unit 2 (Forest Type: White Pine)

This unit would be moved closer to the desired future condition in this planning period by removing the white pine overstory. A two-aged age class structure would be created. Wherever it exists oak and other hard mast producing species would remain. An existing hardwood understory exists in this stand that would be released by opening up the canopy. The regenerated stand would be a mixed cove

hardwood-white pine stand. Manual site preparation would result in hardwood regeneration dominated by light intolerant species such as hemlock, birch and red maple.

Unit 3a (Forest Type: Oak Hickory)

Existing species composition is expected to remain essentially the same with the removal of the overstory. A slight decrease in oak composition could occur. A two-aged stand would be created with the older age class dominated by oaks. Because of the dry, southwesterly facing aspect, oak is expected to regenerate and be recruited into the future stand. More shade tolerant species such as white pine may enter the canopy and yellow poplar may become more prevalent on the lower slopes. Therefore, oak composition throughout this stand may vary. Manual site preparation would remove some competing vegetation from the existing hardmast regeneration; however, most species cut would sprout prolifically from the stump.

Unit 3b (Forest Type: Cove Hardwood)

A two-aged age class structure would be created with the removal of the majority of the overstory. Oaks and other hard mast producing species would dominate the older age class. The new age class (regeneration or future overstory) is expected to change from an oak composition of approximately 20-25 percent to less than 5 percent. Regenerating oak is not expected to be recruited into the overstory in the future. Recruitment of overall tree regeneration is also expected to be difficult due to grape vine proliferation, but is achievable. Some grape arbor development on the upper or eastern portion of the unit is expected; however clipping the vines prior to harvest would most likely curb grape arbor development. Manual site preparation is not expected to release existing hardmast regeneration. Most species cut during harvest and site preparation would sprout prolifically from the stump.

Unit 4 (Forest Type: Yellow Poplar)

Species composition would remain unchanged during the planning period with thinning to a 60-70 BA. Proportionally the oak component may increase due to the removal of only yellow poplar. Over the longterm the species composition is expected to remain relatively the same. Yellow poplar tends to be somewhat self-perpetuating, but more shade tolerant species may enter the canopy.

Unit 5 (Forest Type: Cove Hardwood)

A two-aged class structure would be created with the removal of the majority of the overstory. Oaks and other hard mast producing species would dominate the older age class. The overall species composition is not expected to change. There is advanced oak in the understory; however, yellow poplar saplings are expected to out compete the oak. The new age class (regeneration of future overstory) is expected to change from an oak composition of approximately 20-25 percent to less than 5 percent. Regenerating oak is not expected to be recruited into the overstory in the future. Manual site preparation is not expected to release existing regeneration.

Alternative 3

Species composition, age class distribution, and understory vegetation would continue to change in stands not treated as in the no action alternative. Regeneration is proposed with the 2-age regeneration method (residual Basal Areas may be increased from original proposal for visual mitigation purposes) to achieve many of the project objectives. This method allows for the growth and development of a new age class in the understory along with the continued growth of the overstory; as a result, the stand takes

on a two-aged structure. Reduced basal area would allow more sunlight for the development of regeneration. The overstory is left in place until mid rotation or later (40+ years), leaving the area undisturbed for an extended period of time. In many cases the overstory remains in place for a full rotation (80-100 years).

In general this alternative would help to meet the objective of a healthy sustainable forest and provide a more balanced age class distribution. In the land base suitable for timber, with this alternative (10 years from now), 2% of the analysis area would be between 0 and 10 years old, 17% would be in the 11-60 year old age class, 25% would be between 61-80 years old, and 56% would be over 80 years of age. The 49 acres of the analysis area in the early successional vegetative communities would contribute to achieving the forest plan direction of providing early successional habitat.

Table 25: Alternative 3: Age Class Distribution by Compartment Immediately After Planned Treatments

ALTERNATIVE 3
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 AND 56

Immediately After Planned Treatments

Age Class	C53	C55	C56	Total	% of Area
0 - 10	34	15	37	86	3
11 - 20	97	30	105	232	9
21 - 30	25	62	69	156	6
31 - 40	0	0	16	16	1
41 - 50	0	0	0	0	0
51 - 60	47	151	43	241	9
61 - 70	298	68	61	427	16
71 - 80	32	114	791	937	36
81 - 90	389	0	0	389	15
91 - 100	91	0	10	101	4
101+	41	0	0	41	1
TOTAL	1054	440	1132	2,626	100

Table 26: Age Alternative 3: Class Distribution by Compartment 10 Years From Present

ALTERNATIVE 3
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 AND 56

Ten Years From Present

Age Class	C53	C55	C56	Total	% of Area
0 - 10	34	15	0	49	2
11 - 20	0	0	37	37	1
21 - 30	97	30	105	232	9
31 - 40	25	62	69	156	6
41 - 50	0	0	16	16	1
51 - 60	0	0	0	0	0
61 - 70	47	151	43	241	9
70 - 80	298	68	61	427	16
81 - 90	32	114	791	937	36
91 - 100	389	0	0	389	15
101+	132	0	10	142	5
TOTAL	1054	440	1132	2,626	100

The information above reflects the cumulative effects of proposed, planned and ongoing activities that would affect the age class distribution for the project area.

This alternative will help meet the objective of providing a sustainable flow of timber. The following chart depicts estimated volume by unit for this alternative. The estimated total timber yield for this alternative is 960 CCF (sawtimber) and 147 CCF (pulpwood) for an estimated timber sale yield of 1107 CCF.

Table 27: Alternative 3: Estimated timber volume in hundred cubic feet (CCF) and million board feet (MBF) by Unit.

Unit #	Volume (CCF)	Volume (MBF)
1	0	0
2	174	96
3a	289	159
3b	166	91
5	478	263
Total	1107	609

This alternative is supported by the science of forest management by integrating research and management to achieve the projects objectives as outlined in the Forest plan. This alternative also emphasizes high value hardwood sawtimber as a condition and commodity, high quality hardwood

species on highly productive sites and takes advantage of the forests ability to produce large trees of hardwood species such as northern red oak and black cherry. This alternative contributes toward a sustainable, healthy forest by prescribing species conversion from white pine forest type to a mixed cove hardwood-white pine forest type in Unit 2. It also meets the goal of reducing clearcutting and increasing the use of other harvest techniques. The proposed action in Unit 5 will meet the objective of restoring mast-bearing species, in particular oaks.

Specific Unit Evaluation for Overstory Species Composition (Alternative 3)

The proposed treatments for Unit 1 (Hardwood/White Pine), Unit 2 (Forest Type: White Pine), Unit 3a (Forest Type: Oak/Hickory), and Unit 3b (Forest Type: Cove Hardwood) are the same as in Alternative 2. The difference between the alternatives is that Alternative 3 proposes treating fewer acres than Alternative 2 for the protection of Forest Concern species and their habitat (See Table 3).

Unit 4 (Forest Type: Yellow Poplar)

No action is proposed in this stand in this alternative. Effects are the same as in Alternative 1.

Unit 5 (Forest Type: Cove Hardwood)

A two-aged class structure will be created with the removal of the majority of the overstory. Oaks and other hard mast producing species will dominate the older age class. However, the overall species composition is not expected to change. There is advanced oak in the understory. A prescribed burn is expected to favor oak regeneration and increase its presence in the future overstory.

Alternative 4

Species composition, age class distribution, and understory vegetation would continue to change in stands not treated as in the no action alternative. Regeneration is proposed with the 2-age regeneration method (residual Basal Areas may be increased from original proposal for visual mitigation purposes) to achieve many of the project objectives. This method allows for the growth and development of a new age class in the understory along with the continued growth of the overstory; as a result, the stand takes on a two-aged structure. Reduced basal area would allow more sunlight for the development of regeneration. The overstory is left in place until mid rotation or later (40+ years), leaving the area undisturbed for an extended period of time. In many cases the overstory remains in place for a full rotation (80-100 years).

In general this alternative would help to meet the objective of a healthy sustainable forest and provide a more balanced age class distribution. In the land base suitable for timber, with this alternative (10 years from now), 2% of the analysis area would be between 0 and 10 years old, 17% would be in the 11-60 year old age class, 25% would be between 61-80 years old, and 56% would be over 80 years of age. The 49 acres of the analysis area in the early successional vegetative communities would contribute to achieving the forest plan direction of providing early successional habitat.

Table 28: Alternative 4: Age Class Distribution by Compartment Immediately After Planned Treatments

ALTERNATIVE 4
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 AND 56

Immediately After Planned Treatments

Age Class	C53	C55	C56	Total	% of Area
0 - 10	34	15	37	86	3
11 - 20	97	30	105	232	9
21 - 30	25	62	69	156	6
31 - 40	0	0	16	16	1
41 - 50	0	0	0	0	0
51 - 60	47	151	43	241	9
61 - 70	298	68	61	427	16
71 - 80	32	114	791	937	36
81 - 90	389	0	0	389	15
91 - 100	91	0	10	101	4
101+	41	0	0	41	1
TOTAL	1054	440	1132	2,626	100

Table 29: Age Alternative 4: Class Distribution by Compartment 10 Years From Present

ALTERNATIVE 4
TIMBER SUITABLE ACRES BY AGE CLASS
COMPARTMENTS 53, 55 AND 56

Ten Years From Present

Age Class	C53	C55	C56	Total	% of Area
0 - 10	34	15	0	49	2
11 - 20	0	0	37	37	1
21 - 30	97	30	105	232	9
31 - 40	25	62	69	156	6
41 - 50	0	0	16	16	1
51 - 60	0	0	0	0	0
61 - 70	47	151	43	241	9
70 - 80	298	68	61	427	16
81 - 90	32	114	791	937	36
91 - 100	389	0	0	389	15
101+	132	0	10	142	5
TOTAL	1054	440	1132	2,626	100

The information above reflects the cumulative effects of proposed, planned and ongoing activities that would affect the age class distribution for the project area.

This alternative will help meet the objective of providing a sustainable flow of timber. The following chart depicts estimated volume by unit for this alternative. The estimated total timber yield for this alternative is 960 CCF (sawtimber) and 147 CCF (pulpwood) for an estimated timber sale yield of 1107 CCF.

Table 30: Alternative 4: Estimated timber volume in hundred cubic feet (CCF) and million board feet (MBF) by Unit.

Unit #	Volume (CCF)	Volume (MBF)
1	0	0
2	174	96
3a	289	159
3b	166	91
5	478	263
Total	1107	609

This alternative is supported by the science of forest management by integrating research and management to achieve the projects objectives as outlined in the Forest plan. This alternative also emphasizes high value hardwood sawtimber as a condition and commodity, high quality hardwood species on highly productive sites and takes advantage of the forests ability to produce large trees of hardwood species such as northern red oak and black cherry. This alternative contributes toward a sustainable, healthy forest by prescribing species conversions from white pine forest type to a mixed cove hardwood-white pine forest type in Unit 2. It also meets the goal of reducing clearcutting and increasing the use of other harvest techniques. The proposed action in Unit 5 will meet the objective of restoring mast-bearing species, in particular oaks.

Specific Unit Evaluation for Overstory Species Composition (Alternative 4)

Unit 1 (Forest Type: Hardwood/White Pine)

This unit would meet the objective of a healthy sustainable forest condition because this former white pine stand is in regeneration. The species composition is a mixture of hardwood and white pine. Herbicide site preparation and release along with oak planting would result in white pine being less prevalent in the species composition and existing hardmast species would be released. This should increase the hardmast component of this stand. The specific project objectives for future overstory composition, mixed cove hardwood-white pine, would be met in this planning period.

Unit 2 (Forest Type: White Pine)

This unit would be moved closer to the desired future condition in this planning period by removing the white pine overstory. A two-aged age class structure would be created. Wherever it exists oak and other hard mast producing species would remain. An existing hardwood understory in this stand would be released by opening up the canopy. Herbicide site preparation and release along with oak planting

would result in white pine being less prevalent in the species composition and existing hardmast species would be released. Regeneration would continue to be dominated by light intolerant species such as hemlock, birch, white pine, and red maple because this is the species composition of the understory at the present. The planting and subsequent release by herbicide, if needed, may increase the hardmast component of this stand. The regenerated stand would be a mixture of cove hardwood and white pine.

Unit 3a (Forest Type: Oak Hickory)

Existing species composition is expected to remain essentially the same with the removal of the overstory, a slight decrease in oak composition could occur. A two-aged stand would be created with the older age class dominated by oaks. Because of the dry, southwesterly facing aspect, oak is expected to regenerate and be recruited into the future stand. Herbicide site preparation and release, if needed, along with oak planting would result in white pine being less prevalent in the species composition and existing hardmast species would be released. This should increase the hard mast component in the future stand.

Unit 3b (Forest Type: Cove Hardwood)

A two-aged age class structure would be created with the removal of the majority of the overstory. Oaks and other hard mast producing species would dominate the older age class. The new age class (regeneration or future overstory) is expected to remain constant with an oak composition of approximately 20-25. Herbicide site preparation and release, if needed, along with oak planting is expected to result in oak being recruited into the overstory in the future. Recruitment of overall tree regeneration is also expected to be less difficult because grape vines are very susceptible to herbicides. Some grape arbor development on the upper or eastern portion of the unit is expected; however, herbicide should eliminate most grape development except in grape arbors.

Unit 4 (Forest Type: Yellow Poplar)

No action is proposed in this stand in this alternative. Effects are the same as in Alternative 1.

Unit 5 (Forest Type: Cove Hardwood)

A two-aged age class structure would be created with the removal of the majority of the overstory. Oaks and other hard mast producing species would dominate the older age class. The overall species composition however is not expected to change. There is advanced oak in the understory. Herbicide site preparation and follow up treatment, if needed, would favor oak regeneration and secure its presence in the future overstory. A prescribed burn is expected to favor oak regeneration and increase its presence in the future overstory.

4.8 Old Growth

Alternative 1 (No Action)

There would be no impact on the designated or potential old growth areas in the suitable timber base, or other Management Areas. All stands would move closer to becoming potential old growth.

Alternatives 2, 3 and 4

There would be an additional 181 acres designated as future old growth under these alternatives. Added to the existing 59 acres of old growth previously designated in Compartment 56, the total future old growth for Compartments 53, 55 and 56 would be 240 acres.

None of the proposed activities would affect currently designated or areas proposed for future old growth. The cumulative effect to future old growth would be the additional designation of 181 acres in the analysis area to future old growth.

4.9 Botanical Resources

4.9.1 Introduction

The general potential effects to Threatened and Endangered (T & E), Sensitive (S), and Forest Concern (FC) plant species that are exposed to logging and construction activities such as moving heavy equipment, skidding logs, and road construction are the direct impacts of damaging individual plants and the indirect effects of modifying the habitat. Some of the expected indirect effects of timber removal would be an initially increase in light and temperature, reduce humidity, and decrease soil surface moisture. These effects may have a positive affect or negative affect depending upon the particular plant species. Some weedy and early successional species such as *Rubus*, are expected to increase in the activity area. T & E, S and FC plant species may be negatively effected by the competition of these species. The long term effect of rotational logging practices upon the general plant communities are poorly understood. There is some evidence that the repopulation of some herbaceous plant species in mixed mesophytic communities may take more than a hundred years after logging. Most species are expected to recover faster than that. Clear cutting in relatively large patches is thought to have a greater effect than that of Shelterwood type of treatments or two-aged treatments. See the Forest Plan standards and guides for a description of these methods of harvest.

An analysis of the botanical resources (BOTA) for this project was completed in January 2002. The BOTA report can be found in the Biological Evaluation in Appendix D.

4.9.2 Plant Natural Communities and Special Habitats

Many of the biological communities and special habitats in the project area are not affected by activities in the proposed project. The habitat changes for the natural communities and special habitats that represent Management Indicator Species (MIS) in this analysis are discussed in Appendix G of this document. The habitat changes cited in Appendix G are consistent with the Forest Plan. Most of the habitat changes are needed to accomplish the multiple use goals of the plan.

Cumulative Effects

The cumulative effect of this project, along with other similar projects, would change habitats in amounts close to forest-wide averages of the recent past. Therefore, population trends of Management Indicator Species (MIS) related to habitat changes on the forest would continue as cited in the most recent update of the MIS assessment.

4.9.3 Plant Threatened and Endangered Species

All Alternatives

This proposal would not affect any proposed or listed Federal threatened or endangered plant species or their habitat. Because there is no known direct, indirect or cumulative effect known to any Federal threatened or endangered plant species, there are no recommendations to lessen the effect of this proposal. Consultation with the United States Fish and Wildlife Service is not required.

4.9.4 Plant Sensitive Species

The proposed activities are located too far from the known population of *Aconitum reclinatum*, a Sensitive species, to have any effect on the population or habitat for this population located within the project area.

Juglans cinerea

Status: Federal C2; State, Watch List; Global, G3; Forest, Sensitive.

Juglans cinerea is a tree that is found from western New Brunswick to North Dakota south to Georgia in rich forest communities. It is rapidly declining because of a fungal disease, which is the primary cause for concerns of the species viability. Individual element occurrences of *Juglans cinerea* populations within North Carolina are not actively tracked on the BCD database system. However, there are greater than 100 known populations of this species in North Carolina (J. Amorosa). These populations are mostly in the mountain counties of North Carolina. A small population of a few individuals of *Juglans cinerea* is known in Unit 3a.

Direct and Indirect Effects

Direct impacts to the known local population will be avoided in Alternatives 3 and 4 but may be directly affected in Alternative 2. Removal or partial removal of the overstory, tree canopy or competing vegetation (such as grapevine), is known to benefit this species. The indirect effects of Alternatives 3 and 4 should have a positive, beneficial effect to the local populations. Alternative 1 would not directly affect *Juglans cinerea*; however, the competing effect of the existing vegetation may, over time, depress the vigor of the population.

Cumulative Effects

There are two recent proposals within the Pisgah National Forest that have been known to effect or may affect *Juglans cinerea*. One proposal to widen Waterville road within Haywood County may negatively affect two individual *Juglans cinerea* trees and a timber harvest within the Davidson River watershed in Transylvania County may positively affect several individuals of *Juglans cinerea*. The sum total of all these effects does not have a significant effect upon Forest population viability.

Because there are so many known populations of *Juglans cinerea* and the concern for this species is a fungal pathogen and not habitat disturbance, any alternative of this project would not contribute to negative trend for this species. No individuals of *Juglans cinerea* are expected to be affected directly in

Alternative 3 and 4. Individuals of *Juglans cinerea* may be directly affected in Alternative 2. Alternative 1 may indirectly negatively affect the population by not removing competing vegetation. Alternatives 3 and 4 may positively indirectly affect *Juglans cinerea* by removing competing vegetation.

4.9.5 Plant Forest Concern Species

All Alternatives

There are no known Forest Concern plant species within the proposed activity areas that would be directly or indirectly effect by this proposal. Known populations of *Carex woodii* and habitat for *Carex projecta* are located too far from the proposed activities to be affected by the proposed activities. This proposal will have no known effect on any Forest Concern plant species. Because there is no known direct, indirect or cumulative effect known to any Forest Concern plant species, there are no recommendations to lessen the effect of this proposal.

4.10 Fisheries Resources

4.10.1 Introduction

Examples of direct effects of a proposed action on aquatic species include (but are not limited to) things such as crushing individual insects, fish, or redds during stream crossing installation. Such effects are more likely to occur to less mobile aquatic organisms (e.g. aquatic insects, freshwater mussels, and fish eggs and larvae). Whereas, more mobile species such as crayfish, aquatic salamanders, and juvenile and adult fish are often able to escape direct effects by simply leaving the area (emigration).

Examples of direct effects on aquatic habitat include, but are not limited to, things such as changes in the quality, quantity, or diversity of habitat available resulting from sedimentation (or a reduction thereof). It is important to note that effects on aquatic habitats from management activities can be positive or negative, depending on the nature of the proposed actions and site-specific conditions. Examples of indirect effects of a proposed action on aquatic species include (but are not limited to) altered reproductive or foraging success and increased disease as a result of sedimentation and degraded water quality and altered community structure as a result of migration (see above).

Examples of indirect effects on aquatic habitat include, but are not limited to, things such as changes in the quality, quantity, or diversity of habitat available resulting from changes in riparian vegetation. Specifically, the transport of large woody debris (LWD), an integral component of aquatic habitat diversity, to stream channels is a function of riparian vegetation structure and composition. It is important to note here that the Forest Plan does not allow vegetation management within 100 feet of perennial streams unless it is specifically for the enhancement of riparian values. This standard was designed to allow vegetation along streams to become old and decadent and to serve as a long-term source of LWD to stream channels. However, areas exist across the Forests where vegetation can be managed within designated riparian areas to facilitate LWD transport and serve as a short-term source of habitat improvement.

An analysis of the aquatic resources (AQUA) for this project was completed in January 2002. The AQUA report can be found in the Biological Evaluation in Appendix D.

4.10.2 Fisheries Management Indicator Species

All Alternatives

Implementation of any of the alternatives would not impact the two aquatic MIS species or habitat for those species should they occur in the project or analysis areas. Species viability would not be affected by implementation of any of the alternatives.

4.10.3 Fisheries Threatened and Endangered Species

All Alternatives

This proposal will not affect any proposed or listed Federal threatened or endangered aquatic species or their habitat. Because there is no known direct, indirect or cumulative effect known to any Federal threatened or endangered aquatic species, there are no recommendations to lessen the effect of this proposal. Consultation with the United States Fish and Wildlife Service is not required.

4.10.4 Fisheries Sensitive Species

All Alternatives

Implementation of any alternative proposed for the Northside Timber Sale project would not have negative impacts on aquatic Sensitive species, nor will project implementation result in a trend toward listing for any species. There are no expected cumulative effects on aquatic Sensitive species from implementation of any alternative.

4.10.5 Fisheries Forest Concern Species

All Alternatives

Implementation of any of the alternatives would not impact the nineteen aquatic Forest Concern species or habitat for those species should they occur in the project or analysis areas provided that Forest Plan direction and required mitigation measures listed in Section 4.4 of this document are implemented. Species viability would not be affected by implementation of any alternative. There are no expected cumulative effects on aquatic Forest Concern species from implementation of any alternative.

4.11 Wildlife Resources

4.11.1 Introduction

An analysis of the wildlife resources (WILDA) for this project was completed in February 2002. The WILDA report can be found in the Biological Evaluation in Appendix D.

4.11.2 Wildlife Management Indicator Species

Preferred habitats for Management Indicator Species (MIS) are listed in the affected environment section of this document (Section 3.11.2). Where possible, the residual trees will be hard mast species and as sunlight becomes more available, the tree crowns would increase in size and vigor, therefore increasing mast production. The following management recommendation would maintain hard mast producing trees:

- Select residual leave trees in the following species priority: white oak, red oak, hickory, chestnut and scarlet oak, hemlock and other hardwoods. Selection of these residual trees would be further based on having good form and currently of mast producing size, approximately 14 inches diameter at breast height (DBH) or greater.

Black Bear

Alternative 1 (No Action)

With the no action alternative, the mature state of the forest will continue to provide necessary habitat conditions for species such as black bear. If timber harvesting is reduced or discontinued in the future, there may be long term negative effects to MIS requiring early successional habitat including black bear. Most of the MIS analyzed require at least a portion of their habitat in early succession, and on Forest Service land this habitat would be limited to isolated pockets of blowdown, wildfire damage, or other natural disturbances.

Alternative 1 would result in a short term no effect and a long term negative effect determination on black bear by not increasing the diversity of succession within the upland hardwoods forest type.

Alternatives 2 and 3

The open road density of the analysis area would not change under Alternative 2 or 3. The current open road density within the wildlife analysis area in NC and the Pisgah National Forest is 1.1 mi/sq and exceeds the open road density recommended in the Forest Plan. Part of this is attributed to the location of Highway 19-W through the project area. There is no potential for changing the management of Highway 19-W.

The implementation of the above management recommendation concerning residual leave trees would result in continued utilization within the newly developing stands in Units 3a, 3b, 4 and 5 by hard mast dependent species and creation of potential den trees which would move the area towards better bear habitat in the long term. Alternatives 2 and 3 would only reduce the hard mast component by <1% and the residual tree management recommendation would assure that hard mast producing trees are left as residuals in the regenerated stands. Thinning within Unit 4, the poplar stand (Alternative 2), would have no effect on bear habitat conditions except it would increase the sunlight to the forest floor resulting in an expected increased brushy and herbaceous layer over the short term until the canopy closes again.

Providing grape arbor protection in all units and protecting soft mast species during planned site preparation would provide the greatest habitat benefit for black bear. Also, cutting the woody stems that

have begun to encroach on the areas of dense *Rubus* spp. and other soft mast brush around the existing grass/forb areas is recommended to keep soft mast production from decreasing.

Unit 3a is a preferred forest type, producing both a hard mast overstory and a soft mast huckleberry understory. Even with the close proximity of State highway 19-W, site specific topography allows this stand to provide good habitat in its current condition for black bear. The stand is 81 years old and, as demonstrated by multiple research on bear habitat utilization, it is declining in use by bears as it ages. Past management of this stand type and aspect have demonstrated a high percentage of oak in the regenerating stands.

The site preparation proposed utilizing prescribe burning in Unit 5 (Alternative 3) would enhance the overstory oak component in the resulting stand, even though oak will not be the dominant overstory species. The manual site preparation proposed in these alternatives would not affect the black bear habitat in the short term but would increase the hard mast component in future stands which would benefit the bear.

Alternative 4

The open road density of the analysis area would not change under Alternative 4. The current open road density within the wildlife analysis area in NC and the Pisgah National Forest is 1.1 mi/sq and exceeds the open road density recommended in the Forest Plan. Part of this is attributed to the location of Highway 19-W through the project area. There is no potential for changing the management of Highway 19-W.

The implementation of the above management recommendation concerning residual leave trees would result in continued utilization within the newly developing stands in Units 3a, 3b, 4 and 5 by hard mast dependent species and creation of potential den trees which would move the area towards better bear habitat in the long term.

Alternative 4 proposes to manually plant northern red oak in all proposed units, including Unit 1, which would improve the hard mast component in future stands. Currently, 42% of the area analyzed provides mature, hard mast producing forest types. This proposal reduces that by less than 1% and when considering the residual tree marking guidelines, this reduction would be even lower. The site preparation proposed utilizing prescribe burning in Unit 5 would enhance the overstory oak component in the resulting stand, even though oak would not be the dominant overstory species. The herbicide site preparation proposed in this alternative would not affect the black bear habitat in the short term but would increase the hard mast component in future stands which would benefit the bear.

Table 31: Summary of Effects of Alternatives on Black Bear

Summary of Effects with Management Recommendations Implemented

Black Bear	Increased habitat	Decreased habitat	Net change
Alternative 1	0	0	0
Alternative 2	15 acres – Unit 3a	0	+ 15 acres
Alternative 3	48 acres	0	* + 48 acres
Alternative 4	48 acres long term +26 acres	0	**+ 48 acres long term + 26 acres

*Alt 3 = Unit 3a plus 35 ac Burn area

**Alt 4 = all of alt 3 plus oak planting in unit 5, 1 & 2 increasing the oak component over a long term period.

Eastern Wild Turkey

Alternative 1 (No Action)

The white pine overstory within Unit 1 has suffered mortality from the SPB, resulting in a naturally regenerating pine/hardwood forest condition. Without site preparation in Unit 1, the stand is regenerating into a pine/hardwood stand. With site preparation this unit would result into a hardwood/pine stand. This alternative would have minimal negative short term effects to eastern wild turkey by no increase in grass/forb and soft mast habitat components.

Alternative 2

Unit 2 is a planted white pine forest type in an older age class, which is not usually utilized for thermal cover as white pine does not retain its lower branches. Further the present forest floor condition within a pine dominated environment, usually does not provide forbs, grasses, and soft mast. If the basal area of overstory white pine is removed, as proposed in Alternatives 2 - 4, the hardwood regeneration would be released and result in a mixed hardwood/pine forest which provides habitat within the brush layer and forest floor for turkey and many other species.

Unit 3a is expected to regenerate into the same forest type and hard mast composition as the present stand. Over the long term, regenerating Unit 3a into a young, vigorous acorn producing age class would benefit the turkey. Alternative 2 proposes to thin Unit 4, which would increase the sunlight to the forest floor and therefore, increase the herbaceous layer, improving spring food source availability for the turkey. The protection and enhancement of soft mast species would also benefit the wild turkey. Alternative 2 results in minimal positive effects with the implementation of the residual tree marking guidelines.

Alternatives 3 and 4

Alternative 4 has the long term benefit of ensuring a higher component of hard mast due to the northern red oak planting proposed on all treated acres, including Unit 1. Unit 3a is expected to regenerate into the same forest type and hard mast composition as the present stand. Over the long term, regenerating Unit 3a into a young, vigorous acorn producing age class would benefit the turkey. Prescribe burn

treatment of Unit 5 as proposed in Alternatives 3 and 4 would benefit the wild turkey by producing sprouting of soft mast shrubs and resulting in the long term in a stand with a larger oak component. Alternatives 3 and 4, with residual tree marking guidelines and the prescribe burn proposal, would result in a greater positive effect for wild turkey habitat. The red oak planting proposed in Alternative 4 for all units would improve the long-term mast component over the long term and result in the greatest positive affect to wild turkey habitat.

The existing grass/forb habitat should be maintained at its maximum/existing size, with fertilizing and/or liming as needed, to ensure continued growth and vigor. Landings within Compartment 53 should be enhanced by cutting, every 5 years, any woody trees encroaching on the brush/briar areas adjacent to many of the grass/forb openings. Combined with the brushy areas that are remnants of old logging debris piles, this would enhance the current grass/forb component over the next planning period. In the short term, the open condition of the regenerating stands, for up to 5 years, would be used by turkey broods for bug foraging. The seeding of the roads, skid trails, and landings in the sale area, would increase the amount of grass/forb openings by about 5.5 acres. This seeding would increase spring and summer foods, as well as provide bugging areas, for both young and adult turkeys.

Table 32: Summary of Effects of Alternatives on Eastern Wild Turkey

Effects with Management Recommendations Implemented

Wild Turkey	Increased habitat	Decreased habitat	Net change
Alternative 1	4 acres	0	+ 4 acres
Alternative 2	69 acres	0	+ 69 acres
Alternative 3	74 acres	0	+ 74 acres
Alternative 4	74 acres	0	+ 74 acres

Ruffed Grouse

Ruffed grouse utilize much of the same habitat as wild turkey and would react to treatments within cove hardwood and pine forest types in much the same manner. The past timber sale activities within the analysis area created 2% early successional habitat (0-10 year old) and this proposal will increase the early successional habitat by 1% for a total of 3% across the analysis area.

Alternative 1 (No Action)

There would be a long term negative effect on ruffed grouse as the existing early successional condition ages beyond suitable habitat and no new early successional habitat is created.

Alternative 2

Alternative 2 proposes to regenerate the largest number of acres resulting in producing the greater area of regeneration preferred by the ruffed grouse. The southerly portion of Unit 5 is currently highly suitable habitat for grouse, with large amounts of grape, a thick shrub height layer of vegetation, with a large birch component, and understory hemlock. The standards and guidelines for grape arbor retention and the proposed harvest would resulted in a positive effect for Alternative 2.

Alternatives 3 and 4

The prescribe burn treatment proposed in Alternatives 3 and 4 within Unit 5 would allow this habitat to increase as sprouting and re-growth of the shrub layer is the expected result of fire. Providing grape arbors within harvest units, protecting soft mast during planned site preparation, and not harvesting the southern rocky portion of Unit 5 would result in Alternative 3 and 4 benefiting ruffed grouse habitat overall.

The lack of availability of grass/forb habitat remains the limiting factor for ruffed grouse populations. Ruffed grouse cannot protect its brood from predators as easily as wild turkey due to their smaller size; therefore, they make limited use of grass/forb areas larger than 0.5 acre. Ruffed grouse utilize linear grass/forb openings to a much greater degree. Maintenance of temporary roads as linear openings would benefit this species.

The standards and guidelines for grape arbor retention would be followed in Alternatives 3 and 4. This combined with the addition of no harvest within the southerly portion of Unit 5 and the prescribed burning proposed, would result in a greater positive effect on Alternatives 3 and 4 than Alternative 2. Alternative 4 proposes to plant northern red oak on all harvested acres plus Unit 1; therefore, this alternative has the greatest positive affect to habitat over the long term.

Table 33: Summary of Effects of Alternatives on Ruffed Grouse

Summary of Effects with Management Recommendations Implemented

Ruffed Grouse	Increased habitat	Decreased habitat	Net change
Alternative 1	+4 acres	0	+ 4 acres
Alternative 2	+69 acres	0	+69 acres
Alternative 3	+74 acres	0	+74 acres
Alternative 4	+74 acres	0	+74 acres

Raccoon

Alternative 1 (No Action)

Alternative 1 would have no effect on raccoon.

Alternatives 2, 3 and 4

The current standards and guidelines in the Forest Plan call for retaining den trees during harvest activities. The riparian and seeps standards and guidelines found in the Forest Plan will protect much of the habitat for this species. The large habitat component of older forests within ½ mile of streams would not be affected by this proposal. Retention of hard mast producing species as stated in the marking guidelines would minimize the reduction of suitable habitat, especially in Unit 3a.

Alternatives 3 and 4 propose to prescribe burn Unit 5 to improve the advanced oak regeneration, resulting in a greater oak component in the regenerating stand over the long term and a greater amount of soft mast stems over the short term. Alternative 4 proposes to plant northern red oak across all units,

which will improve the hard mast component within regenerated stands. Mechanical or herbicide site preparation, as proposed by Alternatives 3 and 4, would not affect raccoon. The reduction in soft mast available due to the clipping of grape stems would have no effect, as grape arbors will be maintained in all stands.

The final determination of effects resulted in Alternatives 2, 3 and 4 having a negative effect to less than 1% of the mature forest across the analyzed area.

Table 34: Summary of Effects of Alternatives on Raccoon

Summary of Effects with Management Recommendations Implemented

Raccoon	Increased habitat	Decreased habitat	Net change
Alternative 1	0	0	0
Alternative 2	0	50 acres	-50 acres
Alternative 3	0	34 acres	-34 acres
Alternative 4	0	34 acres	-34 acres

Solitary Vireo

Alternative 1 (No Action)

Alternative 1 would have no effect on Solitary Vireo.

Alternatives 2, 3 and 4

Units 1 and 2 are located in the traditionally preferred habitat for this species (pine and mixed pine stands above 3500 feet in elevation). However, these stands are also within 200 feet of Highway 19-W. Studies (Kuitnunen, 1998) have shown that bird densities within 50 meters of well traveled roads are lower than bird densities along forest edges and forested habitat. While the study did not collect data on the Solitary Vireo specifically, being a middle-aged to mature forest habitat species, the influence of State Highway 19-W would likely reduce use of these stands.

Studies (Sauer et al 1995, BBS data) have demonstrated this species has maintained a stable population and the most recent update of the MIS assessment determined the population is increasing. Therefore, there is potential for negatively affecting poor habitat for this species by any of the action alternatives and this habitat was also negatively affected by the SPB caused white pine mortality in Unit 1.

Table 35: Summary of Effects of Alternatives on Solitary Vireo

Summary of Effects with Management Recommendations Implemented

Solitary Vireo	Increased habitat	Decreased habitat	Net change
Alternative 1	0	4 acres	-4 acres
Alternative 2	0	19 acres	-19 acres
Alternative 3	0	19 acres	-19 acres
Alternative 4	0	19 acres	-19 acres

Ovenbird

Alternative 1 (No Action)

Alternative 1 would have no effect on Ovenbird.

Alternatives 2, 3 and 4

The Ovenbird does not demonstrate a strong preference in forest habitat conditions, but is found at a slightly higher incidence, in mature forests. The most recent update of the MIS assessment found Ovenbird populations are increasing rangewide but may be decreasing locally. Ovenbird prefer an upland forest habitat with several different tree species of different heights, so would be negatively affected by the harvesting of Unit 3a in Alternatives 2, 3 and 4. The harvesting proposed would alter vegetative conditions from the preferred mature stage; however, this mature forest condition would make up 58% of the analyzed area after treatment and residual trees would be left to create a two-aged stand; therefore, the negative effects would be minimal.

In conclusion, Alternatives 2, 3 and 4 would result in a minimal negative effect to Ovenbird. Any negative effects will be minimal due to the minimal habitat affected by the maximum harvest treatment of <2% of the forest within the analysis area.

Table 36: Summary of Effects of Alternatives on Ovenbird

Summary of Effects with Management Recommendations Implemented

Ovenbird	Increased habitat	Decreased habitat	Net change
Alternative 1	0	0	0
Alternative 2	0	-15 acres	-15 acres
Alternative 3	0	-13 acres	-13 acres
Alternative 4	0	-13 acres	-13 acres

Pileated Woodpecker

Alternative 1 (No Action)

Alternative 1 does not reduce the amount of mature forest. Pileated Woodpeckers forage on downed logs and therefore will benefit for the duration of down, large woody debris as the dead white pine fall. With the no action alternative, the mature state of the forest will continue to provide necessary conditions for those species requiring it. This alternative would have a positive effect on the pileated woodpecker as the forest ages.

Alternatives 2, 3 and 4

Pileated Woodpecker prefers mature forest but are found in seedling/sapling habitat and are most numerous in mature cove forests and riparian habitat. The most recent update of the MIS assessment found that Pileated Woodpecker populations are increasing across the Nantahala and Pisgah National Forests.

Alternatives 3 and 4 reduce the amount of mature cove forest by 21 acres and Alternative 2, by 35 acres. The portion of cove forest below the road in Unit 3b exhibits the highest potential habitat characteristics within the project area for Pileated Woodpecker. Thinning Unit 4, as proposed by Alternative 2, would allow the remaining trees to increase in diameter and improve the habitat for the woodpecker. As a result of the Forest standards and guidelines that provide for maintaining den trees and riparian area protection, any negative effects of harvesting Unit 4 would be minor. The same Forest standards and guidelines would be followed for Alternatives 3 and 4. Not proposing to harvest in the occupied *Inflectarius subpallitus* cove forest areas, would result in reducing the negative effect of harvesting mature forests. Alternatives 2, 3 and 4 would result in a minimal negative effect to Pileated woodpecker.

Table 37: Summary of Effects of Alternatives on Pileated Woodpecker

Summary of Effects with Management Recommendations Implemented

Pileated Woodpecker	Increased habitat	Decreased habitat	Net change
Alternative 1	0	0	0
Alternative 2	0	-38 acres	-38 acres
Alternative 3	0	-21 acres	-21 acres
Alternative 4	0	-21 acres	-21 acres

Cumulative Effects on Management Indicator Species

Past timber management within this watershed resulted in 2% in the 0-10 year old age class or early successional habitat. The spatiality of this habitat was of concern with most of it clustered close to State Highway 19-W resulting in increased motorized and human disturbance potential for wildlife utilizing the habitat. However, the Granny Lewis EA included several harvesting units more uniformly spread across the landscape which will benefit species, such as black bear, that are sensitive to motorized vehicles but depend on early successional habitat throughout their lifecycle. This proposal will improve the spatiality of early successional habitat across the landscape. Analysis of road densities within the analyzed area are above the standards and guidelines for black bear with both State Highway 19-W and the Granny Lewis road in TN managed as open.

Grass/Forb habitat is at critically low levels within this analysis area and the proposed Northside timber sale activities would not significantly increase the habitat. Private land is expected to become more developed into residential housing as the access is improved by the development of State Road 23.

Site preparation activities planned in this proposal include mechanical (Alternatives 2 and 3) or herbicide (Alternative 4) treatment of understory species to enable more shade tolerant species regeneration such as hickory and oak to persist into the overstory of the new stands. This practice would benefit ruffed grouse, wild turkey and black bear species if grape arbors and soft mast species are protected in the hardwood forest types (Unit 3b and Unit 5) where this attribute of the habitat is significant. The planting of northern red oak proposed by Alternative 4 would increase the oak component in regenerating stands. The prescribed burning on 35 acres, as proposed in Alternatives 3 and 4, would encourage soft mast sprouting and production in the short term and release the seedling oak component in the regenerating forest. The hard mast component within the analysis area is

approximately 42% and the maximum proposed harvest in this project would reduce the hard mast component by less than 1%. These numbers are derived from harvest acreages and do not reflect the hard mast producing species retained in the treatment areas as residuals.

As summarized in the effects to MIS species, past, current, and these proposed actions would result in minor positive habitat benefits to black bear, wild turkey, and ruffed grouse with minor negative affect on raccoon habitat. Three bird MIS would be negatively affected by the proposed action; however, the effects would be minimal, affecting <2% of their present habitat in this analysis area. Past and current management activities included standards for snag and den tree retention as well as riparian area protection measures.

4.11.3 Wildlife Threatened and Endangered Species

All Alternatives

No Federally Threatened or Endangered wildlife species are known to occur within this analysis area; therefore, there will be no direct, indirect, or cumulative effects. Formal consultation with U.S.D.I. Fish and Wildlife Service is not required, as there will be no negative effects on threatened or endangered wildlife species by any alternative considered in this analysis.

4.11.4 Wildlife Sensitive Species

All Alternatives

Weller's salamander, a Regional Forester's Sensitive species, was observed on Flat Top Mountain in 1945. The species is thought to persist at this location and all element of occurrence records for this salamander in North Carolina are from mountain tops. The proposed project would not affect any habitat on Flat Top Mountain; therefore, there would be no effect to this salamander by any alternative considered.

4.11.5 Wildlife Forest Concern Species

Cerulean Warbler (*Dendronica cerulea*)

Alternative 1 (No Action)

Habitat information from known Cerulean Warbler habitat demonstrates the use of gap openings by this species. Some naturally occurring gap openings are to be expected in a forest; however, their typical single tree size is not a large enough opening for species use as demonstrated by the population occurrence records across the landscape. Therefore, a determination of no effect (positive or negative) was made for Alternative 1.

Alternatives 2, 3 and 4

Vegetative conditions of the cerulean's habitat would be the large, cove forest with open understories, which occur in areas within Units 3b, 4, and 5. No evidence of Cerulean warblers was found during

surveys for this species in the treatment units with potential habitat for the species. Therefore, a determination of no effect on Cerulean warbler was made for Alternatives 2, 3 and 4.

Southern Zigzag Salamander (*Plethodon ventrali*)

Alternative 1 (No Action)

Alternative 1 would not remove the overstory white pine that would allow these sites to revert to a hardwood forest type. Pine stands are typically not preferred habitat due to the lack of leaf litter, pine needles do not retain the cool, moist conditions of a leaf layer. Potential salamander habitat is expected to increase as the hardwood forest type ages once the pine overstory is removed. All alternatives, including the “no action” Alternative 1, will increase the salamander habitat where SPB mortality has occurred and large, woody debris accumulates within Unit 1. There will be long term positive effects to salamander habitat for Alternative 1 on 4 acres

Alternatives 2, 3 and 4

The riparian area protection listed within the Aquatic Resource Analysis (AQUA) for this proposed project will protect any salamanders that may be utilizing the riparian habitat bordering Unit 2. Protection of potential habitat would be made by following the guidelines referred to in the protection of seeps within other units in the proposal. Implementing the following mitigation measures will provide additional protection:

1. Any gravel used to strengthen the road carrying capacity of this closed portion of FS road 278, as shown on the wildlife habitat map, will be minimal within the riparian area crossings and the road will be ripped and re-seeded in grass/forb cover within the season of operation for Unit 2.
2. The season of harvesting activity will be outside of the November 1 - April 30 time-frame to avoid disturbance during late fall and early spring.

Salamander movement is greatly restricted for any population in the area of the historic element occurrence south of State Highway 19-W by the paved roadbed and traffic flow. Gravel is likely needed on this closed portion of Forest Service road 278 to accommodate heavy logging equipment in harvesting proposed Unit 2. Minimal gravel should be used and the roadbed ripped and seeded post-harvest to provide continued herbaceous coverage. It was determined in discussions with Dr. Petranka (personal communication 2/25/99), avoiding late fall and early spring harvesting would greatly reduce the likelihood of salamander mortality by heavy equipment utilizing this closed portion of FS road 278.

While there is little likelihood of zigzag salamanders utilizing this roadbed due to the inadequate habitat characteristics present in Units 1 and 2, a determination was made that the hauling activities to harvest Unit 2 in Alternatives 2, 3, and 4 may impact individuals but is not likely to cause a trend to federal listing or a loss of viability. To ensure potential mortality or displacement are kept to a minimum, the mitigation measures listed above will be in place, to minimize potential impacts to the zigzag salamander or its habitat by the hauling activities with Alternatives 2, 3, and 4. There would be long term positive effects to salamander habitat for Alternatives 2, 3, and 4 on 19 acres, with the implementation of the hauling road mitigation measures listed above.

Honey Glyph Snail (*Glyphyalinia vanattai*)

All Alternatives

All surveys for this species in potentially affect habitat resulted in no honey glyph snails being found. Therefore, there will be no known effect to this species by any alternative considered.

Velvet Covert Snail (*Inflectarius subpalliatius*)

Alternatives 1 (No Action), 3 and 4

Velvet Covert, *Inflectarius subpalliatius*, a Forest Concern species, was found during the surveys to occur within Units 3a, 3b, and 4. Alternatives 1, 3 and 4 do not propose to harvest occupied habitat in Unit 3a or 3b or thin Unit 4, and will leave the vegetative cover on the southern portion of Unit 5 where a large number of rocks exist which may provide habitat conditions for snails and amphibians (2 acres). Therefore, there will be no effects to the overall snail populations or habitat by Alternatives 1, 3 or 4.

Alternative 2

Alternative 2, will harvest the occupied *Inflectarius subpalliatius* habitat in Units 3a and 3b. The thinning of Unit 4 as proposed by Alternative 2 would not decrease the canopy cover to the extent of creating negative effects on the snail population or its habitat. Individuals may be negatively affected by the harvesting activity in Unit 4; however, the overall effect to the snail population would be minimal or have no effect (Caldwell/Florence personal communication 5/20/99). Therefore, Alternative 2 may impact individuals but not likely affect populations with the thinning activity in Unit 4. However, Alternative 2 would impact individuals and likely cause negative effects to the population and habitat by harvesting the occupied habitat in Units 3a and 3b.

4.12 Biological Diversity

All Alternatives

The biological diversity of the project and analysis area would not be degraded by these alternatives since the effects on the vegetation; wildlife, Threatened and Endangered species, Sensitive species, or Forest Concern species, and old growth resources would not degrade biological diversity.

4.13 Economics

Alternative 1 (No Action)

If no other timber were substituted, then the Western North Carolina region would support fewer jobs, about five jobs/1 MMBF, as well as a loss of \$127,000/1 MMBF, in income to the local communities. It is unlikely that jobs in other industries would increase. (Grassy/Wesser FEIS page III/IV 71).

Alternative 2

The Present Net Value (PNV) is \$18,886 when the timber sale entry is considered as a single event (single-entry). The benefit/cost ratio for this alternative is 1.30 (see Financial Efficiency Analysis and Economic Assumptions, Appendix F). The PNV is positive due to the value of the timber removed in relation to the cost of preparing and administering the sale, reforesting the sale area, and future management of the area.

Alternative 3

The Present Net Value (PNV) is \$2,798 when the timber sale entry is considered as a single event (single-entry). The benefit/cost ratio for this alternative is 1.05 (see Financial Efficiency Analysis and Economic Assumptions, Appendix F). The PNV is positive due to the value of the timber removed in relation to the cost of preparing and administering the sale, reforesting the sale area, and future management of the area.

Alternative 4

The Present Net Value (PNV) is \$148 when the timber sale entry is considered as a single event (single-entry). The benefit/cost ratio for this alternative is 1.00 (see Financial Efficiency Analysis and Economic Assumptions, Appendix F). The PNV for this alternative is neutral.

4.14 Recreation and Leisure

Alternative 1 (No Action)

This alternative would retain the current character of the environmental setting in the project area. The number, type, and location of recreation activities occurring in the project area and the amount of use would not be affected by resource management activities.

Alternatives 2, 3 and 4

Opportunities to hunt certain game species and to view songbirds and other small non-game species would be improved around the newly harvested stands until these stands become about ten years old. Wildlife would be temporarily displaced where harvest activity occurs until these activities are complete. Black bear, grouse, and turkey, would return after the initial disturbance period to utilize the soft mast and cover that would be provided in the generation cuts.

Recreation use may be affected by this alternative when the actual harvesting would take place. There would be noise and traffic associated with the harvesting operations. Hikers may be temporarily affected if they are hiking the Appalachian Trail in the project area during the implementation of the prescribed burn proposed under Alternatives 3 and 4. The effects would be temporary and short term in nature. It is not anticipated that this proposal would have any measurable long term effect on the recreation resource.

4.15 Health and Safety

Alternative 1 (No Action)

Because no activities are proposed under this alternative and there are no known safety hazards present in the project area, there would be no affect on the health and safety of the public.

Alternative 2

Timber harvesting is proposed in this alternative. These areas would be harvested using tractor logging. Those who work in the logging profession are aware of the hazards associated with the logging profession. The general public will be kept out of areas with active logging activities.

Alternative 3

Timber harvesting is proposed in this alternative. These areas would be harvested using tractor logging. Those who work in the logging profession are aware of the hazards associated with the logging profession. The general public will be kept out of areas with active logging activities.

Lookouts would be posted along the Appalachian Trail during the implementation of the prescribed burn proposed in this alternative. Hikers would only be allowed to pass when the area was safe. Prescribed burns are conducted under the direct supervision of a burning boss with fire behavior expertise consistent with the project's complexity. All workers participating in prescribed burning must meet health, physical, and training requirements listed in Forest Service Manual 5140. Protective clothing and equipment are required. A Prescribed Fire Plan is prepared for each burn. This Prescribed Fire Plan gives specific on the ground and weather conditions that must be met before the burn can be executed. All conditions and parameters are monitored prior to and during a prescribed burn to meet the requirements of the plan and provide for safety for those in and around the burn area.

Alternative 4

Timber harvesting is proposed in this alternative. These areas would be harvested using tractor logging. Those who work in the logging profession are aware of the hazards associated with the logging profession. The general public will be kept out of areas with active logging activities.

The same procedures are to be followed for prescribed burning as described in Alternative 3. Areas would not be prescribe burned for at least 30 days following the application of any herbicide.

Herbicides would be applied according to the labeling information and the site-specific analysis done for each area where it is applied. Herbicides would be applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health.

Dermal contact and inhalation are expected to be the primary routes of occupational exposure to glyphosate (the active ingredient in Accord) and triclopyr (the active ingredient in Garlon 3A and Garlon 4). Occupational exposure to these materials has not been reported to cause significant adverse

human health effects. On the basis of available information, exposure to these herbicides whose active ingredient is glyphosate or triclopyr is not expected to produce significant adverse human health effects when labeling and application directions are followed and safety recommendations are implemented.

Accord is no more than slightly toxic and no more than slightly irritating when exposed to the skin or inhaled based on toxicology studies. Direct contact with Accord may cause temporary eye irritation. If exposed to the eyes, the material may cause pain, redness and tearing based on toxicology studies. Although contact with the eyes may result in irritation or discomfort, laboratory studies indicate that the effects are only temporary with the eyes shortly returning to a normal condition. The relative severity of eye irritation caused by glyphosate is lower than many common household shampoos or detergents.

Ingestion of compounds containing glyphosate is no more than slightly toxic based on toxicology studies. No significant adverse health effects are expected to develop if only small amounts (less than a mouth full) are swallowed. Ingestion of similar formulations has been reported to produce gastrointestinal discomfort with irritation of the mouth, nausea, vomiting and diarrhea. Oral ingestion of large quantities of one similar product has been reported to result in hypotension and lung edema.

Accord has been tested for toxicity to aquatic invertebrates, fish, and birds. The results indicate that this product is slightly to moderately toxic to *Daphnia magna*, moderately toxic to warm water and coldwater fish, and practically nontoxic to bobwhite quail and mallard duck. No information is available regarding algal toxicity for this product. Glyphosate, the active ingredient in Accord, has been rated very low for its toxicity to wildlife. Studies have shown that, when properly applied to natural ecosystems, glyphosate will not cause adverse effects on wildlife health, feeding habits or distribution. Aquatic population and habitats will be protected through implementation of the applicable mitigation measures contained in the Vegetation Management in the Appalachian Mountains (VMAM) FEIS issued in July 1989.

A single brief (minutes) exposure of triclopyr (active ingredient in Garlon 3A and Garlon 4) through inhalation is not likely to cause adverse effects. Excessive exposure may cause irritation to the upper respiratory system including the nose and throat. Prolonged or frequently repeated skin contact with triclopyr may cause skin irritation or may cause allergic skin reaction in some individuals. A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. Repeated exposure may result in absorption of harmful amounts.

Small amounts of triclopyr that may be swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing large amounts may cause injury. Ingestion may cause gastrointestinal irritation or ulceration. If aspirated (liquid enters the lungs), may cause lung damage or even death due to chemical pneumonia.

Garlon 4 is moderately toxic to fish and aquatic invertebrates on an acute basis. Garlon 3A is slightly toxic to aquatic organisms on an acute basis. Aquatic population and habitats will be protected through implementation of the applicable mitigation measures contained in the Vegetation Management in the Appalachian Mountains (VMAM) FEIS issued in July 1989.

Notice signs will be posted in areas of anticipated public use where herbicide has been applied. The signs will include information on the herbicide used, when it was applied, and who to contact for

additional information. All applicable mitigation measures contained in the Vegetation Management in the Appalachian Mountains (VMAM) FEIS issued in July 1989 will be followed. An Emergency Spill Plan that outlines procedures to be followed in the event of an accidental spill or excessive exposure is included in Appendix H.

Cumulative Effects

Scientific data have shown that glyphosate does not bioaccumulate. A series of studies have clearly shown that glyphosate is very slowly absorbed across the gastrointestinal membrane and that there is minimal tissue retention and rapid elimination of glyphosate residues from several animal species. The lack of retention and the rapid elimination of glyphosate from animals indicates that even in the event of repeated exposure, glyphosate will not accumulate in the body or food chain.

A risk assessment has been completed on the use of glyphosate and can be found in the Final Environmental Impact Statement for Vegetative Management in the Appalachian Mountains (VMAM). The risk assessment found that deer browsing on vegetation with residual chemical were not adversely affected. No direct effects on small mammals or adverse effects to reproduction, growth, or survival were observed. At high doses, glyphosate was slightly toxic to birds but reproduction was not effected. Adverse affects may occur, if large areas are treated, to local populations of small mammals, birds, and terrestrial amphibians and reptiles.

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