United States Department of Agriculture | Forest Service | National Forests in North Carolina
Pisgah National Forest
Pisgah Ranger District | 1001 Pisgah Hwy
Pisgah Forest, NC 27868-7721
828-877-3265

File Code: 1950
Date: July 9, 2006

Dear Interested Members of the Public and Forest Users:

Enclosed is information my staff has assembled to date evaluating the Case Camp Ridge Project on the Pisgah Ranger District, Pisgah National Forest. The project is located in Transylvania County. Three alternatives have been developed and are currently being analyzed; Alternative A – No Action, Alternative B – Proposed Action, and Alternative C. While Alternative C has been identified as the preferred alternative, a final decision has not been made yet. I am seeking your input before I reach a decision.

Your comments need to be as specific as possible and you must provide the following information: 1) Your name and address; 2) Title of the Proposed Action; 3) Specific substantive comments (215.2) on the proposed action, along with supporting reasons that the Responsible Official should consider in reaching a decision; and 4) Your signature or other means of identification verification. For organizations, a signature or other means of identification verification must be provided for the individual authorized to represent your organization.

In accordance with 36 CFR 215.6(2)(4), comments must be postmarked or received within 30 days beginning the day after publication of this notice in *The Asheville Citizen-Times*. Oral or hand-delivered comments must be received within our normal business hours of 8:00 a.m. to 4:30 p.m. Comments may be mailed electronically, in a common digital format, to: comments-southern-north-carolina-pisgah-pisgah@fs.fed.us; regular mail to: Appalachian Ranger District, Attn: Michael Hutchins, P.O. Box 128, Burnsville, NC 28714; or faxed to 828-884-7527.

I encourage your participation during this 30-day notice and comment period on the information summarized to date to allow me the opportunity to solidify our analysis and complete the environmental assessment (EA). Please note that I am requesting your comments under 36 CFR 215 earlier in the process than with previous projects. By taking your comments now, I believe we can ensure our analysis satisfactorily addresses the issues and effects and the final documentation will be complete and clearly focused. I believe the enclosed information is detailed enough for you to provide substantive, meaningful comments. Following this 30-day notice and comment period, I will be publishing a decision with the EA. Pursuant to 36 CFR 215.11(a) and 215.15(a), my decision will initiate a 45-day appeal period.

Please contact Michael Hutchins, Interdisciplinary Team Leader at 828-682-6146, or Ted Oprean, Project Leader at 828-877-3265 if you have questions concerning this proposal. Thank you for your continued interest in management of the National Forests in North Carolina.

Sincerely,

/s/*Randy Burgess*
RANDALL BURGESS
District Ranger

Enclosure

United States
Department
of
Agriculture

Forest
Service

July
2006

Preliminary Analysis

Case Camp Ridge Project

Pisgah Ranger District, Pisgah National Forest
Transylvania County, North Carolina

Case Camp Ridge Project

Preliminary Analysis

Location of Action:	Pisgah Ranger District Pisgah National Forest Transylvania County, North Carolina
Lead Agency:	USDA Forest Service
Responsible Official:	Randy Burgess Pisgah District Ranger 1001 Pisgah Highway Pisgah Forest, NC 27868
For More Information:	Ted Oprean Project Leader (828) 877-3265 (828) 884-7527 (fax) Michael Hutchins ID Team Leader (828) 682-6146 (828) 682-9179 (fax)
Send Electronic Comments to:	comments-southern-north-carolina-pisgah-pisgah@fs.fed.us

Table of Contents

CHAPTER 1 – PURPOSE AND NEED

1.1 Document Structure

The Forest Service has prepared this Preliminary Analysis (PA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This PA discloses direct, indirect, and cumulative environmental effects that would result from the proposed action and alternatives. The document is organized into five parts:

- *Chapter 1 – Purpose and Need:* This section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal.
- *Chapter 2 – Alternatives:* This section provides a detailed description of alternative methods for achieving the stated purpose as well as the No-action Alternative. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes project design features. This section also provides a summary of the environmental consequences associated with each alternative.
- *Chapter 3 – Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by issues. Within each section, the affected environment is described first, followed by the effects of the No-action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- *Chapter 4 – Preparers and Public Involvement:* This section provides a list of preparers and members of the public consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the PA.

1.1.1 Project Record

This PA incorporates by reference (40 CFR 1502.21) the project record. The project record contains specialist reports and other technical documentation used to support the analysis and conclusions in this PA. The specialist reports provide additional detailed analysis. This PA incorporates by reference the Nantahala and Pisgah Management Indicator Species (MIS) Report. This report along with Monitoring and Evaluation Reports for the National Forests in North Carolina contains the most current information about forest population trends for MIS species.

1.2 Background

This PA documents the results of site-specific analyses concerning proposed activities of the Case Camp Ridge Project on the Pisgah Ranger District, Pisgah National Forest.

The area to be analyzed is within Forest Plan Analysis Area (AA) 09 about five miles northwest of the Pisgah Ranger Station. The project is also located within Compartments 73 (979 acres); 74 (1,053 acres); and 75 (736 acres), Transylvania County (see Vicinity Map at the end of the document). The 9,816 acre Forest Plan AA 9 contains Compartments 70-78 and 81 and may be different geographic boundaries from the AAs individual resources analyze effects to—analysis

and activity areas are defined in Appendix A, Biological Evaluation.

Forest Plan AA 09 contains several Forest Plan Management Areas (MA), each of which has unique goals and appropriate management direction and standards to achieve these goals as described in the Land and Resource Management Plan, Amendment 5 for the Nantahala and Pisgah National Forests North Carolina (1994), hereafter called the Forest Plan (Forest Plan, pages III-54 – III-56). The proposal is within MA 4D which is managed to "[e]*mphasize high quality habitats for wildlife requiring older forests and freedom from disturbance from motorized vehicles. Allow small widely dispersed openings throughout the management area. Close most roads to private motorized vehicles. Early successional habitat is provided in conjunction with managing suitable timber land in these areas."* (Forest Plan, page III-78).

This PA tiers to the Final Environmental Impact Statement (FEIS) for the Forest Plan and to the FEIS for Vegetation Management in the Appalachian Mountains (VMAM).

1.3 Proposed Action

This alternative was developed to address aspects of the Purpose and Need. Maps of this alternative are located at the end of the PA. Acreages between the proposal that was scoped previously this year and acreages of the proposal in the table below are different. The scoping acres were derived by dot grid (less accurate) and acres in the table below were derived by GIS (more accurate).

The following table summarizes harvest-related information for the Proposed Action:

Table 1-1: Case Camp Proposed Action

Stand Number	Treatment	Acres	Harvest System
73-03	Two-age[1]	16	Rubber tired skidder
73-10	Two-age	17	Rubber tired skidder
73-15[2]	n/a	n/a	n/a
73-29	Two-age	20	Rubber tired skidder
74-07	Two-age	16	Rubber tired skidder
74-10	Two-age	15	Rubber tired skidder
74-11	Two-age	20	Rubber tired skidder
74-17a	Two-age	14	Cable
74-25	Two-age	13	Rubber tired skidder
75-06	Two-age	11	Cable
75-09	Two-age	20	Rubber tired skidder
75-13	Two-age	20	Cable
75-21	Two-age	13	Cable
Total Two-age		**195**	
73-08	Selection	6	Rubber tired skidder
74-02	Selection	2	Rubber tired skidder
74-20	Selection	8	Rubber tired skidder
74-17b	Selection	3	Rubber tired skidder
75-10	Selection	3	Rubber tired skidder
75-14	Selection	3	Rubber tired skidder
75-19	Selection	3	Rubber tired skidder
Total Selection		**28**	
74-20	Sanitation Thin	48	Rubber tired skidder
75-01	Sanitation Thin	23	Rubber tired skidder

Stand Number	Treatment	Acres	Harvest System
Total Sanitation		**71**	
73-19	Overwood Removal	12	Rubber tired skidder
Total Overwood		**12**	
75-15	Grass/Forb	3	Rubber tired skidder
Total Grass/Forb		**3**	

1 – Average of 15-25 ft^2 of basal area retained per acre (see also Section 3.7, Chapter 3)
2 – Stand 73-15 may be dropped from the proposal for resource protection

In addition, the Proposed Action would:

- Reconstruct approximately 7.5 miles of existing system roads, and utilize about 1.5 miles of existing "woods" roads to be used as temporary roads for timber harvest operations. Part of the reconstruction includes replacement of 14 undersized culverts and a temporary bridge on Bennett Cove Creek.
- Perform site preparation and release (within 2 to 5 years following site preparation) on about 235 acres of the stands to be regenerated with herbicide (Triclopyr ester and amine formulations) and hand tools (chainsaw and hand ax) following timber harvesting.
- Perform timber stand improvement (TSI) with herbicide (Triclopyr ester and amine formulations) and hand tool methods on approximately 356 acres in stands 73-01, 73-07, 73-08, 73-10, 73-13, 73-16, 73-19, 73-25, 73-26, 74-01, 74-02, 74-03, 74-04, 74-05, 74-08, 74-09, 74-12, 74-13, 75-02, 75-03, 75-04, 75-08, 75-11, 75-16, 75-20, and 75-24.
- Pre-harvest (advanced) oak shelterwood treatment with herbicide (Triclopyr ester and amine formulations) and hand tools on about 265 acres in stands 73-18, 73-24, 74-25, 74-17b, 74-11, 74-6, 74-20, and 75-01.
- Control existing non-native invasive plant species along haul routes and haul routes adjacent to existing and proposed harvest units with herbicide (Glyphosate and/or Triclopyr) on about five acres.
- Convert 0.4 miles of temporary roads to linear wildlife openings creating approximately 0.7 acres of permanent grass/forb habitat. One road accesses stand 73-29 and the other passes through stands 75-19 and terminates in 75-04.
- Provide approximately 3 acres of additional grass/forb habitat by constructing permanent wildlife openings in stand 75-15.

1.4 Purpose and Need for Action

The purpose of this proposal is to meet Forest Plan direction by:

- Providing habitat conditions for wildlife species particularly turkey across the project area by dispersing early successional habitat across the landscape and regulating the amount of 0-10 year age class. Forest Plan standards for 0-10 year age class distribution in MA 4D is not to exceed 10% by compartment or Forest Plan AA (Forest Plan, page III-31). Currently, the percent of 0-10 year age class is 0% in each compartment. Thinning may also be used to improve wildlife habitat (Forest Plan, page III-86);
- Providing a minimum of 0.5% with a maximum of 3% permanent grass and forb openings for turkey habitat (Forest Plan, page III-84). Currently, 0.4% permanent grass and forb openings exists within the compartments;

- Utilizing timber management practices as the primary tool to create desirable habitat (Forest Plan, page III-84);
- Designating small patch old growth to increase biological diversity and provide structural components of old growth at the stand and landscape level (Forest Plan, page III-27);
- Providing for stocking control and species variety through timber stand improvement practices (Forest Plan, pages III-35 & 36) to encourage reproduction of oak, other hard mast and soft mast producing species by treating those stands where such seedlings or saplings are present to favor growth of these species and limit competition from other species.

1.4.1 Why Here, Why Now?

The existing condition of the Case Camp Ridge area has been evaluated and compared against the desired future condition for the area as described in the Forest Plan. Where resources in the area are found to be outside the desired future condition, opportunities for moving the resources towards the desired future condition exist. The Case Camp Ridge area was chosen at this time for vegetation management over other areas on the Pisgah Ranger District because of its planned order of entry in the *Nantahala and Pisgah National Forests, A Schedule of Entry By Analysis Area*. The last appreciable entries in Compartments 73, 74, and 75 were about 14 to 15 years ago and included about 124 acres of regeneration harvest. Forest Plan standards schedule to revisit each compartment in MA 4D every 10-15 years to meet early succession habitat standards (Forest Plan, page III-85). Harvesting is proposed to ensure early successional vegetation in the watershed achieves desired ranges identified in the Forest Plan. The Proposed Action was developed to move resources in the area towards the desired future condition using active management.

1.5 Decision Framework

Based on the analysis disclosed in this PA, the Responsible Official will make a decision and document it in a Decision Notice and Finding of No Significant Impact. The Responsible Official can:

- Select an action alternative that has been considered in detail, or
- Select a modified action alternative, or
- Select the No-action Alternative.

1.6 Public Involvement

The proposal was listed in the January and April 2006 editions of the Schedule of Proposed Actions (SOPA). The proposal was provided to the public, agencies, and organizations for comment during scoping from January 13, 2006 thru February 13, 2006—thirteen individual comments were received during scoping. On April 4, 2006, several members of local and regional environmental organizations attended Forest Service employees on a field trip to the project area.

Using comments received from the public, agencies, and organizations during this period as well as internal review, the interdisciplinary team (IDT) developed a list of issues to address.

1.7 Issues

Issues are defined as a point of discussion, debate, or dispute about environmental effects. Issues are used to develop alternatives, mitigation measures, or analyze environmental effects. The Forest Service separated issues into two groups: significant and other. All comments received during scoping have been reviewed and a determination on significance was made. The issue tracking sheet in the project record lists each comment received and the determination of significance.

1.7.1 Significant Issues

1.7.1.1 Significant Issue #1: Water Quality and Aquatic Habitat – *Reconstructing roads and stream crossings may adversely impact water quality and aquatic habitat*

Indicators

- Miles of road reconstruction
- Number/type of stream crossings developed

1.7.1.2 Significant Issue #2: Wildlife Habitat – *The proposal may not create enough brushy interface habitat* (transitional habitat between grass/forb habitat and forests)

Indicators

- Acres of brushy interface habitat created

1.7.1.3 Significant Issue #3: Old Growth Habitat – *The proposal may impact potential old growth*

Indicators

- Acres of potential old growth harvested
- Acres of small patch old growth designated

1.7.1.4 Significant Issue #4: Scenery Resources – *Logging related activities may impact scenery resources*

Indicators

- Acres of modification visual quality objective (VQO)
- Acres of partial retention VQO

1.7.2 Other Issues

1.7.2.1 Exotic Invasive Plants – *Exotic invasive plants are established in the project area and there are various methods for control*

1.7.2.2 Soil Resources – *Constructing and reconstructing roads and logging related activities may impact soils*

1.7.2.3 Cultural Resources – *Constructing and reconstructing roads and logging related activities may impact cultural resources*

1.7.2.4 Botanical Resources – *Harvest related activities may affect botanical resources*

1.7.2.5 Dispersed Recreation – *Harvest related activities may impact trails (particularly where dual designated on system roads) and dispersed campsites*

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

CHAPTER 2 - ALTERNATIVES

Chapter 2 describes alternatives the agency considered in addition to the proposed action. This chapter compares each alternative considered in detail and lists project design features.

2.1 Range of Alternatives

The range of alternatives developed and analyzed by the interdisciplinary team (IDT) was driven by the Purpose and Need underlying the proposal (Chapter 1, Section 1.4), and by the significant issues responding to the proposal. An alternative should (1) reasonably respond to the Purpose and Need, and (2) address one or more significant issue(s). The only exception is the No Action Alternative, which is required by regulation [40 CFR 1502.14(d)].

The IDT considered five alternatives. Following internal review, three alternatives were considered in detail and two were eliminated from consideration.

2.2 Alternatives Considered in Detail

Three alternatives were developed by the IDT in response to the issues and concerns regarding the proposal; Alternative A – No Action, Alternative B – Proposed Action, and Alternative C. The action alternatives address specific aspects of the Purpose and Need for this proposal. Project design features for activities in each action alternative are also described in this chapter.

2.2.1 Alternative A – No Action

Under this alternative the actions described in the proposed action (Chapter 1, Section 1.3) would not be accomplished. No management actions would take place at this time to improve the existing condition of the environment in the project area. There would be no regeneration, thinning, or timber stand improvements; no treatment of non-native invasive species, no designation of small patch old growth; or wildlife habitat improvements made. This alternative serves as the environmental baseline for analysis of effects.

2.2.2 Alternative B – Proposed Action

A complete description of the Proposed Action can be found in Chapter 1, Section 1.3 above.

2.2.3 Alternative C

This alternative was developed to address comments received during scoping and IDT involvement. The following table summarizes harvest-related information for Alternative C:

Table 2-1: Summary of Harvest-related Information – Alternative C

Stand Number	Treatment	Acres	Harvest System
73-03	Two-age[1]	15	Rubber tired skidder
73-10	Two-age	13	Rubber tired skidder
73-15[2]	n/a	n/a	n/a
73-29	Two-age	22	Rubber tired skidder
74-10	Two-age	13	Rubber tired skidder
74-11	Two-age	15	Rubber tired skidder
74-17a	Two-age	23	Rubber tired skidder

Stand Number	Treatment	Acres	Harvest System
74-25	Two-age	11	Rubber tired skidder
75-09	Two-age	17	Rubber tired skidder
75-21	Two-age	12	Rubber tired skidder
Total Two-age		**141**	
74-20	Selection	11	Rubber tired skidder
74-17b	Selection	3	Rubber tired skidder
75-10	Selection	3	Rubber tired skidder
75-14	Selection	3	Rubber tired skidder
75-19	Selection	3	Rubber tired skidder
Total Selection		**23**	
74-20	Sanitation Thin	75	Rubber tired skidder
75-01	Sanitation Thin	24	Rubber tired skidder
Total Sanitation		**99**	
73-19	Overwood Removal	12	Rubber tired skidder
Total Overwood		**12**	
74-16	Grass/Forb	1	Dozer
75-04	Grass/Forb	2	Dozer
75-15	Grass/Forb	3	Dozer
Total Grass/Forb		**6**	

1 – Average of 15-25 ft^2 of basal area retained per acre (see Section 3.7, Chapter 3)
2 – Stand 73-15 may be dropped from the proposal for resource protection

In addition, Alternative C would:

- ◊ Reconstruct approximately 7.5 miles of existing system roads, and utilize about 1.5 miles of existing "woods" roads to be used as temporary roads for timber harvest operations. Part of the reconstruction includes replacement of 14 undersized culverts and a temporary bridge on Bennett Cove Creek.
- ◊ Site preparation and release (within 2 to 5 years following site preparation) on about 176 acres of the stands to be regenerated with herbicide (Triclopyr ester and amine formulations) and hand tools (chainsaw and hand ax) following timber harvesting.
- ◊ Perform TSI with herbicide (Triclopyr ester and amine formulations) and hand tool methods on approximately 356 acres in stands 73-01, 73-07, 73-08, 73-10, 73-13, 73-16, 73-19, 73-25, 73-26, 74-01, 74-02, 74-03, 74-04, 74-05, 74-08, 74-09, 74-12, 74-13, 75-02, 75-03, 75-04, 75-08, 75-11, 75-16, 75-20, and 75-24 (monitoring would be conducted to determine need to treat non-native invasives)
- ◊ Pre-harvest (advanced) oak shelterwood treatment with herbicide (Triclopyr ester and amine formulations) and hand tools on about 265 acres in stands 73-18, 73-24, 74-06, 74-07, 74-11, 74-17b, 74-20, 74-25, 75-01, 75-06 and 75-13 (includes treatment of non-native invasives)
- ◊ Manage Forest Service Road (FSR) 5047 (Bearpen Branch Road) as a linear wildlife opening (approximately 1.5 acres)—the road would be added to Closure Notice 01-05-2004 prohibiting use of motorized vehicles, non-motorized or wheeled conveyances (bicycles), and horse riding or other saddle or pack animals.
- ◊ Convert 0.4 miles of temporary roads to linear wildlife openings creating approximately 0.7 acres of permanent grass/forb habitat. One road accesses stand 73-29 and the other passes through stands 75-19 and terminates in 75-04. Convert the grass/forb habitat on FSR 5047 to permanent, grass/forb habitat by adding it to the Forest's Closure Notice (01/05/2004) for linear wildlife strips (fields).

- ◊ Provide approximately 6 acres of additional grass/forb habitat in 3 to 5 wildlife openings ranging from 0.5 to 2 acres in size. The areas proposed for their location are the flattened ridge tops between stands 74-5 & 18; 74-16 & 18; and, within the eastern portion of stand 75-04 and possibly extending into 75-17.
- ◊ Maintain newly developed and existing wildlife fields with herbicide (Imazapic and Glyphosate) to establish warm season grasses.
- ◊ Control existing non-native invasive plant species along haul routes and haul routes adjacent to existing and proposed harvest stands with herbicide (Glyphosate and/or Triclopyr) on about five acres.
- ◊ Designate stands 73-05 (170 acres), 74-26 (202 acres), 75-26 (44 acres) and 75-27 (41acres) as small patch old growth.

2.3 Alternatives Considered but Eliminated from Detailed Study

As per 40 CFR 1502.14(a), the following alternatives were considered but eliminated from detailed study:

2.3.1 Alternative 1 – No Timber Harvesting or Temporary Road Construction or Use of Triclopyr

This alternative focused on an ecosystem restoration proposal without commercial timber harvest or use of Triclopyr. This alternative was dropped from detailed study because it did not meet the Case Camp Ridge Purpose and Need, nor was it consistent with Forest Plan standards and guidelines for Management Area 4D (Forest Plan, Standard 1a, page III-85). This alternative does not use timber management practices as the primary tool to create desirable habitat (Forest Plan, General Direction 2, page III-84). There were concerns raised from members of the public about adverse effects of Triclopyr use, especially in the general vicinity of Sliding Rock recreation area. The nearest stand proposed for treatment with Triclopyr to Sliding Rock is 74-4; over 1,300 feet from Sliding Rock. According to a risk assessment, Triclopyr it is not very mobile in loamy soil. Triclopyr is necessary to ensure practical/cost efficient TSI—other herbicides such as Glyphosate are less effective at reducing woody plants. Use of Triclopyr would be pursuant to product labels; Material Safety Data Sheets (MSDSs); pesticide risk assessments; and standards and guidelines from the Forest Plan and the *Vegetation Management in the Appalachian Mountains* (VMAM) FEIS. Portions of this alternative are also met with Alternative A – No Action (see also Section 3.4, Chapter 3).

2.3.2 Alternative 2 – Old Growth

Following scoping of the proposal, comments were received raising concerns that the proposal would harvest within stands members of environmental organizations believed were old growth. On April 4, 2006, members of these organizations and Pisgah National Forest staff reviewed the proposal in the field and it became evident the proposal did not overlap with areas they mapped as old growth. As a result, the proposal was not modified to remove stands or portions of stands due to their mapped areas. In addition, medium old growth patch 7401 is within AA 09 and Alternative C (part of the overall proposal) would designate additional small patch old growth within Compartments 73, 74, and 75.

2.4 Project Design Features and Monitoring Common to Action Alternatives

The action alternatives share these project design features and would become mandatory if the responsible official selects an action alternative for implementation (see also Section 3.7, Chapter 3 for specific scenery project design features, and Appendices A and F).

1. To avoid the possible effect of invasive plant species to this proposal, all known populations of *Miscanthus sinensis*, *Celastrus orbiculaus* and *Spiraea japonica* should be controlled prior to disturbance activities. *Miscanthus sinensis* was found along Forest Roads. All populations total less than one acre. Control of *Miscanthus sinensis, Paulownia tomentosa* and *Ailanthus altissima* is most easily and effectively done by the use of herbicide (Glyphosphate).
2. It is recommended that native plants be utilized in wildlife improvements and roadside erosion control plants.
3. There are regionally Sensitive plant species known in stands 74-07 and 74-20. Stand 74-04 contains a large rock out crop which is likely habitat for additional Sensitive species (see associated habitats in Table A-4, Appendix A). Stand 74-04 is known to contain *Hydrotheria venosa* and *Botrychium jenmanii* within the riparian area. Stand 74-20 has a large rock outcrop that contains *Houstonia longifolia* var. *glabra* and possibly *Drepanolejeunea appalachiana*. Depending on the alternative selected (74-07 Alt. B, 74-20 Alts. B&C), these stands may have activities proposed within these stands. Project design features and Forest standards, exclude the areas containing (or likely to contain) these Sensitive species from activity. Therefore they would not be directly impacted. The buffers around these features are large enough to protect these species from indirect impacts such as light, temperature or sediment increases. Therefore, they would not be directly or indirectly impacted. The project design feature of excluding and buffering rock outcrops and the 100 foot buffer around perennial streams protect these Sensitive plant populations and are important part of the proposal.
4. Protect rock outcrops which are potential habitat for eastern woodrats. This may be achieved during lay out of the harvest units by having a wildlife biologist establish buffers around rock outcrops.
5. Permit continued cutting of small, non-merchantable trees (less than 8 inches diamter breast height) and saplings within 66 feet from the edges of all permanent wildlife openings and linear wildlife strips as a component of these openings to maintain a brushy interface between older timber stands and the grass/forb habitat of the openings. This can be done by either USFS personnel, cooperators such as the NCWRC, or through partnership or stewardship agreements with interested wildlife groups (e.g. Wild Turkey Federation, Ruffed Grouse Society).
6. Permit the use of herbicidal treatment (Imazapic) of permanent wildlife openings to favor native, warm season plants. No herbicide applications would be done within 30 feet of perennial or intermittent streams.
7. No culverts would be installed or replaced inside the North Carolina spawning moratorium of October 15 thru April 15.
8. Trees accidentally felled across stream channels (that prevent or block stream flow) would be lifted (when possible) away from the water. If this is not possible, each tree would be

pulled away from the water where it fell and temporary decking would be used to support the weight of the tree as it is pulled across the channel. These removals would be perpendicular to the stream channel whenever possible to minimize stream bank disturbance. Bare soil would be seeded and mulched if native vegetation does not start to recolonize the area by the time timber removal from the unit is complete.

9. Skid roads would avoid stream crossings and paralleling perennial channels within designated riparian areas.
10. Landings and skid trails should be vegetated as soon as possible after use to avoid off-site soil movement.
11. Temporary roads would be constructed to avoid runoff into area streams. In addition, silt fence, straw bales, or brush barriers would be placed along the length of the road where it parallels or crosses a stream as needed to control runoff and stream sedimentation.
12. National objectives include reducing impacts from invasive species and to improve the effectiveness of treating selected invasive species on the Nation's forests and grasslands. Survey area would be established to monitor control efforts. Survey areas would be established before control treatment, checked during treatment, and within nine months after treatment. A post-treatment evaluation report would be completed and filed in the project file.
13. Minimum right-of-way clearing limits would be used on roads that have dual trail designation and timber hauling would be limited to Monday-Friday.
14. Care would be taken by USFS employees during layout of timber stands to ensure unsuited lands (Management Areas 2C and 4C) are not included in the timber sale.

2.5 Summary Comparison of Actions by Alternative

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

Table 2-2: Management Activities by Alternative

Activity	Alternative[1]		
	A	B	C
Two-age harvest	0	195	141
Group selection harvest	0	28	23
Sanitation thinning harvest	0	71	99
Overwood removal harvest	0	12	12
Total Harvest	**0**	**306**	**275**
Convert temporary roads in stands 73-29 & 75-19 to linear wildlife openings	0	0.5	0.5
Site preparation	0	235	176
Pre-harvest oak shelterwood injection site preparation	0	265	265
Timber stand improvement by chemical and manual methods (if needed)	0	356	356
Control existing non-native invasive plant species along haul routes and haul routes adjacent to existing and proposed harvest units	0	5	5
Designate small patch old growth	0	0	457
Grass forb openings developed	0	3	6
Temporary roads converted to wildlife strips (miles)	0	0.4	0.4
Brushy interface developed manually around existing wildlife fields?	No	No	Yes
Reconstruct existing system roads (miles)	0	7.5	7.5
Utilize existing "woods" roads (temporary roads) and rip, seed, and close them following harvest activities (miles)	0	1.5	1.5

1 Measurements are in acres unless specified otherwise

CHAPTER 3 – ENVIRONMENTAL CONSEQUENCES

Included in this chapter are disclosures of direct, indirect, and cumulative effects of the alternatives on the different resources. Reports from different resource specialists supplied information for portions of the analysis in this chapter. Definitions of specific biological analysis areas (AA) effects are analyzed to are located at the end of Appendix A, Biological Evaluation (BE).

3.1 Hydrology and Aquatic Habitat

Additional analysis on aquatic habitat is disclosed in Appendix A, [Biological Evaluation (BE)]; Section 3.8 [Management Indicator Species (MIS)]; Section 3.9 [Threatened, Endangered, Sensitive (TES), and Forest Concern (FC) Species]; and the aquatic resource report, project record. This analysis addresses activity area waters and aquatic biological analysis area (AA) waters. Activity area waters are defined as those in the area of potential site-specific impacts on aquatic habitat and populations. The AA encompasses waters downstream that potentially could be impacted by project activities, in addition to activity area waters. The AA is larger than the activity area.

3.1.1 Existing Condition

Existing data for aquatic resources within the aquatic AA is used to the extent it is relevant to the project proposal. This data exists in two forms: 1) general inventory and monitoring of, Forest aquatic resources; and 2) data provided by cooperating resource agencies from aquatic resources on or flowing through the Forest. Both of these sources are accurate back to approximately 1980 and are used regularly in project analyses. Data collected prior to 1980 is used sparingly (mostly as a historical reference). Project-specific surveys are conducted to obtain reliable data where none exists.

Substrate within the activity area waters (Table 3-1) was evaluated and visually estimated. The three primary types of substrate that exist were documented at each macroinvertebrate sample site. This information is valuable for determining the amount of habitat available for proposed TES species, MIS, as well as other aquatic organisms.

Table 3-1: Forest Plan Watershed 74 (Davidson River)

Stream Name (UT denotes an un-named tributary)	Compartment- Stand	Miles in Activity Areas	Miles in AA
Pounding Mill Branch	73-3	0.2	1.21
UT1	73-3	0.37	0.78
Cherry Cove	73-15	0.34	1.36
	73-8	0.42	
UT1	73-10	0.24	0.8
	73-8	0.42	
UT2	73-8	0.38	0.59
UT3	73-8	0.19	0.55
UTUT3	73-8	0.11	0.2

Stream Name (UT denotes an un-named tributary)	Compartment- Stand	Miles in Activity Areas	Miles in AA
UT4	74-8	0.19	0.2
UT5	73-19	0.08	0.23
Bennett Cove	73-15	0.19	0.98
UT1			0.38
Justus Cove			0.22
Log Hollow Branch	74-20	1.1	1.49
	75-14	0.47	
UT1	74-20	0.8	1.09
Big Bearpen Branch	74-17	0.76	1.88
	75-14	0.61	
UT1	74-10	0.19	0.9
UT2			0.42
UT3			0.23
Gumstand Branch	75-19	0.08	0.39
Looking Glass Creek			3.6
Totals		**7.14**	**17.5**

3.1.1.1 Pounding Mill Branch

Pounding Mill Branch is adjacent to stands 73-29 and 73-3. There are no stream crossings associated with Pounding Mill Branch. Habitat data was collected from Pounding Mill Branch and consisted of 5% sand, 15% gravel, 60% cobble, 10% boulders and 10% organic material. Fish habitat exists within the analysis area of Pounding Mill Branch below the Case Camp activity area. The area within the analysis area of Pounding Mill Branch supports brook trout. UT Pounding Mill Branch is located adjacent to stand 73-3. No fish habitat exists within this stream other than the lower reaches may be utilized during spawning season. No stream crossings are planned for this project in UT Pounding Mill Branch.

3.1.1.2 Cherry Cove Creek

Cherry Cove Creek is adjacent to stands 73-15 and 73-8. A total of two sampling sites were used on Cherry Cove Creek to give an average of substrate composition percentages of 20% sand, 20% gravel, 30% cobble, 15% boulders and 15% organic matter. Habitat required by fish is found in Cherry Cove Creek. There are 7 stream crossings purposed for Cherry Cove Creek and the unknown tributaries to Cherry Cove Creek.

The UT to Cherry Cove Creek is adjacent to stands 73-15 and 73-8. The substrate composition percentages for UT to Cherry Cove Creek are 5% sand, 10% gravel and 85% cobble. There is no documented fish habitat found in this tributary. There is one stream crossing purposed for this tributary.

The unnamed tributaries 2 and 3 to Cherry Cove Creek pass through stand 73-8. The average percentages for both tributaries are 25% sand, 30% gravel, 25% cobble and 20% organic matter. No fish habitat was found in either tributary UT Cherry Cove Creek 2 or 3.

3.1.1.3 Log Hollow Branch

Log Hollow Branch is adjacent to stand 74-17 and passes through stands 74-20 and 74-14. An average percentage of substrate composition taken from two sampling sites is 18% sand, 22% gravel, 35% cobble, 15% boulders and 10% organic material. There is brook trout habitat located in Log Hollow Branch below Forest Service road 475-B.

The UT to Log Hollow Branch and UT to UT to Log Hollow is adjacent to compartment to stands 74-17 and 74-20. The average substrate composition percentages are 15% sand, 35% gravel, 30% cobble, 5% boulders and 15% organic material. There is no fish habitat found in UT to Log Hollow Branch and UT to UT to Log Hollow.

3.1.1.4 Big Bearpen Branch

Big Bearpen Branch is adjacent to stands 74-17 and 74-14. Average percentages of substrate compositions from 3 sampling sites are 28% sand, 13% gravel, 60% cobble 25% boulder and 6% bedrock. There is brook trout habitat located in Big Bearpen Branch.

The UT to Big Bearpen Branch is adjacent to stands 74-10, 74-11 and 74-17. The substrate composition percentages are 60% sand and silt, 20% cobbles and 20% boulders. There is no fish habitat found in UT to Big Bearpen Branch.

3.1.1.5 Bennett Cove Creek

Bennett Cove Creek is adjacent to stand 73-15. The substrate composition percentages are 5% sand, 20% gravel, 70% cobble and 5% organic material. There is brook trout located in Bennett Cove Creek. There is one stream crossing located in Bennett Cove Creek.

3.1.1.6 Gumstand Branch

Gumstand Branch is adjacent to stand 75-15. This stream has habitat for fish in the last 200- 300 meters before entering into Looking Glass Creek. This stream is characterized by higher gradients and primarily riffle habitat. There is no fish habitat within the activity areas. Substrate is primarily cobble with bedrock and gravel.

3.1.1.7 Justus Cove

Justus Cove is adjacent to stand 75-10. Like Gumstand Branch, this stream has habitat for fish in the lower reaches close to Looking Glass Creek. Habitat is characterized as primarily riffles with higher gradients. There is no fish habitat within the project activity area. Substrate is primarily cobble embedded with gravel and sand/silt (less than 35%).

Culverts along the FSRs 5032, 5042, 5041, 5040, 5047, 475B, 5044, 5045, and 5043 the roads themselves, and existing old roads and skid trails in the activity area are the existing threats to streams and drainages. Impacts from these sources are limited to down slope movement of sediment from road runoff and culvert fills. These problems are associated with the undersized culverts that are located at stream crossings. These undersized culverts have caused headcutting and bank failure downstream of the pipes. In most other cases, it is suspected that a majority of sediments from these sources are deposited in the natural vegetative filters before they reach areas of perennial streams.

3.1.2 Effects Analysis

Effects are disclosed below for 1) general direct and indirect effects of the alternatives on aquatic resources, 2) direct and indirect effects of access on aquatic resources, 3) direct and indirect

effects of timber harvesting on aquatic resources, 4) direct and indirect effects of herbicide use, and 5) cumulative effects to aquatic resources.

3.1.2.1 General Direct and Indirect Effects of Alternatives on Aquatic Resources

Introduction

Examples of direct effects of a proposed action on aquatic species include, but are not limited to, activities such as crushing individual insects, fish, or redds during stream crossing installation. Such effects are more likely to occur to less mobile aquatic organisms such as 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. Direct effects may also include changes in the quality, quantity, or diversity of habitat available resulting from sedimentation. It is important to note that effects to 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 occurrence of disease as a result of sedimentation, degraded water quality, and altered community structure as a result of migration. Indirect effects may also include 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. The Forest Plan does not allow vegetation management within riparian zones for perennial streams unless it is specifically for the enhancement of riparian values (page III-181). 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 to serve as a short-term source of habitat improvement.

Alternative A – No Action

There would be no direct or indirect effects as a result of this alternative as no actions are proposed. The existing description as described above would be maintained. Current activities such as general road maintenance, wildlife suppression, and recreation would also continue in the AA.

Alternatives B & C

Alternatives B and C are discussed together due to the similarity of activity associated with the two action alternatives. Alternative B proposes more harvesting than Alternative C (by approximately 32 acres); however, no harvesting, site preparation activities, or wildlife opening development would occur inside the 100 foot riparian area of AA streams—30 foot riparian area for herbicide use. Access, which has the greatest potential to impact aquatic resources, would be the same for both action alternatives. Therefore, the impacts associated with each action alternative would be the same in regards to aquatic resources.

Sedimentation of aquatic habitats within the activity area may occur with the reconstruction of existing system roads, the reconstruction of roads and skid trails, the installation four culverts that were blown out during large storm events, the replacement of 14 undersized culverts and the installation of the temporary bridge on Bennett Cove Creek. The installation of the four drainage

culverts associated with Forest Service Road (FSR) 5040, FSR 5043 and FSR 5045 may cause some sedimentation if weather conditions are such that sediments could be carried down these ephemeral channels. Sediment loading and turbidity can result in the loss of interstitial habitat within the substrate and cause direct mortality by the crushing or smothering of less mobile organisms such as aquatic invertebrates, fish eggs and juveniles. This effect would be minimized by implementing best management practices (BMPs) including the replacement of culverts within a 48-hour period and seeding and mulching the disturbed area immediately after implementation. Conditions in this area would likely improve after replacing the undersized culverts with larger ones which would allow for more natural stream flow and better passage for aquatic organisms. Many of these undersized culverts which would be replaced with larger ones currently have head cutting and soil erosion around them and downstream of them.

3.1.2.2 Direct and Indirect Effects of Access on Aquatic Resources

This discussion assumes all Forest Service timber sale contract clauses, North Carolina Best Management Practices (BMPs), and any other required management practices relating to water quality would be implemented successfully. Should an implemented contract clause or BMP fail during project implementation, immediate corrective action should be taken to reduce impacts to aquatic resources.

Alternative A

Implementation of the no action alternative would perpetuate the existing condition described above. Aquatic habitat quality, 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. In the Case Camp project area there are 18 undersized culverts in streams that have the potential to blow out during large storm events. The implementation of the no action alternative would leave these undersized pipes in the stream channel which could potentially cause erosion and unstable channel issues long-term.

Alternatives B & C

Direct Effects: Access to the proposed units would require generally the same amount of road reconstruction and temporary road construction for both Alternatives B and C. Road reconstruction would take place on FSR 5032 (Cherry Cove Road), FSR 5040 (Justice Cove Road), FSR 5041 (Case Camp Gap Road), FSR 5042 (Case Camp Ridge Road), FSR 5043 (Log Hollow Road), FSR 5044 (Bennett Knob Road), FSR 5045 (Seniard Ridge Road), and FSR 5047 (Bearpen Branch Road). Road reconstruction would involve the replacement of undersized culverts, installing new culverts that have been washed out in the past with larger culverts to withstand 100 year flood flows and the installation of one temporary bridge across Bennett Cove Creek. The placement of culverts within a stream channel directly impacts approximately 22 to 24 linear feet of stream bottom at the location of the pipe. With the Case Camp Project, there is no new construction of roads within the project area. The culverts placement involved is for replacing old culverts that do not adequately address drainage issues and have the potential to cause erosion and fish passage problems.

The Case Camp project action alternatives involve the reconstruction of 7.5 miles of existing road as well as the development of skid trails and log landings. The road reconstruction would involve the replacement of 14 undersized culverts, four drainage culverts, and the installation of four culverts in locations that were blown out during high flow events and the placement of a

temporary bridge over Bennett Cove Creek. The placement of these culverts would directly impact 22 to 24 linear feet of stream bottom at the location of the replacement or installation. The placement of the temporary bridge would directly impact approximately 20 linear feet of stream bank on each side of Bennett Cove Creek. Impacts from these culvert replacements would be minimized by the implementation of NC BMPs and other sediment control measures. These measures include a mitigation measure that would prohibit the replacement or installation of any perennial stream crossing during the trout spawning moratorium of October 15th through April 15th. This would minimize impacts to spawning habitat which may be in the immediate vicinity of the crossing replacement or installation. Other sediment control measures would be implemented at the site to avoid off site movement of soil at the crossings.

Riparian areas have been identified as 100 feet on either side of perennial channels and 30 feet on either side of intermittent channels. No activity, including the placement of log landings and skid trails, would occur in this area with the exception of access at stream crossings.

Road drainage issues on all the existing system roads and temporary roads within the activity area would be addressed with the proposed action alternatives. Improvements would be so that drainage from roads would enter into vegetation rather than directly into activity area streams. Following harvest activities, disc and seeding of all unsurfaced temporary roads, skid roads and log landings would occur.

Indirect Effects: There may be off-site movement of soil into activity area waters from road reconstruction, bridge and culvert placements. Turbidity and sediment loading can cause mortality by injuring and stressing individuals or smothering eggs and juveniles. Available habitat, including the interstitial space within substrate used as spawning and rearing areas, may be covered with sediments. Episodic fluctuations in turbidity may occur after soil disturbance ends because sediments deposited within the stream bed may be re-suspended during high flow events (Swank *et al*. 2001). If habitat complexity is lost through sedimentation, a shift in the aquatic insect community could occur that favors tolerant macroinvertebrates. Larger, more mobile aquatic species, such as fish are able to temporarily escape the effects of sedimentation by leaving the disturbed area. Eggs and juveniles may be lost due to reduced habitat or suffocation. This can result in the loss of, or reduced, year-class strength, which can lead to accelerated population fluctuations and suppressed population levels. Over time, these species would recolonize areas as habitat conditions improve.

Smaller, less mobile organisms such as crayfish and aquatic insects may not be able to move to more suitable habitat. Individuals of these species may decline locally or be lost through reduced productivity. These may recolonize from reaches of undisturbed streams as conditions improve with site rehabilitation. Implementation of contract clauses and erosion control precautions described above would minimize sediment effects and accelerate site rehabilitation.

Skid trails and the temporary road construction may also cross ephemeral streams or spring seeps that feed these streams and others in the activity area. If heavy rains occur while these ephemeral crossings are exposed, bare soil can be transported down slope to intermittent and ephemeral stream channels. Temporary stream crossings should be used across ephemeral channels to avoid the potential for sedimentation of down slope aquatic resources. These crossings could include the use of temporary bridges (e.g. simple log stringers or pre-fabricated decking), culverts, or channel armor (e.g. stone or brush).

Individual insects may be displaced and stressed during culvert removal but these effects would dissipate approximately 50 feet downstream of the construction area and within 1 day. While installation techniques are designed to prevent visible sediment from entering project area waters, there would be a slight increase in sediment within the creeks substrate within the first 50 feet below the activity area. These sediments would persist until the next high flow event, which would scour these sediments from the stream channel. There may be an increase in stream turbidity during the installations. However, these effects would be minimized by application of erosion and sedimentation control measures (e.g. diversion pumps, silt fence, sediment traps, seeding, and mulch). Turbidity effects would persist for 1-2 days during construction, possibly longer depending upon the local weather conditions. The riparian disturbed areas would be seeded and mulched within 24 hours of completion to prevent or minimize erosion.

These projects may provide beneficial indirect impacts to suitable habitat for the rare aquatic insects since existing sediment problems, such as from head-cutting, bank scouring, and road rutting and washing would be corrected or greatly reduced.

3.1.2.3 Effects of Timber Harvest on Aquatic Resources, Water Quality, and Riparian Areas

Alternative A

The existing condition of aquatic resources as described above would be maintained under this alternative. Natural fluctuations in population stability, and habitat quality and quantity would continue.

Alternatives B & C

North Carolina Forest Practices Guidelines (NC-FPGs) and Forest Plan standards (BMPs) would be implemented during harvest activities. Applications of Forest Plan standards are intended to meet performance standards of the state regulations. Visible sediment derived from timber harvesting, defined by state regulations, should not occur unless there is a failure of one or more of the applied erosion control practices. Should any practice fail to meet existing regulations, additional practices or the reapplication of existing measures would be implemented as specified by state regulations.

There is no plan to harvest within any 100 foot riparian area of perennial streams within the activity areas. According to Volume 1 of the Final Environmental Impact Statement for the Forest Plan, *Under these conditions, no increase in water temperature is anticipated under any of the alternatives. Since riparian-area treatment is not expected under any alternatives, availability of woody debris would be positively influenced if there was no harvest anywhere within the riparian zone on each streambank* (page IV-36). The only cutting within the riparian areas would be associated with stream crossings discussed above. There is the possibility that as trees are cut, they would cross a stream channel or spring. While large woody debris (LWD) 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. If the scales of the trees and stream channels do not match, there is the possibility that leaving large tree boles in the channels and across springs could result in flow obstruction. This can lead to accelerated bank scouring and failure, and subsequently, sedimentation of local and downstream channels. To avoid the potential for this habitat loss, trees accidentally felled across stream channels or springs would 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 would result in permanent stream bank damage. Any damage done to the stream banks would most likely be temporary (less than one year), as there is an abundance of herbaceous vegetation along the banks that would quickly recolonize bare soil.

Water quality should not be adversely affected as long as Forest Plan standards and NC-FPGs are followed, and timber sale contract clauses are implemented. Stream temperatures would not be affected because adequate shade would be maintained along perennial and intermittent streams. Water quality may improve with project implementation occurs as watershed issues including replacing undersized culverts and addressing road drainage issues that exist are repaired.

3.1.2.4 Direct and Indirect Effects of Herbicide Use

Alternative A

The existing condition of aquatic resources has been described above. Natural fluctuations in population stability, and habitat quality and quantity would continue. It should be noted that the encroachment of exotic invasive species throughout the riparian areas of the aquatic resources within the area would likely occur as a result of non-treatment, including burning and the use of herbicides (personal communication with USFS Botanist, David Danley 2005).

Alternatives B & C

Herbicides are proposed in all action alternatives for the Case Camp proposal. Herbicides use for silvicultural treatments and their impacts to aquatic resources is analyzed in detail in the Vegetation Management Environmental Impact Statement for the Southern Appalachians (VMEIS). Included in this document is a detailed analysis of the effects of silvicultural treatments on aquatic resources. Please refer to this document for a description of such effects. No herbicide would be used in the 30 feet of any perennial streams within the Case Camp proposal. No herbicide would be sprayed within the 30 foot designated riparian area of any intermittent streams within the activity area. Hand pulling may occur within these 30 feet to prevent the elimination of native riparian vegetation by exotic species. No pulling would occur on stream banks to prevent erosion.

The following table summarizes potential effects to aquatic resources by alternative:

Table 3.2: Summary of Potential Effects to Aquatic Resources by Alternative

Issue	Alternative A	Alternatives B & C
Effects on aquatic MIS	Existing habitat and population trends continue. Passage may still be an issue on some perennial crossings that are undersized	Existing habitat may improve with the replacement of undersized culverts with larger pipes improving fish passage (where applicable). Existing populations and trends would continue and may have an upward trend as habitat availability increases
Effects on water quality (Associated with the amount of soil disturbance)	Slight risk of degradation from undersized culverts causing headcutting and bank erosion.	Turbidity and sediment loading may increase slightly during culvert installation and temporary bridge installation. Should diminish downstream and cease with site rehabilitation
Effects on aquatic habitat and populations	Existing habitat and population trends continue. Habitat is slightly suppressed due to the existing undersized culverts	May temporarily negatively affect aquatic habitat where stream crossings are being installed but would cease with site rehabilitation

Issue	Alternative A	Alternatives B & C
Effects to riparian areas	Remain in present state. Aquatic habitat would improve, as riparian areas grow older	Remain in present state within 100 linear feet of perennial streams. Aquatic habitat would improve, as riparian areas grow older, increasing large woody debris in streams
Effects of herbicide	No treatment could cause the replacement of native riparian vegetation with exotics	No impact as no spraying would occur within 30 horizontal feet of streams
Effects of Wildlife Habitat Enhancement Work	Existing condition would continue	No impact to aquatic resources as no wildlife enhancement activities would occur inside the 100 foot riparian area of activity or analysis area streams.

3.1.2.5 Cumulative Effects to Aquatic Resources

The cumulative effects to potential habitat are those of past actions, current and foreseeable actions within the aquatic analysis area that have directly or indirectly effected any proposed, endangered, threatened, sensitive (PETS) and Forest concern (FC) aquatic species potential habitat

Alternatives A, B, & C

Past actions analyzed include: the Log Hollow Timber Sale of the early 1990's (1990-1993) and the Big Bearpen Branch Timber Sale of the early 1980's (1982-1983). There were other timber sales prior to the 1980s that were considered due to remnant access issues that those sales have today. The roads were built for these early sales before impacts of undersized pipes were known. Storm damage repair from tropical storms Francis and Ivan are ongoing and would be impacting this area by the replacement of two bridges in Log Hollow Branch and one culvert. Prescribed burning has took place within the Cherry Cove area in 1981 and there were five wildfires since the 1970s within the analysis area with the largest being 140 acres on Coontree Mountain in 1988 and the most recent being at Looking Glass Rock in 1993 (0.5 acres).

Remnants of past timber activities where access was associated with the projects are, in many cases, on-going contributors to negative impacts to aquatic resources. Undersized culverts and other degrading stream crossings have been sources of problems for aquatic resources including unstable stream banks and channelization. With a new activity within the area, solutions to these types of problems are addressed with the project proposal. Within the Case Camp AA, 14 undersized culverts have been identified to be replaced. Currently these crossings are causing some erosion issues downstream and instability of stream banks. There are areas within this project that riparian areas have historically been harvested. However, as these areas continue to grow older, conditions should improve as large woody debris input into analysis area streams returns to a more natural state.

Two tropical storms moved through the project and analysis areas during September of 2004 during an eight day period. These storms released up to 14 inches of rain within 48 hours each time. Many streams within the Davidson River drainage were heavily impacted by the storm events. Streams within the Case Camp Activity area were affected by the storm events. As observed in other watersheds across the Pisgah National Forest, these large storms (100 year floods or greater) often act as a "restart mechanism" for cumulative effects. Substrates in the upper reaches of Big Bearpen, Log Hollow, Bennett Cove and Cherry Cove and Pounding Mill Branch have been cleaned or washed out, creating habitat for aquatic organisms which rely on

interstitial space (the space between substrate particles). Interstitial space is especially important for trout species which spawn over clean substrates that allow for oxygen to reach the eggs and juveniles.

Ongoing actions that are contributing negatively to cumulative impacts on aquatic resources include the run-off and erosion issues associated with FS 5032, 5042, 5041, 5047, 475B, 5044, 5045, and 5043. These roads have several inadequate culverts that are contributing sediments to the Case Camp aquatic analysis area. The Pisgah Ranger District proposes to repair these areas as a part of the Case Camp Timber Sale. These efforts would improve these roads and therefore not contribute to any negative cumulative impacts to aquatic resources.

As a result, the expected cumulative effects should not be any greater than the direct and indirect effects disclosed above and there should be no adverse cumulative effects to the aquatic AA resources, based on the project's design features included in this analysis. Current sources of sediment from the 14 undersized culverts would be addressed with this proposal.

The following table displays past, present, and reasonably foreseeable future actions within and near the Case Camp Ridge AA that would be accounted for in cumulative effects as appropriate by resource analysis:

Table 3-3: Past, Present, and Reasonably Foreseeable Future Actions within and near the Case Camp AA

Action	Description
Timber Sales	Log Hollow (131 acres harvested in 1990-1993 by clearcut, group selection, and shelterwood)
	Bear Pen Branch (96 acres harvested in 1982-1983 by clearcut)
	Firewood (64 acres harvested in 1981 clearcut and thinning)
	Gumstand Gap (246 acres harvested in 1977-1971 clearcut and thinning)
Hemlock Wooly Adelgid	John's Rock – Insect release (2005)
Storm Repairs	Headwaters Road FSR 475B – Slide repairs/culvert replacement (2006-2007)
	Log Hollow Road FSR 5043 – Two bridges replaced (2006-2007)
	Roadwork – Replace existing culverts, install new culverts, realign road at slide, recondition road bed and recut ditch lines along the Upper Avery Creek Road (2006-2007)
	Moore Cove Bridge (2006-2007)
Road Construction	Existing Network
Recreation	North Face Trail – 1.5 mile trail construction (2003)
Special Uses	EMC – Replace existing line and small opening (2006)
Wildlife	Linear wildlife openings/wildlife openings (established over 20 years ago/18 acres)
Rx Fire	None

3.2 Wildlife

3.2.1 Existing Condition

Additional analysis on wildlife species and habitat is disclosed in Appendix A, BE; Section 3.8 (MIS); Section 3.9 (TES & FC); and the wildlife resource report, project record. Wildlife resources were analyzed by three types of spatial or geographic analysis. The largest of these is Forest Plan Analysis Area (AA) 09 which is comprised of 9,816 acres and includes Compartments 70 through 78 and 81. It is in the upper reaches of the French Broad River drainage and is centrally located within the Pisgah Ranger District. On a more local scale, the specific management activities are all contained within Compartments 73 (979 acres), 74 (1,053 acres), & 75 (736 acres), and are referred to as the Activity Area with a total of 2,768 acres. Superimposed atop these areas is another spatial array mapping the Forest Plan Management Areas (MA). They represent the variety of management direction and standards associated with the unique goals of each MA. MA 3B contains 2,237 acres within the AA and no acres within the activity areas. MA's 4A and 4D comprise 3,476 acres within the AA and 2,768 acres within the activity areas. Management in the 4D areas is to emphasize high quality habitats for wildlife requiring older forests and freedom from disturbance with early successional habitat provided in conjunction with managing the suitable timber land.

The age class structure of the forest habitat for this area is summarized in the following table by forest type. Distribution of these age classes is greatly skewed toward the older age groups and is predominantly hardwood forest types. The small amount of younger stands in the 11 to 40 age class is predominantly 20 to 25 years old and is the result of previous timber harvests such as the Log Hollow Timber Sale.

Table 3-4: Acres of Forest Types by Age Class in Activity Area (Compartments 73, 74 & 75)

Forest Type	0-10 years	11-40 years	41-80 years	81-100 years	101+ years	Total
10 White Pine- Upland Hardwood	0	18	0	0	0	18
15 Pitch Pine-Oak	0	0	0	0	58	58
50 Yellow Poplar	0	10	0	53	0	63
52 Chestnut Oak	0	16	0	411	22	449
53 White Oak-Northern Red Oak-Hickory	0	74	0	347	526	947
56 Yellow Poplar-White Oak-Northern Red Oak	0	177	0	439	122	738
59 Scarlet Oak	0	22	24	111	98	255
60 Chestnut Oak-Scarlet Oak	0	19	0	147	59	225
70 Black Cherry	0	15	0	0	0	15
Total Acres	**0**	**351**	**24**	**1,508**	**885**	**2,768**

The amounts and distribution of the 0 to 10 year old stands is summarized in detail in Appendix B of the Case Camp Ridge Project Environmental Assessment. Presently, the AA contains only 74 acres of the 0 to 10 age class, and the activity area contains none. This early successional habitat is important for providing forage, browse, soft mast production, sustained hard mast in time, insect production, structural diversity, and species viability.

About 88% of the hard mast producing forest types in the AA (2,306 of the 2,768 acres) is at mast producing age is in the AA, but only 24 acres are considered to be at the prime mast

producing age of 40 to 80 years old. Consequently, with the aging of these stands the potential for hard mast production in the area has declined, and quality hard mast is much less abundant than it could be. Many species (e.g. deer, turkey, squirrels, etc.) depend significantly on this food source.

Grass/forb habitat exists as former road beds converted to linear wildlife strips and permanently established wildlife fields or openings. The acreages for these are summarized in the following table for both strata of analysis.

Table 3-5: Acres of Grass/Forb Habitat

Area of Analysis	Linear Wildlife Strips	Permanent Wildlife Openings
Activity Area	6.4 acres	4.2 acres
Analysis Area	8.1 acres	9.7 acres

The primary management in this activity area is for turkey and has a desired density of 3% permanent grass and forb openings (Forest Plan pages III–74 & III-84) and a minimum 0.5% for stands within MAs 3 and 4 (Forest Plan page III-23). This objective needs 123 acres of the AA (4,103 acres) and 83 acres of the Activity Area (2,768 acres) to be met. Additional grass and forb habitat is available along road edges, trails, old skid roads, etc., but the habitat component is well below the desired Forest Plan objectives.

3.2.2 Effects Analysis

3.2.2.1 Alternative A – No Action

Under this alternative, there would be no additional grass/forb habitat developed by either permanent wildlife fields or linear strips. The existing condition of 10.6 acres of grass/forb in the activity area (0.38%) and 17.8 acres grass/forb in the AA (0.43%) would still be maintained, but it would remain well below the desired Forest Plan standard of 3% grass/forb at these two scales. Furthermore, there would be no early-successional habitat created through regeneration harvest, and no brushy interface of early seral habitat established around the proposed or existing wildlife fields.

3.2.2.2 Alternative B – Proposed Action

This alternative proposes to develop three additional acres of grass/forb habitat as permanent wildlife fields and contribute another 0.7 acres by converting temporary logging roads that would be permanently maintained as linear wildlife strips. Under this alternative, the grass/forb habitat at both the activity area and AA scales would be approximately 0.5% which is well below the desired Forest Plan standard, but is a slight increase above the existing condition (see also Appendix B for age-class distribution). This alternative also contributes 214 acres of early successional habitat by means of regeneration harvesting, but does not address the creation of a brushy interface around the wildlife openings. Developing this habitat would benefit both game and non-game wildlife species, especially ruffed grouse and turkey.

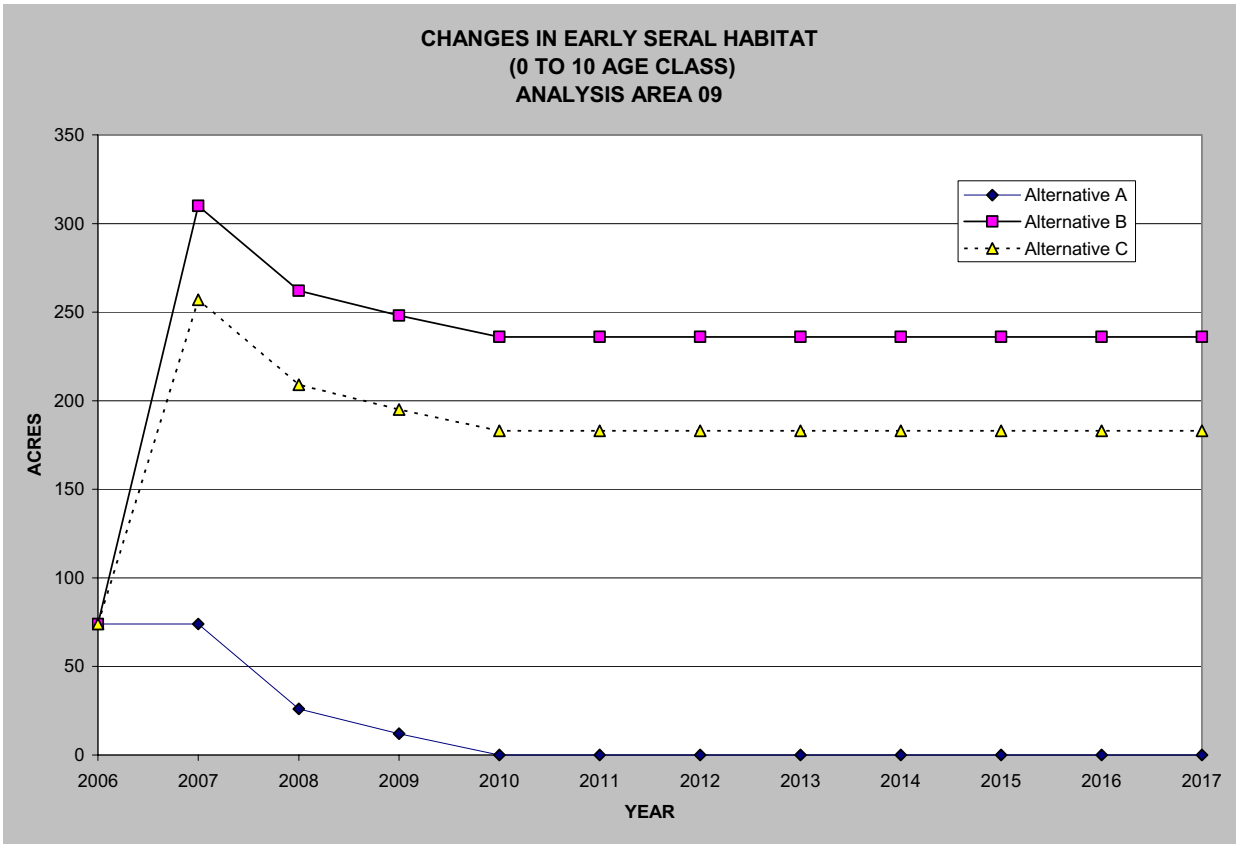
3.2.2.3 Alternative C

This alternative proposes to contribute the same 0.7 acres of grass forb habitat on temporary logging roads as Alternative B, but it creates six additional acres of grass/forb habitat as permanent wildlife fields. Furthermore, another 1½ acres of temporarily existing grass/forb habitat would be maintained as permanent by changing the management status of FSR 5047.

Combined, these actions would produce 0.6% of permanent, grass/forb habitat within either the activity area or AA. This percentage is still below the Forest Plan standard, but is an increase from Alternative B. Regeneration harvesting would create 159 acres of early successional habitat which is less than Alternative B, but 3 to 7 acres of additional early seral habitat could be created and maintained around the edges of the existing and proposed wildlife fields. Cumulatively, this would create between 162 and 166 acres of this habitat (see also Appendix B for age-class distribution). Developing this habitat would benefit both game and non-game wildlife species, especially ruffed grouse and turkey.

The following figure compares early successional habitat changes by alternative:

Figure 3-1: Changes in the Early-successional Habitat of Forest Plan AA 09 by Alternative



3.3 Non-native Plants

It is expected that there would be a temporary increase of ruderal (weedy) species of plants within the activity areas. These species are often prevalent during the initial stages of succession and decrease with age. This is particularly true near constructed roads and log landings. A high percentage of these ruderal species are non-native. There are 124 species of non-native plant species documented to occur on the Pisgah and Nantahala National Forests (Danley and Kauffman). An increase of non-native plant species in the proposed activity area is expected. Many of these species, both native and non-native, have benefits for wildlife and erosion control. However, as succession progresses, most ruderal species tend to become much less prevalent and

generally do not persist in the area. Most ruderal plant species are expected to decrease to non significant population levels within ten years after the initial disturbance.

The persistence of most non-native plant species is not considered desirable to natural ecosystem health. There are primarily two ways in which non-native plant species may persist in the forested ecosystems. A non-native plant species may persist by the introduction of an "invasive non-native species" to the ecosystem or by modification of the ecosystem in such a way that an invasive species becomes dominant. Out of the 124 species of non-native plants known to occur on the Pisgah Nantahala National Forest, 25 are currently recognized as having aggressive invasive qualities that can dominate local communities (Danley and Kauffman, Regional Forester's, May 2001, List of Invasive Exotic Plant Species). The proliferation of these species can have a detrimental and long lasting effect on natural communities and native species. Kudzu, *Pueraria montana*, is a familiar example of this sort of non native persistent species. Consideration was given to the possible effect this proposal may have to invasive non-native species.

Surveys for invasive species were conducted (2004) within the activity areas and around roads to the activity areas. Eleven species on the Regional Forester's invasive non-native plant species are known within the AA (see following table). It is recommended that the known populations of *Miscanthus sinensis*, *Celastrus orbiculaus* and *Spiraea japonica* be controlled to reduce possible adverse effects of invasive plant species to this proposal (see management recommendation given below). The invasive plants *Microstegium vinineum*, *Lonicera japonica* and *Allium vineale* (wild garlic) are so well established in parts of the AA that control by any currently known method is entirely impractical. It is not known what affect, if any, this proposal would have on the populations of *Microstegium vinineum*, *Lonicera japonica* and *Allium vineale* within the AA.

The populations of *Lespedeza cuneata*, *Lolium arundinaceum* and *Coronilla varia* are not known to be invasive within natural forested communities within the mountains. While *Lespedeza cuneata*, *Lolium arundinaceum* and *Coronilla varia* may be invasive in Coastal Plain, Piedmont regions and rare natural areas (i.e. serpentine glades), they are not expected to be a concern in this proposal and/or the AA as they are not known to be invasive within natural forested communities within the mountains. Therefore, it is not recommended that these species be controlled. The following table displays non-native invasive plant species in the activity areas:

Table 3-6: Non-native Invasive Species Summary

Species	Regional Category	Location in Activity Areas	Recommendation
Ailanthus altissima	1	Not present	None
Rosa multifora	1	FSRs 5044, 475B, 5042, 5041, 5032, 5047	Control all populations prior to disturbance on NFS land
Celastrus orbiculatus	1	FSRs 5044, 475B, 5042, 5041, 5032, 5047 and adjacent wildlife field, recently harvested units along road 5045, 5044	Control all populations prior to disturbance on NFS land
Lespedeza cuneata	1	Wildlife Fields, roadsides	This species does not display invasive tendencies. Not recommended to control.

Species	Regional Category	Location in Activity Areas	Recommendation
Paulownia tomentosa	1	Not noted	Control all populations prior to disturbance on NFS land
Lolium arundinaceum	1	Wildlife Fields	This species does not display invasive tendencies. Not recommended to control.
Lonicera japonica	1	Scattered locations mainly along roads.	No effective control method known. No recommendation to control.
Microstegium vinineum	1	Mostly in Alluvial Forests and cove. Very well established	No effective control method known. No recommendation to control.
Miscanthus sinensis	2	FSRs 5045, 5032	Control all population prior to disturbance on NFS land
Allium vineale	1	Wildlife Fields, along roads	This species does not display invasive tendencies. Not recommended to control
Coronilla varia	2	Found only along system roads	This species does not display invasive tendencies. Not recommended to control
Spirea japonica	2	FSR 5041	Control all populations prior to disturbance on NFS land

The other way in which non-native plants may persist in the area is by continual disturbance. For example, a maintained road shoulder or wildlife field often has persistent ruderal and non-native plant species. These areas are often maintained in an early successional state for wildlife or human benefit. Therefore, it is expected that this proposal could slightly increase the persistence of non-native vegetation in the analysis area. To reduce this effect, it is recommenced that native plants be utilized in wildlife improvement and roadside erosion control plantings. It is recognized that erosion control and wildlife production are the primary goals of seeding areas and some non-native plant species may be highly beneficial to accomplish these goals. However, a presidential executive order [Executive Order 11987, Title 3- The President] recognizes the need to reduce the impact of non-native species by reducing the amount in which non-native plant species are planted on federal property. All the goals of erosion control, wildlife production and encouragement of native plant species may be met by planting native plant species or a suitable mixture of native and non-native mixture of species.

3.4 Herbicides

3.4.1 Alternative A – Direct, Indirect, and Cumulative Effects

Under this alternative, there would be no adverse direct, indirect, or cumulative effects to wildlife, water quality, and humans as related to herbicide use as none would be applied. The existing condition would remain the same; invasive and invasive exotic plant species would likely continue to spread in the AAs. There are no other known foreseeable actions in the activity areas that could affect herbicide use.

3.4.2 Alternatives B & C – Direct, Indirect, and Cumulative Effects

The following table displays expected maximum acreages of herbicide treatment (Glyphosate Imazapic, and Triclopyr) that may occur:

Table 3-7: Maximum Acres of Herbicide Applied Manually by Alternative[1]

Herbicide	Alternative A	Alternative B	Alternative C
Triclopyr/Glyphosate/Imazapic (ac)[2]	0	866	811

1 – Not all acreage is treated, i.e. buffers along streams and "non-target" species would not be treated. Herbicides are applied manually and would not be applied aerially (see also Appendix F). Herbicides are primarily applied to stems during TSI and to foliage on non-native invasives.

2 – Acres include treatment for timber stand improvement, site preparation, non-native invasive species, daylighting, and wildlife fields

Use of herbicides is not expected to have measurable adverse effects on wildlife, water quality, and humans due to proper application as per Material Safety Data Sheets (MSDSs), product labels, risk assessments, fact sheets, mitigation measures contained in the *Vegetation Management in the Appalachian Mountains* (VMAM) FEIS, issued in July 1989, Forest Plan standards and guidelines (Forest Plan, page III-181), and design features disclosed in Appendix F. The use of herbicides poses some risk to wildlife, water quality, and humans; however, any pesticides applied would be done according to the labeling information, at the lowest rate effective at meeting project objectives in accordance with guidelines for protecting the environment, and manually (not aerially). This risk is further reduced by requiring the applicator to be trained in safety precautions, proper use, and handling of herbicides. Other factors reducing risk are the low level of active ingredient per acre and placement of notice signs in areas where herbicides have been applied. The signs include information on the herbicide used, when it was applied, and who to contact for additional information.

Herbicide with the active ingredients Glyphosate and Triclopyr are not considered soil active. In addition, with the provision of riparian buffer strips on stream zones, the risk of herbicide spills or movement into stream zones is further reduced. Due to project design, effects of the treatment would be limited to individual trees/plants and the immediate area near them and is not expected to adversely affect private residences downstream. All applicable mitigation measures contained in the VMAM FEIS and Forest Plan standards and guidelines would be followed. A complete discussion of the effects of herbicides is contained in this FEIS, to which this analysis tiers to. Current pesticide information for Imazapic, Glyphosate, and Triclopyr may be found at: http://www.fs.fed.us/foresthealth/pesticide/risk.shtml

Impacts of herbicide use to wildlife, water quality, and humans are expected to be low due to proper handling and application. The use of herbicides would have no measurable impact on water quality because according to the Vegetation Management FEIS "*No herbicide is aerially applied within 200 horizontal feet, nor ground-applied within 30 horizontal feet, of lakes, wetlands, or perennial or intermittent springs and streams. No herbicide is applied within 100 horizontal feet of any public or domestic water source. Selective treatments (which require added site-specific analysis and use of aquatic-labeled herbicides) may occur within these buffers only to prevent significant environmental damage such as noxious weed infestations. Buffers are clearly marked before treatment so applicators can easily see and avoid them*" (Veg. Mgt. FEIS, page II-67). There would be no adverse effects (direct, indirect, or cumulative) of the usage of herbicides associated with the action alternatives if no spills occur within riparian areas—no herbicide would be applied within at least 30 feet of riparian areas. According to the Veg. Mgt. FEIS, "*The greatest hazards to surface and ground water quality arise from a possible accident or mishandling of concentrates during transportation, storage, mixing, and loading, equipment cleaning, and container disposal phases of the herbicide use cycle*".

Herbicides would be mixed at the pesticide storage building at the Pisgah Ranger District Work Center and not in the field and applicators do not carry concentrated amounts of herbicide in the field. There are no other known foreseeable applications of herbicides on NFS lands in the Case Camp Ridge area that could affect herbicide use with this proposal—the last measurable herbicide use on NFS lands in the Case Camp Ridge area was about 10-15 years ago in the Log Hollow area. Additional project design features are listed in Appendix F below.

Effects from past activities listed in Table 3-3 above in the AA that used herbicides are not expected to cause adverse cumulative effects from herbicide use with this proposal because effects from each project are not expected to be cumulatively added together due to the project design of each, adherence to standards in the Vegetation Management FEIS and Forest Plan and the relatively small amount of acres treated within the entire 9,800 acre AA over the past 20 years.

3.5 Soil Resources

The following is an analysis of the soils that would be impacted by logging or temporary road construction activities in the project area. The following table lists the soil map units found by stand number:

Table 3-8: Primary Soil Map Units Potentially Affected by Stand by Alternative[1]

Primary Soil Map Unit Name (Series)	Slope Percent Range[1]	Alternative A (acres)	Alternative B (acres)	Alternative C (acres)
Ashe-Edneyville (793)	30-95	0	22	35
Chestnut-Edneyville (393)	15-95	0	85	64
Cullasaja-Tuckasegee (101)	15-30	0	5	1
Evard-Cowee (337)	15-50	0	104	105
Porters-Unaka (761)	30-95	0	19	11
Saunook (121)	15-30	0	13	16
Tate-Brevard (125)	8-95	0	15	11
Trimont (737)	30-50	0	63	53
Wesser-Whiteside (862)	2-8	0	2	0
Total Acres			**328**	**296**

1 – Includes soils within harvest stands and existing "woods roads"

2 – Average slope percent ranges are for soil map units from NRCS data and are not necessarily the average slope within the stand (A = 0% - 2%, B = 2% - 8%, C = 8% - 15%, D = 15% - 30%, E = 30% - 50%, and F = 50% - 95%)

The following table displays characteristics of each soil map unit:

Table 3-9: Comparison of Soil Map Units

Map Unit Name (Series)	Characteristics
Ashe-Edneyville (793)	The Ashe series consists of moderately deep, somewhat excessively drained soils on gently sloping to very steep ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part, and weathered from felsic or mafic igneous and high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. The Edneyville series consists of very deep, well drained soils on gently sloping to very steep ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part, and is weathered from felsic or mafic igneous or high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade

Map Unit Name (Series)	Characteristics
	metagraywacke.
Chestnut-Edneyville (393)	The Chestnut series consists of moderately deep, well drained soils on gently sloping to very steep ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part, and weathered from felsic or mafic igneous or high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke. The Edneyville series consists of very deep, well drained soils on gently sloping to very steep ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part, and is weathered from felsic or mafic igneous or high-grade metamorphic rocks such as granite, hornblende gneiss, granodiorite, biotite gneiss, and high-grade metagraywacke.
Cullasaja-Tuckasegee (101)	The Cullasaja series consists of very deep, well drained soils on benches, toe slopes, foot slopes, drainageways, and fans in coves in the Blue Ridge (MLRA 130). They formed in colluvium derived from materials weathered from felsic to mafic high-grade metamorphic and igneous rocks such as granite, mica gneiss, hornblende gneiss, and schist. The Tuckasegee series consists of very deep, well drained soils on gently sloping to very steep benches, foot slopes, toe slopes, drainageways, and fans in coves in the Southern Appalachian Mountains. These soils formed in colluvium derived from materials weathered from igneous and metamorphic crystalline rocks such as granite, mica gneiss, hornblende gneiss, and schist.
Evard-Cowee (337)	The Evard series consists of very deep, well drained, moderately permeable soils on ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum affected by soil creep in the upper part and weathered from felsic to mafic, igneous and high-grade metamorphic rocks. The Cowee series consists of moderately deep, well drained, moderately permeable soils on ridges and side slopes of the Blue Ridge (MLRA 130). They formed in residuum affected by soil creep in the upper part, and weathered from felsic to mafic, igneous and high-grade metamorphic rocks.
Porters-Unaka (761)	The Porters series consists of deep, well drained, moderately permeable soils on ridges and side slopes in the Southern Appalachian Mountains. These soils formed in residuum, affected by soil creep in the upper part that has weathered from felsic to mafic, high-grade metamorphic and igneous rocks such as granite, gneiss, hornblende gneiss, mica gneiss, schist, and amphibolite. The Unaka series consists of moderately deep, well drained, loamy soils formed in residuum from granite and gneiss. They are mainly at high mountain elevations.
Saunook (121)	The Saunook series consists of very deep, well drained, moderately permeable soils on benches, fans, and toe slopes in coves in the Blue Ridge (MLRA 130). They formed in colluvium derived from materials weathered from felsic to mafic, igneous and high-grade metamorphic rocks. Slope ranges from 2 to 60 percent.
Tate-Brevard (125)	The Tate series consists of very deep, well drained, moderately permeable soils on benches, fans, and toe slopes in coves in the Blue Ridge (MLRA 130). They formed in colluvium weathered from felsic to mafic high-grade metamorphic rocks. The Brevard series consists of very deep, well drained soils on gently sloping to steep high stream terraces, foot slopes, benches, fans and coves of the Southern Appalachian Mountains and mesic areas of the Southern Piedmont. They formed in colluvium and alluvium weathered from a mixture of high-grade metamorphic and igneous rocks.
Trimont (737)	The Trimont series consists of very deep, well drained, moderately permeable soils on cool north- to east-facing or shaded side slopes and heads of coves in the Blue Ridge (MLRA 130). They formed in residuum that is affected by soil creep in the upper part and weathered from felsic to mafic high grade metamorphic rocks.
Wesser-Whiteside (862)	The Wesser series consists of poorly drained and very poorly drained, moderately rapidly permeable soils on flood plains and in hanging coves of intermediate mountains in the Blue Ridge (MLRA 130). These soils formed in coarse textured

Map Unit Name (Series)	Characteristics
	alluvium that is shallow to strata of sandy material containing more than 35 percent gravel and cobbles. The Whiteside series consists of very deep, moderately well drained, moderately permeable soils on colluvial toe slopes, benches, and fans in coves in the Southern Appalachian Mountains. These soils formed in colluvium and alluvium derived from materials weathered from felsic to mafic crystalline rocks such as granite, mica gneiss, and hornblende gneiss.

3.5.1 Alternative A – Direct, Indirect, and Cumulative Effects

There would be no adverse effects to soils with this alternative because no activities are proposed. Any areas with current erosion would not be corrected. Soil displacement and compaction related to temporary road construction and landing construction would not occur.

3.5.2 Alternatives B and C Direct, Indirect, and Cumulative Effects

3.5.2.1 Direct and Indirect Effects

There are no anticipated adverse effects to soils with either of these alternatives because the soil types in the project area are moderately to very deep and well to excessively drained—reducing potential for compaction [two acres (<1%) of poorly drained soil map unit 862 would be impacted by Alternative B]; would not be taken out of production through permanent road construction or conversion to non-forest land; and would have project design features (Section 2.4, Chapter 2) and Forest Plan standards (Best Management Practices or BMPs) applied to further reduce potential for compaction and long-term damage. There would be some erosion with the temporary use of 1½ miles of existing "woods" roads under both alternatives. However, the effects would be short-term and limited in their extent when applied to the total area of operation. Alternative B proposes to harvest with cable logging systems (partial suspension of logs) on 31 acres. The remaining harvest under Alternative B (294 acres) and all harvest under Alternative C (293 acres) would use ground based logging equipment (rubber tired skidders)—which is about 3% of AA 9. While cable logging systems afford higher protection to soils than ground based systems, adverse effects to soils (e.g., permanently taken out of production) are not expected to occur for the reasons stated above.

3.5.2.2 Cumulative Effects

There is a proposal to replace the Log Hollow Bridge and the Seinard Ridge Bridge on FSR 5043 damaged by the September 2004 storms. The bridges are constructed of wood, with log "stringers" for their surfaces, and logs for the abutment footings. The new bridges would be either glue-laminated diaphragm or steel crossframe bridges with concrete for the abutment footings. The new bridges would be constructed in the same locations as the existing bridges, would be about 15 – 16 feet in width, and are scheduled to be replaced fall/winter 2006. Since the bridge replacements are not new crossings and disturbance with replacement would occur in previously disturbed areas, the cumulative effects to soils are expected to be short-term, localized, and on such a small scale as to be immeasurable when compared to the 9,800 acre Forest Plan AA. Forest Plan standards and BMPs would be adhered to during installation of the replacement bridges. There are no other past, present, or foreseeable actions in the AA (see Table 3-3 above) with adverse effects to soils that could cumulatively be added to potential adverse effects to soils from the Case Camp Ridge project.

3.6 Cultural Resources

A total of 33 archeological sites were located and recorded during the survey on areas proposed for treatment in the Case Camp proposal. Ten sites are rated Class I and are eligible for inclusion in the National Register of Historic Places (NRHP) under Criteria D (36 CFR 60.4). One site is currently unevaluated and may be eligible to the NRHP upon further assessment and one grave location was identified. The remaining sites are rated Class III and are not considered eligible to the NRHP.

3.6.1 Alternative A – Direct, Indirect, and Cumulative Effects

There are no expected adverse direct, indirect, or cumulative effects to cultural resources with this alternative because no ground disturbing activities are proposed.

3.6.2 Alternatives B & C – Direct, Indirect, and Cumulative Effects

The Class III sites are not eligible to the NRHP and may be affected by the proposed activities. There are no expected adverse direct, indirect, or cumulative effects to the Class I sites, the unevaluated site, and the grave location with implementation of either of these alternatives as identified cultural sites would be protected by excluding them from ground disturbing activities. There are no expected adverse cumulative effects to cultural resources as a result of the proposal and the actions listed in Table 3-3 above.

3.7 Scenery Resources

3.7.1 Existing Condition

Case Camp project area is located on the Pisgah Ranger District of the Pisgah National Forest, between the Blue Ridge Parkway (BRP) to the west and US 276 to the east. The southern project boundary follows Seniard Ridge and Gumstand Branch; to the north the project is bounded by the Cradle of Forestry and Pink Beds.

Management areas in the area include 2C, 4A, 4C, 4D, 12 & 18. Management Areas 2C and 4C are identified as “not suitable” for timber production in Nantahala and Pisgah Land and Resource Management Plan (LRMP). Management Area 4A has an assigned Visual Quality Objective (VQO) of Retention (R) in Foreground (FG), Sensitivity Level 1; and Partial Retention (PR) in all other Distance Zone (DZ) and Sensitivity Level (SL) combinations. Management Area 4D has an assigned VQO of PR in FG and Middleground (MG) Distance Zones of Sensitivity Level 1; and Modification (M) VQO for all other DZ and SL combinations. Under R VQO, management activities are allowed one growing season to meet the objective; PR is allowed two; and M VQO is allowed three. Refer to the LRMP Amendment 5 for specific definitions of Visual Management System terminology, and Management Area standards.

Scenery consists of the combination of landforms, rock outcrops, water bodies, and vegetation as seen across the landscape. From viewpoints analyzed for this project, modifications to the landscape can be seen on public lands in the form of paved roads, developed recreation areas, past timber management, logging roads and log landings. Past timber harvest areas vary in size and the degree to which they blend-in with the surrounding forest; most have matured to the point where they are unnoticeable to the average viewer.

Many of the analyzed views are screened by foreground vegetation during leaf-on season, and are filtered during leaf-off season. Others are open and unobstructed. Foreground views are of mixed hardwood-conifer forests, with an open understory in places and dense Rhododendron or Mountain Laurel in others. Middleground views are of forested lands with occasional small openings in areas of existing roads or developed recreation areas. In places, patches of younger trees are seen in past timber management areas; these stands may appear to have a slightly different color, texture or height than the adjacent forest.

3.7.2 Scenery Analysis

Field surveys and computer analysis were used to identify viewpoints (VP) and determine visibility of proposed management activities. All travel corridors, water bodies and use areas in and around the project area were analyzed for potential viewpoints. Field surveys were conducted during leaf-off season to insure all potential viewpoints were identified.

The following list identifies VP locations considered in the analysis. Some of the views would be seen as the observer is moving (in a vehicle, walking, horseback, bicycle, etc.); others are from stationary vistas or overlooks. Views may be filtered or screened by foreground vegetation, others are open and unobstructed. The degree of potential impact varies with these and several other factors such as distance from viewer, viewer position, slope, size, shape and type of proposed harvest or road, landing, etc. All of these factors are considered when determining what activities would meet assigned VQOs or what mitigation would be required.

3.7.2.1 Viewpoints

- Blue Ridge Parkway (BRP) & Mountains to Sea Trail (TR440) from Seniard Ridge to US276.
- Mountain Heritage Scenic Byway (US276)
- Cradle of Forestry in America & Pink Beds Picnic Area
- Sliding Rock recreation area
- Looking Glass Rock & TR114
- Forest Service Roads FSR225, FSR475B & FSR477
- Forest Service Trails TR119, TR122, TR132, TR138, TR343, TR601 & TR609

3.7.3 Effects by Alternative

The following charts list proposed treatment areas potentially visible from analyzed VPs, assigned VQOs of seen areas, and necessary mitigation for each of the action alternatives. Proposed wildlife treatments, invasive plant control, road reconstruction and timber stand improvements are not listed in the charts. Non-commercial silviculture or wildlife treatments would create minimal impacts to scenic resources. Road reconstruction would include correction of drainage problems, spreading gravel and possibly replacing culverts. All road reconstruction would occur within the existing road prism, and would not include new alignments or widening. Gated roads would be seeded as linear wildlife openings or allowed to naturally re-vegetate with herbaceous plants. All areas proposed for road reconstruction, wildlife or non-commercial silviculture treatments would meet the assigned VQOs from all associated viewpoints.

3.7.3.1 Alternative A (No Action), Direct & Indirect Effects

All VQOs would be met.

3.7.3.2 Alternative B (Proposed Action), Direct & Indirect Effects

This alternative proposes two-age harvests with 15-20 square feet of residual basal area per acre on 214 acres, selection harvest on 28 acres, thinning on 71 acres, overwood removal on 12 acres, and a variety of wildlife and other non-commercial silviculture treatments. All commercially harvested areas would be skidder or skyline logged with no new road construction.

With implementation of scenery mitigation, all actions in this alternative would meet assigned VQOs from all VPs analyzed. Visible management activities in this alternative would be similar to those in Alternative "C". However, it would have more visible acres of regeneration harvest.

Table 3-10: Alternative B Scenery Analysis

Stand	Treatment	Logging Method	VQO	Project Design Feature
73-03	Two-age	skidder	PR	1, 12
73-10	Two-age	skidder	PR	1
73-15	Two-age	skidder	PR	none
73-29	Two-age	skidder	PR	1, 13
74-07	Two-age	skidder	PR	4
74-10	Two-age	skidder	PR, M	2, 6, 9, 11, 14
74-11	Two-age	skidder	PR	2, 8, 9, 12
74-17a	Two-age	cable	PR, M	2, 6, 9, 11, 12
74-25	Two-age	skidder	PR, M	2, 9, 11, 12
75-06	Two-age	cable	PR, M	4, 5, 8, 9, 12
75-09	Two-age	skidder	PR, M	1, 7, 9, 11, 12
75-13	Two-age	cable	PR	4, 9, 12
75-21	Two-age	cable	PR	1, 9, 12, 13
73-08	Selection	skidder	PR, M	7, 9, 13, 15
74-02	Selection	skidder	PR, M	6, 9, 15
74-20	Selection	skidder	R, PR, M	6, 9, 15
74-17b	Selection	skidder	PR, M	6, 9, 15
75-10	Selection	skidder	R	13
75-14	Selection	skidder	R, PR, M	6, 9, 15
75-19	Selection	skidder	PR, M	6, 9, 15
74-20	Thin	skidder	R, PR, M	6, 9
75-01	Thin	skidder	R, PR	13
73-19	Overwood Removal	skidder	PR, M	6, 9, 11, 12

1. Maintain 25 rba/ac minimum in harvest area.
2. Maintain 30 rba/ac minimum in harvest area.
3. Maintain 35 rba/ac minimum in harvest area.
4. Maintain 40 rba/ac minimum in harvest area, or drop unit.
5. Locate unit boundary one tree height below ridge.
6. Burn or lop & scatter slash to within 2 feet of ground for 100 feet beyond edge of road or trail.
7. Burn or lop & scatter slash to within 4 feet of ground for 50 feet beyond edge or road or trail.
8. Maintain uncut vegetative screen at least one tree height below logging road.
9. Screen log landings from view, and restore as close to original contour as practical.
10. Opening along road or trail not to exceed 500 linear feet.
11. Maintain a minimum of 100 foot buffer between harvest area and trail, open road, or closed road designated as trail; if necessary work with landscape architect to identify location and clearing limits on log landings, bladed skid roads and/or cable corridors.
12. Feather edge of upper unit boundary over a 100 foot distance (into buffer or adjacent stand where applicable).
13. Insure no portion of harvest unit is within MA 2C.
14. Drop portion west of TR609.
15. Do not place groups adjacent to open roads, trails or closed roads designated as trails. For groups over 0.25 acres in size, maintain a 100 foot buffer from trails.

3.7.3.3 Alternative C, Direct & Indirect Effects

This alternative proposes two-age harvests with 15-20 square feet of residual basal area per acre on 159 acres, selection harvest on 23 acres, thinning on 99 acres, overwood removal on 12 acres, and a variety of wildlife and other non-commercial silviculture treatments. All commercially harvested areas would be skidder logged with no new road construction.

With implementation of scenery mitigation, all actions in this alternative would meet assigned VQOs from all VPs analyzed. Visible management activities in this alternative would be similar to those in Alternative "B". However, it would have fewer visible acres of regeneration harvest.

Table 3-11: Alternative C Scenery Analysis

Stand	Treatment	Logging Method	VQO	Project Design Feature
73-03	Two-age	skidder	PR	1, 12
73-10	Two-age	skidder	PR	1
73-15	Two-age	skidder	PR	none
73-29	Two-age	skidder	PR	1, 13
74-10	Two-age	skidder	PR, M	2, 6, 9, 11
74-11	Two-age	skidder	PR	2, 8, 9, 12
74-17a	Two-age	skidder	PR, M	2, 6, 9, 11, 12
74-25	Two-age	skidder	PR, M	2, 9, 12
75-09	Two-age	skidder	PR, M	1, 7, 9, 11, 12
75-21	Two-age	skidder	PR	1, 9, 12, 13
74-20	Selection	skidder	R, PR, M	6, 9, 15
74-17b	Selection	skidder	PR, M	6, 9, 15
75-10	Selection	skidder	R	13
75-14	Selection	skidder	R, PR, M	6, 9, 15
75-19	Selection	skidder	PR, M	6, 9, 15
74-20	Thin	skidder	R, PR, M	6, 9
75-01	Thin	skidder	R, PR	13
73-19	Overwood Removal	skidder	PR, M	6, 9, 11, 12

1. Maintain 25 rba/ac minimum in harvest area.
2. Maintain 30 rba/ac minimum in harvest area.
3. Maintain 35 rba/ac minimum in harvest area.
4. Maintain 40 rba/ac minimum in harvest area, or drop unit.
5. Locate unit boundary one tree height below ridge.
6. Burn or lop & scatter slash to within 2 feet of ground for 100 feet beyond edge of road or trail.
7. Burn or lop & scatter slash to within 4 feet of ground for 50 feet beyond edge or road or trail.
8. Maintain uncut vegetative screen at least one tree height below logging road.
9. Screen log landings from view, and restore as close to original contour as practical.
10. Opening along road or trail not to exceed 500 linear feet.
11. Maintain a minimum of 100 foot buffer between harvest area and trail, open road, or closed road designated as trail; if necessary work with landscape architect to identify location and clearing limits on log landings, bladed skid roads and/or cable corridors.
12. Feather edge of upper unit boundary over a 100 foot distance (into buffer or adjacent stand where applicable).
13. Insure no portion of harvest unit is within MA 2C.
14. Drop portion west of TR609.
15. Do not place groups adjacent to open roads, trails or closed roads designated as trails. For groups over 0.25 acres in size, maintain a 100 foot buffer from trails.

3.7.3.4 Cumulative Effects

As previously stated, past timber harvest areas, clearings, roads, structures, and other landscape modifications are visible on National Forest Lands as seen from analyzed VPs. The degree to

which these modifications impact scenic quality varies greatly with the type, scale, and contrast with the surrounding natural landscape. Treatments proposed in the action alternatives would create openings, or the canopy may appear thinner. In leaf-off season, segments of reconstructed road may be visible or existing roads may become more visible after harvest. However, scenery mitigation is designed with consideration for cumulative effects of proposed, existing and foreseeable future landscape modifications. If the proposed actions in each alternative are implemented with the following scenery mitigation, the assigned VQOs would be met even where proposed activities would be seen in conjunction with other existing and future landscape modifications.

3.8 Management Indicator Species

3.8.1 Introduction

An assessment of habitat changes linked to management indicator species (MIS) and habitat components is documented in this section based on the new species list that became effective Forest-wide on October 1, 2005. The assessment provides a checkpoint of project level activities, the anticipated change in habitat used by MIS, and the likely contribution to Forest-wide trends. Additional information on MIS, as well as other species, is located in the wildlife, aquatics, and botanical resource reports located in the project record.

3.8.2 Process

The Forest-wide list of MIS was considered as it relates to this project analysis area. Only those MIS that occur or have habitat within the project analysis area and may be affected by any of the alternatives were carried through a site-specific analysis. The documentation below shows which MIS were and were not analyzed along with the reasons.

Consistent with the Forest Plan and its associated FEIS (Volumes I and II), the effects analyses focus on changes to MIS habitat. These project-level effects are then put into context with the Forest-wide trends for populations and habitats.

To process and document the information efficiently, a series of tables are used as follows:

1) **Table 3-12**: This table displays biological communities and associated MIS, and reasons species were, or were not selected for analysis in the project. The source of these tables is Amendment 17 to the Nantahala and Pisgah Land and Resource Management Plan effective October 1, 2005, and the associated preliminary analysis (PA) and project record.
2) **Table 3-13**: This table displays the habitat components and associated MIS, and reasons species were, or were not selected for analysis in the project.
3) **Table 3-14**: This table displays by MIS the Forest-wide population trend along with the associated biological community or special habitat. The information in this table is taken from the MIS Report for the Nantahala and Pisgah National Forests.
4) **Table 3-15**: This table compares the effects (expressed as changes in habitat) by alternative to the Forest-wide estimates of habitats for each habitat component considered in the project-level analysis. This table explains how the project's effects to habitats affect Forest-wide population cumulative trends for the species considered.

Table 3-12: Biological Communities, associated MIS, and why Species were Chosen or Eliminated from Analysis

Biological Community	MIS	Analyzed Further/ Evaluation Criteria*
Fir dominated high elevation forests	Fraser fir	No/1
Northern hardwood forests	Ramps	No/1
Carolina hemlock bluff forests	Carolina hemlock	No/1
Rich Cove forests	Ginseng	No/1
Xeric yellow pine forests	Pine warbler	No/1
Reservoirs	Largemouth bass	No/1
Riparian forests	Acadian flycatcher	No/2
Coldwater streams	Wild trout (brook, brown, and rainbow); blacknose dace	Yes
Coolwater streams	Smallmouth bass	No/1
Warmwater streams	Smallmouth bass	No/1

*1 Biological Community and its represented species do not occur within the activity areas; therefore, this biological community would not be affected by any of the alternatives. Given no effects to the community, the alternatives in this project would not cause changes to forest-wide trends or changes in population trends of species associated with this community.

2 Biological Community and its represented species would be protected in accordance with LRMP standards and guidelines. Populations would not be affected by management activities because the associated habitat would not be entered by the proposed activities, pursuant to forest plan direction; therefore, there would be no change to forest-wide population trends.

Table 3-13: Habitat Components Associated MIS and why Species were Chosen or Eliminated from Analysis

Habitat Components	MIS	Analyzed Further/ Evaluation Criteria*
Old Forest Communities (100+ years old)	Black bear	Yes
Early successional (0-10 years old)	Rufous-sided (eastern) towhee	Yes
Early successional (11-20)	Ruffed grouse**	No/1
Soft mast producing species	Ruffed grouse	Yes
Hard mast-producing species (>40 yrs)	Black bear	Yes
Large contiguous areas with low levels of human disturbance	Black bear	No/1
Large contiguous areas of mature deciduous forest	Ovenbird**	No/1
Permanent grass/forb openings	White-tailed deer	Yes
Downed woody debris	Ruffed Grouse	Yes
Snags	Pileated woodpecker	No/2

*1 Habitat and its represented species do not occur within the project area; therefore, this special habitat would not be affected by any of the alternatives. Given no effects to the habitat, the alternatives in this project would not cause changes to forest-wide trends or changes in population trends of species associated with this habitat.

2 Habitat and its represented species would be protected in accordance with LRMP standards and guidelines. Populations would not be affected by management activities; therefore, there would be no change to forest-wide population trends.

** Species is present within AA or activity areas, but the associated habitat component is not.

Table 3-14: MIS Estimated Population Trend and Biological Community or Habitat Component

Species	Estimated Population Trend	Biological Community and/or Habitat Component
Black Bear	Increasing	Old Forest Communities & Hard mast-producing species (>40 yrs)
White Tailed Deer	Static to decreasing	Permanent grass-forb openings
Rufous-Sided (Eastern) Towhee	Decreasing	Early-successional (0-10)
Ruffed Grouse	Static	Downed woody debris
Wild Brook, Brown and Rainbow Trout; Blacknose Dace	Static	Coldwater streams

Table 3-15: Habitat Component, Forest-wide Estimates, and Expected Changes resulting from the Alternatives

Habitat Component	Forest-wide Estimate	Alternative A	Alternative B	Alternative C
Early successional (0-10 years old)	26,800 ac (yr 2000) 2,040 ac (5 yr avg)	No change	214 ac increase over next 10 years	162-166 ac increase over next 10 years
Soft mast producing species	13,144 ac early seral (yr 2000), highest potential on 5,650 ac	No change	214 ac increase for next 15-20 years	162-166 ac increase for next 15-20 years
Hard mast-producing species (>40 yrs)	High El Red oak: 40,600 ac Mesic Oak/H: 283,340 ac Dry Mesic Oak/H: 21,800 ac Chestnut Oak/H: 8,600 ac Upland hwd (other): 6,900 ac	None affected	Up to 214 ac reduction (9% within the activity areas)	Up to 166 ac reduction (7% within the activity areas)
Permanent grass/forb openings	3,000 acres	No change	3 ac increase in openings, 0.7 ac in linear wildlife strips	6 ac increase in openings, 0.7 ac in linear wildlife strips
Coldwater streams	5,060 miles	No change	Approximately 432 linear feet of stream bottom would be impacted at the culvert replacements on coldwater streams. One bridge crossings on Bennett Cove Creek would impact approximately 30 linear feet of streambank. Therefore, less than 0.08 miles of stream habitat would be affected by the action alternative of the 17.5 miles of coldwater stream within the analysis area.	Approximately 432 linear feet of stream bottom would be impacted at the culvert replacements on coldwater streams. One bridge crossings on Bennett Cove Creek would impact approximately 30 linear feet of streambank. Therefore, less than 0.08 miles of stream habitat would be affected by the action alternative of the 17.5 miles of coldwater stream within the analysis area.

Habitat Component	Forest-wide Estimate	Alternative A	Alternative B	Alternative C
Downed woody debris	High accumulation small wood: 18,000; Large wood: 386,000; Low accumulation (approximately 600,000)	No change	325 ac increase	293 ac increase

3.9 Threatened, Endangered, Sensitive, and Forest Concern Species

Introduction

This section discloses the determination of effects the proposal may have on threatened and endangered (T&E); Regional Forester's sensitive (S); and Forest Concern (FC) aquatic, wildlife, and botanical species—see Appendix A, BE for complete disclosure of surveys, habitat, species, and effects analyses. There would be no effect to any TES or FC species under Alternative A as no actions are proposed—current conditions would be maintained.

3.9.1 Threatened, Endangered, and Sensitive Species

No T&E species or their habitat are known or were found to occur in any of the proposed activity areas. Consequently, this project would have no effects upon any proposed or listed, federally threatened or endangered species. Because of project design, there would be no effects to the local populations of S species. There is no occupied or unoccupied habitat recognized as essential for listed or proposed species recovery, nor to meet Forest Service objectives for the Sensitive species identified. Formal consultation with the U. S. Fish & Wildlife Service is not required.

3.9.2 Forest Concern Species

The following table lists the FC species that could occur within the AAs along with potential effects by species from Alternatives B or C:

Table 3-16: FC Species and Potential Effects from Alternatives B or C

Species	Habitat	Occurrence	Potential Effect
Aquatic FC Species			
Cryptobranchus alleganiensis (hellbender)	Lotic- Clean substrate, larger streams & rivers	Does not occur in the aquatic activity or analysis area waters.	No effect
Necturus maculosus (mudpuppy)	Lotic- Clean substrate, larger streams and rivers	Does not occur in the aquatic activity or analysis area waters.	No effect
Matrioptila jeanae (a caddisfly)	Lotic-small streams	May occur in both the activity area and analysis areas.	Individual insects may be displaced and stressed during installation but these effects would dissipate approximately 50 feet downstream of the construction area and within 1 day.
Cymocythere clavata	Lotic- streams and	Not likely to occur	No effect

Species	Habitat	Occurrence	Potential Effect
(Oconee crayfish ostracod)	rivers in the Savannah River Drainage	within the aquatic activity or analysis area waters.	
Waltoncythere acuta (Transylvania crayfish ostracod)	Lotic- high gradient streams	Not likely to occur within the aquatic activity or analysis area waters.	No effect
Percina nigrofasciata (Blackbanded darter)	Lotic- streams and rivers in the Savannah River Drainage	Does not occur in the aquatic activity or analysis area waters.	No effect
Etheostoma inscriptum (turquoise darter)	Lotic-streams and rivers in the Savannah River drainage	Does not occur in the aquatic activity or analysis area waters.	No effect
Hybopsis rubrifrons (rosyface chub)	Lotic-streams and rivers in the Savannah River drainage	Does not occur in the aquatic activity or analysis area waters.	No effect
Micropterus coosae (red-eye bass)	Lotic-streams and rivers in the Savannah River drainage	Does not occur in the aquatic activity or analysis area waters.	No effect
Notropis lutipinnis (Yellowfin shiner)	Lotic-streams and rivers in the Savannah River drainage	Does not occur in the aquatic activity or analysis area waters.	No effect
Hiodon tergisus (mooneye)	Lotic- French broad river	Does not occur in the aquatic activity or analysis area waters.	No effect
Baetopus trishae (a mayfly)	Lotic- streams	May occur in the activity area and analysis area.	Individual insects may be displaced and stressed during installation but these effects would dissipate approximately 50 feet downstream of the construction area and within 1 day.
Habrophlediodes sp. (a mayfly)	Lotic-very small streams	May occur in the activity area and analysis area.	Individual insects may be displaced and stressed during installation but these effects would dissipate approximately 50 feet downstream of the construction area and within 1 day.
Barbaetis benfieldi (Benfield's bearded sm minnow mayfly)	Lotic-rivers, French Broad River	Not likely to occur within the aquatic activity or analysis area waters.	No effect
Drunella longicornis (a mayfly)	Lotic- streams and rivers	May occur in the activity area and analysis area.	Individual insects may be displaced and stressed during installation but these effects would dissipate approximately 50 feet downstream of the construction area and within 1 day.
Pleurobema oviforme (Tennessee clubshell)	Lotic- Little Tennessee River	Does not occur in the aquatic activity or analysis area waters.	No effect
Isoperla frisoni (a stonefly)	Lotic- mountain streams and rivers	May occur in the activity area and analysis area.	Individual insects may be displaced and stressed during installation but these effects would

Species	Habitat	Occurrence	Potential Effect
			dissipate approximately 50 feet downstream of the construction area and within 1 day.
Bolotoperla rossi (a stonefly)	Lotic-streams	May occur in the activity area and analysis area.	Individual insects may be displaced and stressed during installation but these effects would dissipate approximately 50 feet downstream of the construction area and within 1 day.
Botanical FC Species			
Brachyelytrum septentrionale	Serpentine Forest, Northern Hardwood Forest, Rich Cove Forest	Population known from high elevation along Blue Ridge Parkway	None. Too far from proposed action to be impacted.
Carex woodii	Northern Hardwood Forest, Rich Cove Forest, Acidic Cove Forest, Mesic Oak-Hickory	Several populations known from Davidson River drainage (Danley, 1994, 1996, 2003, 2004)	None. Too far from proposed action to be impacted.
Delibarda repens	Southern Appalachian Bog, Acidic Cove Forest, Swamp Forest-Bog Complex	Pink Beds Bog (Murdock et. al., 1982)	None. Too far from proposed action
Entodon sullvantii	Spray Cliff, Rock Outcrop in Acidic Cove Forest in Gorge	Historic (1890) occurrence in the Pink Beds Bog. No recent records	None. Too far from proposed action to be impacted.
Wildlife FC Species			
Neotoma floridana haematoreia Eastern Woodrat-So. Appal.	Rocky places in deciduous or mixed forests, in southern mountains and adjacent Piedmont	Not known in AA or Activity Area. Habitat occurs in AA so species could occur there.	None. Project design features would ensure habitat protection
Dendroica cerulean Cerulean warbler	Mature hardwood forests; steep slopes and coves in mountains [breeding season only]	Not known in AA or Activity Area. Habitat occurs in AA so species could occur there.	Alternative B reduces 58 acres of habitat – no habitat is reduced under Alternative C
Sphyrapicus varius appalachiensis Appalachian yellow-bellied sapsucker	Mature, open hardwoods with scattered dead trees [breeding season only]	Records of occurrence in AA and Activity Area. Habitat present.	No effect in regenerated stands due to project design features. Unknown effect in thinned stands
Celastrina nigra Dusky Azure	Rich, moist deciduous forests; host plant-goat's beard (*Aruncus dioicus*)	Not known in AA or Activity Area. Habitat may occur in AA so species could occur there.	No species identified during surveys – individuals may be impacted if present

"Known to occur" Those species of which there is documentation that the species exists within a specified area, or it was found in the area during surveys.

"Likely to occur" Those species of which there is no documentation of the species occurring in a specified area but are expected to occur based on documentation of very similar habitat to known

	populations. For purposes of the AQUA, it should be assumed that the species does occur in a specified area until presence/absence of the species is verified.
"May occur"	The species probably occurs in a specified area in the broadest sense. Only very general habitat preferences and species distribution are used to determine if a species may occur. This does not imply their existence in an area, but that their general habitat description is found in the area, so therefore the species may occur.
"Not likely to occur"	Suitable habitat for a species may exist in a specified area, but there is other information known about the area and/or the species to determine that it is not likely to occur. These species are not included in the analysis.
"Does not occur"	Exhaustive surveys (existing and ours) have not found the species in the project and/or analysis areas. These species are not included in the analysis.

3.10 Dispersed Recreation

3.10.1 Alternative A – Direct, Indirect, and Cumulative Effects

There would be no direct, indirect, or cumulative effects to dispersed recreational use under this alternative. Existing back country hiking, dispersed camping, rock climbing, biking, etc. would not be affected.

3.10.2 Alternatives B & C – Direct, Indirect, and Cumulative Effects

Under these alternatives, there would be temporary impacts to trails that are dual designated as roads (FSR 5043/Seinard Ridge Trail) – i.e. hauling and road reconstruction would have temporary effect on existing trail use and experience, especially during summer months. In addition, there may be some temporary effects on dispersed camp sites along FSR 475B. Both campers and those using the dual designated roads/trails would experience additional noise and traffic during timber hauling periods. To help reduce this effect, there would be minimum right-of-way clearing limits placed on these and other appropriate areas and hauling for this sale would be limited to Monday-Friday due to the use the area gets on weekends. There are no expected adverse cumulative effects to dispersed recreation as a result of the proposal and the actions listed in Table 3-3 above.

3.11 Other Areas of Concern

3.11.1 Alternative A – Direct, Indirect, and Cumulative Effects

Since no action is proposed under this alternative, there would be no direct, indirect, or cumulative effects to park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

3.11.2 Alternative B – Direct, Indirect, and Cumulative Effects

There would be no measurable direct, indirect, or cumulative effects from any of these alternatives because none of them propose actions within park lands, prime farmlands, wetlands (as per 1977 Executive Orders 11988 and 11990), wild and scenic rivers, or ecologically critical areas. It also would not violate local law or requirements imposed for the protection of the environment. There are no other known foreseeable actions in the activity areas that could adversely affect park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

CHAPTER 4 – PREPARERS AND PUBLIC INVOLVEMENT

The following individuals helped develop this environmental assessment:

4.1 ID Team Members

4.1.1 Core IDT

Scott Ashcraft – Zone Archaeologist
Chris Brown - Forester Trainee
Erik Crews – Forest Landscape Architect
Dave Danley – Zone Botanist
Dennis Danner – Zone Wildlife Biologist
Michael Hutchins – IDT Leader
Ted Oprean – Project Leader, Silviculturist
Lorie Stroup – Zone Fisheries Biologist

4.1.2 Other Forest Service Personnel Providing Input

Diane Bolt – Resource Assistant, Pisgah RD
Randy Burgess – Pisgah District Ranger
Barry Jones – Civil Engineer, NFs NC
Ken Rago – Timber, Heritage, Fire Staff Officer, NFs NC
Patrick Scott – Fire Management Officer, Pisgah RD

4.2 Federal, State, and Local Agencies Providing Input

Brian Cole – USDI Fish and Wildlife Service
Dave McHenry – North Carolina Wildlife Resources Commission

4.3 Others Providing Input

Megan Best
Richard Bury, PhD
R.W. Denman
Bob Gale, Western North Carolina Alliance
David Hill
Hugh Irwin, Southern Appalachian Forest Coalition
Joshua Kelly
Bridget Nelson, Southern Appalachian Biodiversity Project
Charles Nicholson
Steve Novak, WildLaw
Charles Parris
Ben Prater, Southern Appalachian Biodiversity Project
John Preston
Terry Rice
Leon Sheppard

APPENDIX A – BIOLOGICAL EVALUATION

BIOLOGICAL EVALUATION

CASE CAMP RIDGE TIMBER SALE

National Forest in North Carolina
Pisgah Ranger District

I. INTRODUCTION

The purpose of this biological evaluation (BE) is to provide the decision maker with relevant biological information as to the possible effects this proposal may have on federally classified Threatened and Endangered (T&E) species and the U.S. Forest Service, Region 8's Sensitive (S) species.

This BE documents the possible biological effects of a proposed project to manage forest vegetation as per the direction of the Land and Resource Management Plan (Forest Plan) for the Nantahala and Pisgah National Forests. Management would be done by a combination of direct habitat improvement practices for wildlife combined with treatment of forested stands by means of a commercial timber sale and noncommercial timber stand improvement practices. The proposed project is located in the northern portion of Transylvania County and is known as the Case Camp Ridge Project. Major resource activities included within this proposal (Alternative C) and considered in this analysis are:

- Construction of permanent wildlife fields totaling about 6 acres of grass/forb habitat, and conversion of some temporary roads into linear wildlife openings for additional grass/forb habitat.
- Creation and maintenance of a brush/forb interface at the edges of existing and newly created permanent wildlife openings.
- Maintenance of permanent wildlife openings to favor native, warm season grasses and forbs with both mechanical and chemical treatments.
- Contributing early seral, forested habitat by means of timber harvesting to create a 0 to 10 age class of timber. Harvest and regeneration would be done using two age, selection, sanitation thinning, and overwood removal harvest methods.
- Reconstructing existing system roads and utilizing old woods roads as temporary roads, and using and maintaining the existing roads in the area.
- Site preparation with herbicide and manual methods stands regenerated.
- Pre-harvest advance oak treatment in other stands.
- Designating small old growth patches in compartment and stand numbers 73-05, 74-26, 75-26, and 75-27.
- Controlling exotic and invasive plant species with herbicides.

A detailed description of the proposal and its management activities is contained in Section 1.3, Chapter 1 of the Case Camp Ridge Project Environmental Assessment (EA). A list of project design features and monitoring is provided in Section 2.4, Chapter 2.

II. METHODS - SURVEYS & DEFINITION OF ANALYSIS AREAS

The following sources were used to identify potentially affected T&E and S botanical, wildlife, and aquatic species and habitat for Transylvania County, NC where the proposed project is located.

1. TES species lists and their habitat information from the U.S. Fish and Wildlife Service (USFWS), North Carolina Wildlife Resources Commission (NCWRC), and North Carolina Natural Heritage Program (NCNHP) occurrence records, and the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality.
2. The USFS Region 8, Regional Forester's Sensitive Species List dated August 7, 2001 (modified 09/26/2005).
3. Personal communication with biologists from agencies listed in items 1 & 2.
4. Surveys completed for this analysis, past surveys, and analysis for projects within or near the analysis areas.
5. Consulting with individuals both in the public and private sector who are knowledgeable of the area and its biota.

This complete county list of species compiled is available as Attachment A-1 to this document. This list was then analyzed by the botanical, wildlife, and aquatics specialists to determine occurrence of these species within their respective biological analysis areas and activity areas of the proposed project. They then used these more localized occurrence determinations to identify specific areas for field survey and to continue their evaluation of possible effects. Primarily because of the differing nature of the habitat requirements associated with their respective species, these Analysis Areas (AA) differ somewhat for each of the biological resources.

The Botanical (AA) or botanical "boundary of effects" used for this proposal is defined as: the total area within 2 kilometers of any proposed management activity area or known Element Occurrence (EO) of any T&E or S plant species. This definition creates a botanical AA of 10,234 acres that lies primarily within compartments 72, 73, 74, 75, 83 and 85. All potential effects (direct, indirect and cumulative) to botanical resources in the botanical AA were analyzed using this 2 kilometer "boundary". The botanical AA definition was selected because it is analogous to the Natural Heritage Program and The Nature Conservancy's plant delimitation guidelines of EO.

The Wildlife (AA) used was Analysis Area 09 as defined in the Nantahala & Pisgah LRMP. It comprises 9,816 acres and includes Compartments 70 through 78, and 81. The wildlife activity area analyzed was defined by the compartments containing the forested stands identified for the proposed management activities. It includes Compartments 73 (979 acres), 74 (1053 acres), & 75 (736 acres) and totals 2,768 acres.

The Aquatic (AA) encompasses waters downstream that potentially could be impacted by project activities, and is derived from and includes the "activity area waters." Activity area waters are defined as those in the area of potential site-specific impacts on aquatic habitat and populations. The aquatic AA is therefore larger than the activity area waters.

A. Botanical Surveys

The botanical field surveys were conducted by a meander search pattern to survey all the variation in habitat within the unit. The survey was conducted until all of the habitats within the unit were surveyed and no new plant species were added to the unit species list after a minimum of 20 minute's search was made (timed meander search). Focused attention was given during the surveys to habitats within the units that may be associated with T&E and S plant species, (e.g. rock outcrops, seeps, etc.). The intensity of the coverage varied depending on the extent of any likely T&E and S species habitat, complexity of vegetation, and/or presence of indicator species.

The proposed units were surveyed by David M. Danley, Forest Botanist on Feb. 23, March 7, 9, 16 April 3, May 4, 10, 11, 15, 16, 17, 18, 25 and June 1, 2006. Phenology of the T & E and S species was used to schedule surveys at the optimum time to minimize any possibilities of overlooking any species in the field. All proposed units or activity areas were visited at least once during this time. Some areas were found to be virtually devoid of herbaceous vegetation and required very little intensive survey while other areas required considerably more time to adequately survey.

B. Wildlife Surveys

Wildlife habitat assessment surveys were done on 10/21/05, 11/03/05, 01/31/05, 02/09/06, 02/10/06, 05/25/06, and 05/31/06 by Dennis Danner, USFS zone wildlife biologist. Point Count Surveys of breeding birds were done on 05/23, 24 & 27/2006 by Dennis and Mae Lee Hafer, USFS forest wildlife biologist.

C. Aquatic Surveys

Lorie Stroup, USFS Fisheries Biologists and Kerri Lyda, USFS Biological Technician conducted aquatic habitat and aquatic insect surveys of the proposed aquatic project and analysis areas in the late winter and spring months of 2006. The surveys consisted of examining streams within the aquatic activity area, noting habitat quality, quantity, and suitability for rare aquatic and management indicator species (MIS), as well as existing impacts and their source. Analysis area streams were surveyed for fish using a backpack electrofishing machine.

III. EXISTING BIOLOGICAL CONDITION

Detailed reviews of species information and habitat can be found within the botanical, aquatic, and wildlife analyses reports within the project record. They were prepared using the best available information at the time they were written. A summary of the survey results for botany, terrestrial wildlife, and aquatics follows.

A. Plants & Plant Communities

Of the 106 T&E, S plant species that are known to occur in Transylvania Co. (Danley, Botanical Analysis, D. Danley. 2006), 13 are known to occur within the AA and 68 have potential habitat within it. No T&E or S species are known to occur within the proposed activity areas. All other S and T&E plant species were dropped from the list for further consideration and analysis for one of the following reasons: 1) lack of suitable habitat within the botanical AA; 2) they have a

well-known distribution that does not include the analysis area; or, 3) based on field surveys no habitat was observed in the activity areas.

The Case Camp botanical analysis can be characterized by mid to high elevation Mountain region plant communities. The analysis area has several south to southeast trending drainages. The major streams are Looking Glass Creek and Davidson River. A succession of southeast trending, interlinking ridges is found between drains. The highest points of these ridges are about the Pisgah Ridge (Ridge Parkway) 4600 ft. on the north. The drainage flows downward to about 2400 feet to the south. The analysis area exhibits many typical natural communities of the mid to high elevation southern Appalachian mountains.

Three common community types are characteristic within the analysis area. These communities are: Mesic Oak Hickory, Chestnut Oak Forest, and Acidic Cove Forest, and, to a much lesser extent, the Pine-Oak Heath Forest and Rich Cove Forest. Small habitat areas such as small rock outcrops and forested seeps and streams can be imbedded within these communities. The regionally rare plant communities can be found in the Pink Beds (Southern Appalachian Bogs); Looking Glass Rock (High Elevation Granite Dome) and Pisgah Ridge (High Elevation Communities). Natural communities often grade together and definite boundaries usually difficult to see. However, there is often a pattern to these communities on the landscape. Within the analysis area, the Acidic Cove Forest often occupies areas near streams, lower cove slopes and northern aspects. Higher cove slopes, south and western slopes are often dominated by the Chestnut Oak Forest. The Pine Oak Heath Community is found on dryer Ridges and slopes. The Mesic Oak-Hickory Forest and anthropogenic communities have the most diverse herbaceous component of the communities found within the analysis area. Collectively however, the analysis area has a very poor herbaceous diversity. All of the communities are very common community types and have relatively low probabilities of occurrence for Forest T&E and S plant species (See Schafale and Weakley for a detailed description and discussion of these communities). Thus, the botanical activity areas generally have a low potential for plant T&E and S species to occur in the proposed activity areas. The primary natural communities affected by this proposal are the Chestnut Oak Forest and Mesic Oak Forest Forest.

Using the natural vegetation predictive model (S. Simon, USFS) with the USFS Continuous Inventory of Stand Condition (CISC) data and combined with direct field observations, the acres of natural communities are estimated in Table 1 within the botanical AA.

Table A-1: Estimated Quantities of Communities within Botanical AA

Community	Est. Acres/ % of Total Habitat in AA	Acres over 40 years old
Acidic Cove Forest	2,929 acres / 29%	2,768 acres
Chestnut Oak Forest/Pine Oak Heath	4,628 acres/ 45%	4,119 acres
Rich Cove Forest	12 acres/ <1%	12 acres
Other Communities: Granitic dome, Southern Appalachian Bogs etc.	379 acres/ 4%	379 acres
Mesic Oak-Hickory Forest	922 acres/ 9 %	870 acres
High Elevation Communities including: Northern Hardwood Forest, Spruce-Fir Forest	1,364 acres/ 13%	1,364 acres
Total	**10,234 acres**	**9,512 acres**

There are two Special Interest Areas recognized by the current Forest Plan within the Botanical AA. They are Looking Glass Rock (1600 acres, High Elevation Granite Dome) and The Pink Beds Bog (205 acres, in part, Southern Appalachian Bogs). This proposed project would have no effect on the communities of either of these two Special Interest Areas.

B. Terrestrial Wildlife

The amounts and distribution of the 0 to 10 year old stands is summarized in detail in Appendix B of the Case Camp Ridge Project Environmental Assessment. Presently, the AA contains only 74 acres of the 0 to 10 age class, and the activity area contains none. This early successional habitat is important for providing forage, browse, soft mast production, sustained hard mast production in time, insect production, habitat structural diversity, and species viability.

About 88% of the hard mast producing forest types in the AA (2,306 of the 2,768 acres) is at mast producing age in the AA, but only 24 acres are considered to be at the prime mast producing age of 40 to 80 years old. Consequently, with the aging of these stands the potential for hard mast production in the area has declined, and quality hard mast is much less abundant than it could be. Many species (e.g. deer, turkey, squirrels, etc.) depend significantly on this food source.

Grass/forb habitat exists as former road beds converted to linear wildlife strips and permanently established wildlife fields or openings. The acreages for these are summarized in Table A-2 for both levels of analysis.

Table A-2: Acres of Grass/Forb Habitat

Area of Analysis	Linear Wildlife Strips	Permanent Wildlife Openings
Activity Area	6.4 acres	4.2 acres
Analysis Area	8.1 acres	9.7 acres

The primary management in this activity area is for turkey and has a desired density of 3% permanent grass and forb openings (Forest Plan, pages III–74 & III-84) for the stands classified as MA 3 and 4. This objective needs 103 acres of the Analysis Area (4,103 acres) and 83 acres of the Activity Area (2,768 acres) to be met. Additional grass and forb habitat is available along road edges, trails, old skid roads, etc., but the habitat component is obviously well below the desired Forest Plan objectives.

Coyote scats were the most frequently encountered animal droppings found on the linear wildlife strips. Very few deer droppings and little evidence of browsing were found, and only a few turkey tracks were seen. These observations substantiated the effect of so little availability of both early seral and grass/forb habitats.

C. Aquatic Survey Results

Knowledge of aquatic substrate data is helpful in assessing the amount of habitat suitable and available for T&E and S species. Substrates within the activity area waters were evaluated and visually estimated. The three primary types of substrates that exist within the activity area waters were documented at each macro invertebrate sample site. Indicated in Table 3 are the NC Department of Environmental Management (DEM) designations and water quality standards known as "Classifications and Water Quality Standards Applicable to the Surface Waters and Wetlands of North Carolina." These classifications are also used to assist in denoting what type of habitat is available to TES species.

Table A-3: Forest Plan Watershed 74 (Davidson River)

Stream Name (UT denotes an unnamed tributary)	Compartment- Stand	Miles in Activity Area	Miles in Analysis Area
Pounding Mill Branch	73-3	0.2	1.21
UT1	73-3	0.37	0.78
Cherry Cove	73-15	0.34	1.36
	73-8	0.42	
UT1	73-10	0.24	0.8
	73-8	0.42	
UT2	73-8	0.38	0.59
UT3	73-8	0.19	0.55
UTUT3	73-8	0.11	0.2
UT4	74-8	0.19	0.2
UT5	73-19	0.08	0.23
Bennett Cove	73-15	0.19	0.98
UT1			0.38
Justus Cove			0.22
Log Hollow Branch	74-20	1.1	1.49
	75-14	0.47	
UT1	74-20	0.8	1.09
Big Bearpen Branch	74-17	0.76	1.88
	75-14	0.61	
UT1	74-10	0.19	0.9
UT2			0.42
UT3			0.23
Gumstand Branch	75-19	0.08	0.39
Looking Glass Creek			3.6
Totals		**7.14**	**17.5**

Culverts along the Forest Service Roads (FSR) 5032, 5042, 5041, 5040, 5047, 475B, 5044, 5045, and 5043; the roads themselves; and existing old roads and skid trails in the activity area are the existing threats to streams and drainages. Impacts from these sources are limited to down slope movement of sediment from road runoff and culvert fills. These problems are associated with the undersized culverts that are located at stream crossings. These undersized culverts have caused head cutting and bank failure downstream of the pipes. In most other cases, it is suspected that a majority of sediments from these sources are deposited in the natural vegetative filters before they reach areas of perennial streams. By replacing these undersized culverts

habitat would improve for aquatic TES species. Though none were found during the analysis area surveys, habitat exists.

D. Summary of T&E and Sensitive Species Occurrence

Table A-4 respresents those species from the county lists in Attachment A-1 that were not excluded from further analysis and summarizes the occurrence determinations for TES species for both the Analysis and Activity Areas for the three biological resources surveyed and analyzed.

Table A-4: TES Species known or Likely to Occur in Case Camp Ridge Analysis or Activity Areas

Species	Type	Habitat	Occurrence
Threatened or Endangered Species (Plants, Wildlife, &Aquatic Organisms)			
Alasmidonta raveneliana (Appalachian elktoe)	Mussel	Lotic-clean substrate rivers	Does Not occur in Looking Glass Creek or any of the analysis area waters.
Gymnoderma lineare	Lichen	High Elevation Rocky Summit, Moist Rock Outcrop in Acidic Cove in Gorge	Known at the base of Looking Glass Rock. Not Known in Activity Areas
Helonias bullata	Vascular	Southern Appalachian Bog, Swamp Forest-Bog Complex	Known in the Pink Beds. Not Known in Activity Areas
Isotria medeoloides	Vascular	White Pine Forest, Mesic Oak-Hickory	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Sarracenia rubra ssp. jonesii	Vascular	Southern Appalachian Bog	Not known in Activity areas or AA. May have potential habitat in botanical AA.
2002 Region 8 Regional Forester's Sensitive Species List[1] - Plants			
Aconitum reclinatum	Vascular	Northern Hardwood Cove Forest, Boulderfield Forest, High Elevation Seep, Rich Cove Forest	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Aneura maxima	Liverwort	Spray Cliff	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Anzia americana	Lichen	Gorge, Acidic Cove	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Aspiromitus appalachianus	Lichen	Stream	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Bartramidula wilsonii	Moss	Spray Cliff, Moist Montane Acidic Cliff, Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Berberis canadensis	Vascular	Rich Cove Forest, Glade, mafic rock	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Botrychium jenmanii	Vascular	Rich Cove Forest	Known in riparian area of Bearpen Branch stand 74/04 and in Pink Beds. Not known in activity areas

Species	Type	Habitat	Occurrence
Bryocrumia vivicolor	Moss	Spray Cliff, Moist Montane Acidic Cliff, Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Carex biltmoreana	Vascular	High Elevation Granitic Dome, Montane Cedar-Hardwood Forest, Montane Acidic Cliff	Known from Looking Glass Rock and Lanning Ridge. Not known in activity area.
Cheilolejeunea evansii	Liverwort	Acidic Cove, Oak-White Pine Forest, Escarpement Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Chelone cuthbertii	Vascular	Southern Appalachian Bog	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Cleistes bifaria	Vascular	Pine-Oak/Heath Forest, Pine-Oak Woodland, Shortleaf Pine	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Drepanolejeunea appalachiana	Liverwort	Acidic Cove, Montane Oak-Hickory, Serpentine Woodland, Serpentine Forest	Known from and historic record along Looking Glass Creek and unconfirmed report in rock outcrop in stand 74-20. Not in activity area
Fothergilla major	Vascular	Pine-Oak/Heath Forest, Montane Oak Woodland, Roadside	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Houstonia longifolia var.glabra	Vascular	High elevation granite domes, other rock outcrops	Known from Looking Glass Rock and in rock outcrop in stand 74-20. Not in activity area
Hydrothyria venosa	Lichen	Aquatic in Streams	Known in riparian areas of Bearpen Branch stand 74/04, Hollow Branch and in Looking Glass Creek. Not known in activity areas
Juglans cinerea	Vascular	Rich Cove Forest, Mesic Oak-Hickory, Montane Alluvial Forest	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Lysimachia fraseri	Vascular	Mesic Oak-Hickory Forest, Montane Oak Forest, Rich Cove Forest, Acidic Cove Forest, Roadside	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Megaceros aenigmaticus	Hornwart	Stream	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Monotropsis odorata	Vascular	Rich Cove Forest, Mesic Oak-Hickory, Xeric Oak-Hickory, Pine-Oak/Heath Forest	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Nardia lescurii	Liverwort	Acidic Cove Forest, near streams	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Plagiochila caduciloba	Liverwort	Spray Cliff, Streamside, Rock Outcrop in Acidic Cove Forest in Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Plagiochila echinata	Liverwort	Spray Cliff, Streamside, Rock Outcrop in Acidic Cove Forest in	Not known in Activity areas or AA. May have potential habitat in

Species	Type	Habitat	Occurrence
		Gorge	botanical AA.
Plagiochila sullivantii var. sullivantii	Liverwort	Spray Cliff, Spruce-Fir Forest	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Plagiochila virginica var. caroliniana	Liverwort	Spray Cliff, Rock Outcrop in Acidic Cove Forest in Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Plagiomnium carolinianum	Moss	Rock Outcrop in Acidic Cove Forest in Gorge, Streambank	Known from Pink Beds and along Looking Glass Creek. Not known in activity area
Platyhypnidium pringlei	Moss	Spray Cliff, Rock Outcrop in Acidic Cove Forest in Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Radula sullivantii	Liverwort	Spray Cliff, Rock Outcrop in Acidic Cove Forest in Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Rhododendron vaseyi	Vascular	Northern Hardwood Forest, High Elevation Seep, Southern Appalachian Bog, Meadow, Roadside	Known from Lanning Ridge and near Blue Ridge Parkway. Not known in Activity areas.
Schlotheimia lancifolia	Moss	Oak-Hickory Forest, Acidic Cove Forest, Hemlock Hardwood Forest, Highlands Plateau, Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Shortia galacifolia var. galacifolia	Vascular	Acidic Cove Forest, Streambank, Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Stachys clingmanii	Vascular	Northern Hardwood Forest, Boulderfield Forest	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Thermopsis fraxinifolia	Vascular	Xeric Oak-Hickory Forest, Montane Oak Woodland, Pine-Oak/Heath	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Trillium rugelii	Vascular	Rich Cove Forest, low elevation	Not known in Activity areas or AA. May have potential habitat in botanical AA.
Tsuga caroliniana	Vascular	Carolina Hemlock Forest, Montane Acidic Cliff, Pine-Oak/Heath, High Elevation Rocky Summit	Known from Pink Beds and Looking Glass Rock. Not known in activity areas.
Waldsteinia lobata	Vascular	Acidic Cove Forest, Mesic Oak-Hickory, Gorge	Not known in Activity areas or AA. May have potential habitat in botanical AA.
2002 Region 8 Regional Forester's Sensitive Species List[1] – Wildlife			
Corynorhinus rafinesquii (Rafinesque's Big-eared Bat)	Mammal	Mountains, roosts old buildings, caves, mines, and hollow trees, usually near water	Not known in Activity areas or AA. Potential habitat in AA
Falco peregrinus (Peregrine Falcon)	Bird	Cliffs for nesting	Nesting site on Looking Glass Rock, feeds within AA
Speyeria Diana (Diana fritillary)	Insect	Rich woods and adjacent edges and openings; host plants (Viola	Possibly occurs within AA and activity areas. Potential habitat in AA

Species	Type	Habitat	Occurrence
Trimerotropis saxatilis (Rock-loving grasshopper)	Insect	Lichen-covered rock outcrops	Not know in Activity area or AA. Potential habitat in AA
2002 Region 8 Regional Forester's Sensitive Species List[1] – Aquatic Organisms			
Cambarus chaugaensis (Oconee stream crayfish)	Crayfish	Lotic-streams and rivers in the Savannah River drainage	Does not occur in the aquatic activity or analysis area waters.
Cambarus reburrus (French Broad Crayfish)	Crayfish	Lotic- moderately flowing streams and rivers	Does not occur in the aquatic activity or analysis area waters.
Macromia margarita (Mountain River Cruiser)	Dragonfly	Lotic- riverene habitat.	Not likely to occur within the aquatic activity or analysis area waters.

1 – August 7, 2001, Region 8 Regional Forester's Sensitive species list

IV. PAST AND FORESEEABLE FUTURE ACTIVITIES

Past timber harvests were the Log Hollow Timber Sale (TS) in 1991, the Bearpen Branch TS in1982 &1983, the Gumstand Gap TS in 1979, and the Firewood TS in 1981. No timber harvests were made within the last 10 years. Consequently, there currently is no 0 to 10 age class of timber within the analysis and activity areas, and there has not been any timber associated opportunities to create linear wildlife strips or wildlife openings to contribute to the grass/forb habitat within the proposed project area.

Two tropical storms moved through the project and analysis areas during September of 2004 during an 8 day period. These storms released up to 14 inches of rain within 48 hours each time. Many streams within the Davidson River drainage were heavily impacted by the storm events. Streams within the Case Camp Activity area were affected by the storm events. As observed in other watersheds across the Pisgah National Forest, these large storms (100 year floods or greater) often act as a "restart mechanism" for cumulative effects. Substrates in the upper reaches of Big Bearpen, Log Hollow, Bennett Cove and Cherry Cove and Pounding Mill Branch have been cleaned or washed out, creating habitat for aquatic organisms which rely on interstitial space (the space between substrate particles). Interstitial space is especially important for trout species which spawn over clean substrates that allow for oxygen to reach the eggs and juveniles. Numerous land management activities such as road, bridge, and culvert repair; erosion repair and reseeding; and tree removal have been done to repair major storm damage experienced in the area.

Ongoing actions that are contributing negatively to cumulative impacts on aquatic resources include the run-off and erosion issues associated with FSR 5032, 5042, 5041, 5047, 475B, 5044, 5045, and 5043. These roads have several inadequate culverts that are contributing sediments to the Case Camp aquatic analysis area. The Pisgah Ranger District proposes to repair these areas as a part of the Case Camp Timber Sale. These efforts would improve these roads and therefore not contribute to any negative cumulative impacts to aquatic resources.

As a result, the expected cumulative effects should not be any greater than the direct and indirect effects disclosed above and there should be no adverse cumulative effects to the analysis area aquatic resources, based on the project's design features included in this analysis.

V. EFFECTS ON BOTANICAL, WILDLIFE & AQUATIC T & E SPECIES

Implementing the activities proposed in the Case Camp Ridge project would have the following direct, indirect, and cumulative effects.

Direct & Indirect Effects

There are no known T&E species in the proposed Analysis or Activity Areas, nor are there any species known to be near enough to the proposed activities to be directly or indirectly affected. Therefore, this action would have no direct or indirect effects to any T&E species.

Cumulative Effects

The cumulative effects to potential habitat are the total effects of past, current, and foreseeable actions within either the Analysis or Activity Areas that have directly or indirectly affected T&E species or their potential habitat. Past timber harvests, storm damage repair, and controlled burns were considered to have such a cumulative influence on the habitats within the proposed project. All other activities were considered minor and not analyzed.

Because there are no known T&E species within the Analysis or Activity Areas, no known past, current, or foreseeable actions have directly or indirectly affected them.

VI. EFFECTS ON THE REGIONAL FORESTER'S SENSITIVE SPECIES

Direct & Indirect Effects

There are no effects to Sensitive plant species because there are no known species, or their habitats, within, or close to, the activity areas. There would be no direct, indirect, or cumulative impacts to these species and habitats because the proposed activities are far enough removed from them.

Creation of permanent wildlife openings in the proximity to Looking Glass Rock could benefit the peregrine falcons that nest there. The edges around such openings are typically active with small birds, and the open areas (if large enough) would permit the peregrines to hunt and feed upon them.

Cumulative Effects

Because there are no known Sensitive species within the Analysis or Activity Areas, no known past, current, or foreseeable action(s) have directly or indirectly affected them.

There is no risk to the population viability of any of the Forest's S species that would occur as a result of the implementation of the Case Camp Project proposed activities. The project would have no adverse cumulative effects on any Sensitive species or their habitat.

VII. PROJECT DESIGN FEATURES & MITIGATION REQUIREMENTS

Because no T & E species were found to occur, no mitigation requirements are necessary to comply with the National Environmental Policy Act (NEPA) or the National Forest Management Act (NFMA). However, though there are no T & E or Sensitive species affected by this proposal, the following design features were recommended within the individual analysis reports.

A. Botanical Design Features

1. To avoid the possible effect of invasive plant species to this proposal, all known populations of *Miscanthus sinensis*, *Celastrus orbiculaus* and *Spiraea japonica* should be controlled prior to disturbance activities. *Miscanthus sinensis* was found along Forest Roads. All populations total less than 1 acre. Control of *Miscanthus sinensis, Paulownia tomentosa* and *Ailanthus altissima* is most easily and effectively done by the use of herbicide (Glyphosphate).
2. It is recommended that native plants be utilized in wildlife improvements and roadside erosion control plants.
3. There are regionally Sensitive plant species known in stands 74/07 and 74/20. Stand 74/04 contains a large rock out crop which is likely habitat for additional Sensitive species (see associated habitats in Table A-4). Stand 74/04 is known to contain *Hydrotheria venosa* and *Botrychium jenmanii* within the riparian area. Stand 74/20 has a large rock outcrop that contains *Houstonia longifolia* var. *glabra* and possibly *Drepanolejeunea appalachiana*. Depending on the alternative selected (74/7 Alt. B, 74/20 Alts. B&C), these stands may have activities proposed within these stands. Project design features and Forest standards, exclude the areas containing (or likely to contain) these Sensitive species from activity. Therefore they would not be directly impacted. The buffers around these features are large enough to protect these species from indirect impacts such as light, temperature or sediment increases. Therefore, they would not be directly or indirectly impacted. The project design feature of excluding and buffering rock outcrops and the 100 foot buffer around perennial streams protect these Sensitive plant populations and are important part of the proposal.

B. Wildlife Design Features

1. Protect rock outcrops which are potential habitat for eastern woodrats. This may be achieved during lay out of the harvest units by having a wildlife biologist establish buffers around rock outcrops.
2. Permit continued cutting of small, non-merchantable trees (less than 8 inches diamter breast height) and saplings within 66 feet from the edges of all permanent wildlife openings and linear wildlife strips as a component of these openings to maintain a brushy interface between older timber stands and the grass/forb habitat of the openings. This can be done by either USFS personnel, cooperators such as the

NCWRC, or through partnership or stewardship agreements with interested wildlife groups (e.g. Wild Turkey Federation, Ruffed Grouse Society).

3. Permit the use of herbicidal treatment (e.g. Plateau or Journey) of permanent wildlife openings to favor native, warm season plants. No herbicide applications would be done within 30 feet of perennial or intermittent streams.

C. Aquatic Design Features

1. No culverts would be installed or replaced inside the NC spawning moratorium of October 15 thru April 15.
2. Trees accidentally felled across stream channels (that prevent or block stream flow) would be lifted (when possible) away from the water. If this is not possible, each tree would be pulled away from the water where it fell and temporary decking would be used to support the weight of the tree as it is pulled across the channel. These removals would be perpendicular to the stream channel whenever possible to minimize stream bank disturbance. Bare soil would be seeded and mulched if native vegetation does not start to recolonize the area by the time timber removal from the unit is complete.
3. Skid roads would avoid stream crossings and paralleling perennial channels within designated riparian areas.
4. Landings and skid trails should be vegetated as soon as possible after use to avoid off-site soil movement.
5. Temporary roads would be constructed to avoid runoff into area streams. In addition, silt fence, straw bales, or brush barriers would be placed along the length of the road where it parallels or crosses a stream as needed to control runoff and stream sedimentation.

VIII. DETERMINATION OF EFFECT

No Threatened and Endangered species nor their habitat are known or were found to occur in any of the proposed activity areas. Consequently, this project would have no effects upon any proposed or listed, federally threatened or endangered species. Because of project design, there would be no effects to the local populations of the Regional Forester's Sensitive species listed in Table 4 above. There is no occupied or unoccupied habitat recognized as essential for listed or proposed species recovery, nor to meet Forest Service objectives for the Sensitive species identified. Formal consultation with the U. S. Fish & Wildlife Service is not required.

Prepared by:

/s/*Dennis Danner* June 29, 2006

Dennis Danner, Wildlife Biologist, Pisgah National Forest

Contributors:

Lorie Stroup, Fisheries Biologist, Pisgah National Forest
David M. Danley, Pisgah National Forest Botanist

Attachment A-1

Occurrence Determination Summaries for T& E and Sensitive Species listed for Transylvania County, NC

These lists are a compilation of data provided from the North Carolina Natural Heritage biological data base, the U.S. Fish & Wildlife Service county records, Region 8 of the U. S. Forest Service, or recently acquired occurrence information not yet recorded into the NCNHP data base of T&E and S species for Transylvania County. The status of their occurrence within the county was used to determine which species would be carried forward for further analysis. Coding varies slightly for each of the three biological analyses, but only those species that do not occur within the analysis or activity areas or did not have habitat present within these areas were dropped from further analysis of effects.

A. Botanical Species

Federally Threatened or Endangered Plant Species

Species	Common Name	Natural Community/Habitat	Occurs?
Geum radiatum	Spreading Avens	High Elevation Rocky Summit	4
Gymnoderma lineare	Rock Gnome Lichen	High Elevation Rocky Summit, Moist Rock Outcrop in Acidic Cove in Gorge	2
Helonias bullata	Swamp pink	Southern Appalachian Bog, Swamp Forest-Bog Complex	2
Isotria medeoloides	Small whorled pogonia	White Pine Forest, Mesic Oak-Hickory	3
Sarracenia rubra ssp. *jonesii*	Mountain sweet pitcherplant	Southern Appalachian Bog	3

Region 8 Sensitive Plant Species

Species	Common Name	Natural Community/Habitat	Occurs?
Aconitum reclinatum	Trailing Wolfsbane	Northern Hardwood Cove Forest, Boulderfield Forest, High Elevation Seep, Rich Cove Forest	3
Aneura maxima	A liverwort	Spray Cliff	3
Anzia americana	A liverwort	Gorge, Acidic Cove	3
Aspiromitus appalachianus	A hornwort	Stream	3
Bartramidula wilsonii	A moss	Spray Cliff, Moist Montane Acidic Cliff, Gorge	3
Berberis canadensis	American Barberry	Rich Cove Forest, Glade, mafic rock	3
Botrychium jenmanii	Alabama Grape-fern	Rich Cove Forest	2
Bryocrumia vivicolor	A moss	Spray Cliff, Moist Montane Acidic Cliff, Gorge	3
Carex biltmoreana	Biltmore Sedge	High Elevation Granitic Dome, Montane Cedar-Hardwood Forest, Montane Acidic Cliff	2
Carex misera	Wretched Sedge	High Elevation Rocky Summit, Montane Acidic Cliff, High Elevation Granitic Dome	4
Cheilolejeunea evansii	A liverwort	Acidic Cove, Oak-White Pine Forest, Escarpement Gorge	3
Chelone cuthbertii	Cuthbert's Turtlehead	Southern Appalachian Bog	3
Cleistes bifaria	Orchid	Pine-Oak/Heath Forest, Pine-Oak Woodland, Shortleaf Pine	3

Species	Common Name	Natural Community/Habitat	Occurs?
Drepanolejeunea appalachiana	A liverwort	Acidic Cove, Montane Oak-Hickory, Serpentine Woodland, Serpentine Forest	2
Eurybia avita	Alexander's Rock Aster	Low Elevation Granitic Outcrop	4
Fothergilla major	Large Witch-alder	Pine-Oak/Heath Forest, Montane Oak Woodland, Roadside	3
Glyceria nubigena	Smoky Mountain Mannagrass	Northern Hardwood Forest, Boulderfield Forest, High Elevation Seep, Spruce-Fir Forest	4
Hasteola suaveolens	Sweet Indian Plantain	Montane Alluvial Forest	4
Hexastylis rhombiformis	French Broad Heartleaf	Acidic Cove Forest, Hemlock Hardwood Forest, Montane Alluvial Forest	4
Houstonia longifolia var.glabra	Granite Dome Bluet	High elevation granite domes, other rock outcrops	2
Hydrothyria venosa	An aquatic liverwort	Stream	2
Hypericum graveolens	St John's wort	High Elevation Seep, Wet Meadow	4
Juglans cinerea	Butternut	Rich Cove Forest, Mesic Oak-Hickory, Montane Alluvial Forest	3
Leptodontium excelsum	Sward moss	Spruce-Fir Forest	4
Lysimachia fraseri	Fraser's Loosestrife	Mesic Oak-Hickory Forest, Montane Oak Forest, Rich Cove Forest, Acidic Cove Forest, Roadside	3
Megaceros aenigmaticus	A hornwort	Stream	3
Monotropsis odorata	Sweet Pinesap	Rich Cove Forest, Mesic Oak-Hickory, Xeric Oak-Hickory, Pine-Oak/Heath Forest	3
Nardia lescurii	A liverwort	Acidic Cove Forest, near streams	3
Plagiochila austinii	A liverwort	Moist Montane Acidic Cliff	4
Plagiochila caduciloba	A liverwort	Spray Cliff, Streamside, Rock Outcrop in Acidic Cove Forest in Gorge	3
Plagiochila echinata	A liverwort	Spray Cliff, Streamside, Rock Outcrop in Acidic Cove Forest in Gorge	3
Plagiochila sharpii	A liverwort	High Elevation Rocky Summit, Rock Outcrop in Acidic Cove Forest in Gorge	4
Plagiochila sullivantii var. sullivantii	A liverwort	Spray Cliff, Spruce-Fir Forest	3
Plagiochila virginica var. caroliniana	A liverwort	Spray Cliff, Rock Outcrop in Acidic Cove Forestin Gorge	3
Plagiomnium carolinianum		Rock Outcrop in Acidic Cove Forest in Gorge, Streambank	3
Platyhypnidium pringlei		Spray Cliff, Rock Outcrop in Acidic Cove Forest in Gorge	3
Polytrichum appalachianum		Rocky Summits, mid to high elevation	4
Radula sullivantii		Spray Cliff, Rock Outcrop in Acidic Cove Forest in Gorge	3
Rhododendron vaseyi	Pink-shell Azalea	Northern Hardwood Forest, High Elevation Seep, Southern Appalachian Bog, Meadow, Roadside	2
Schlotheimia lancifolia	Copper moss	Oak-Hickory Forest, Acidic Cove Forest, Hemlock Hardwood Forest, Highlands Plateau, Gorge	3
Shortia galacifolia var. galacifolia	Southern Oconee Bells	Acidic Cove Forest, Streambank, Gorge	3
Stachys clingmanii	Clingman's Hedge-nettle	Northern Hardwood Forest, Boulderfield Forest	3

Species	Common Name	Natural Community/Habitat	Occurs?
Thalictrum macrostylum	Rue	Serpentine Woodland, Serpentine Forest, moist woods?	4
Thermopsis fraxinifolia	Ash-leaved Golden-banner	Xeric Oak-Hickory Forest, Montane Oak Woodland, Pine-Oak/Heath	3
Trillium rugelii	Trillium	Rich Cove Forest, low elevation	3
Tsuga caroliniana	Carolina Hemlock	Carolina Hemlock Forest, Montane Acidic Cliff, Pine-Oak/Heath, High Elevation Rocky Summit	2
Waldsteinia lobata	Lobed Barren-strawberry	Acidic Cove Forest, Mesic Oak-Hickory, Gorge	3

1 = Found in activity area
2 = Found within botanical analysis area but not within the activity area
3 = Could occur within the botanical analysis area (based on broad habitat concepts)
4 = No known occurrences or habitat known within botanical analysis area, (NOT ANALYZED FURTHER)

B. Wildlife Species

Federally Threatened or Endangered Wildlife Species

Species	Common Name	Natural Community/Habitat	Occurs?
Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel (Endangered)	High elevation forests, mainly spruce/fir	4
Clemmys muhlenbergi	Bog Turtle (Threatened S/A)	Bogs, wet pastures, wet thickets	4

Region 8 Sensitive Wildlife Species

Species	Common Name	Natural Community/Habitat	Occurs?
Corynorhinus rafinesquii	Rafinesque's big-eared bat	Roosts in old buildings, hollow trees, caves, mines usually near water	3
Falco peregrinus	Peregrine Falcon	Cliffs (for nesting)	1
Thryomanes bewickii altus	Appalachian Bewick's wren	Woodland borders or openings, farmlands or brushy fields, at high elevations (breeding season only)	4
Speyeria diana	Diana fritillary	Rich woods and adjacent edges and openings; host plants (Viola)	3
Trechus satanicus	A ground beetle	Under rocks, logs, and other ground cover (Devil's Courthouse & Graveyard Fields areas)	4
Trimerotropis saxatilis	Rock-loving grasshopper	Lichen-covered rock outcrops	3

1 = Known to occur within activity area
2 = Known to occur in wildlife AA but not within the activity area
3 = May occur within the Wildlife Activity Area or Wildlife AA because habitat for the species does or may exist
4 = Not known to occur within wildlife AA and no habitat is known to occur within wildlife AA, (NOT ANALYZED FURTHER)
5 = Habitat description for the species is unknown or too general to analyze the effects of project implementation (NOT ANALYZED FURTHER)

C. Aquatic

Federally Threatened or Endangered Aquatic Species

Species	Common Name	Natural Community/Habitat	Occurs?
Alasmidonta raveneliana	*Appalachian elktoe (mussel)*	*Mountains, Tennessee drainages Lotic-clean substrate rivers*	*Does Not Occur (1)*

Region 8 Sensitive Aquatic Species

Species	Common Name	Natural Community/Habitat	Occurs?
Cambarus chaugaensis	*Oconee stream crayfish*	*Lotic-streams and rivers in the Savannah River drainage*	*Not Likely to Occur (5)*
Cambarus reburrus	*French Broad crayfish*	*Lotic-moderately flowing streams and rivers*	*May Occur (4)*
Macromia margarita	*mountain river cruiser (dragonfly)*	*Lotic-riverene habitat*	*Not Likely to Occur (5)*

1 = Recent survey data within or downstream the aquatic analysis area (<5 yrs old)
2 = Historical survey data within or downstream the aquatic analysis area (>5 yrs old)
3 = Vicinity records (within or downstream the analysis area, not necessarily within activity area)
4 = Suitable habitat present, but no vicinity records
5 = No suitable habitat present or vicinity records within analysis area, but species may be present in county
6 = Extirpated species listed for river system

Definitions

Threatened, or Endangered (T&E): is a species that has been listed or is proposed for listing by the United States Fish and Wildlife Service. These species are included in every BE conducted for projects where the species is known to, likely to, or may occur. These species are also included in projects where the species occurred historically but hasn't been found during recent surveys.

Sensitive species (S): is a species appearing on the Regional Forester's Sensitive Species List for the Southern Region (August 7, 2001). These species are included in every BE conducted for projects within an area where the species is known to, likely to, or may occur.

Known to occur: those species in which there are records that they exist within a specified area, or it was found in the area during project specific surveys.

Likely to occur: those species in which there is no documentation of the species occurring in a specified area but are expected to occur based on documentation of very similar habitat to known populations. For purposes of the BE, it should be assumed that the species does occur in specified area until presence/absence of the species is verified.

May (could) occur: the species probably occurs in a specified area in the broadest sense. Only very general habitat preferences and species distribution are used to determine if a species may occur. This does not imply their existence in an area, but that their general habitat description is found in the area, so therefore the species may occur. See the attached resource reports for "may occur".

Forest Plan (LRMP) Analysis Area (AA): 4^{th} order watersheds as determined by the Forest Plan.

Biological Analysis Area: The maximum geographic boundary where cumulative biological effects of analyses from past, present, and reasonably foreseeable actions are expected to be combined with effects from the proposal. Analysis areas are specific to individual resources and may have different boundaries. They are referred in the body of this report as the botanical, wildlife, and aquatic Analysis Areas.

Management Area: Forest Plan designated areas with specific management objectives, standards, and guidelines.

Project Area: The general location identified by the Responsible Official where actions are proposed.

Activity Area: The geographic boundary where direct effects of the proposal (i.e. specific timber stands, haul routes, temporary roads, linear wildlife fields, trails, prescribed fire, treatment of invasive exotics, etc.) would specifically occur, and would change by alternative.

Coldwater Streams: Are usually defined as those with maximum temperatures of 68 degrees F or less. In North Carolina, these streams are largely ground-water fed, have relatively stable flows and generally elevations of 1,100 feet or more. They have gradients that are steep with stable banks. Boulder-rubble dominates their bottoms, and their turbidity is low. Productivity is usually limited.

Coolwater Streams: Represent the transitional community between coldwater streams and warmwater streams. Components of the community may include elements of both coldwater and warmwater habitats.

Warmwater Streams: Are characterized by having annual maximum temperatures greater than 68 degrees F.

APPENDIX B – AGE CLASS DISTRIBUTION

APPENDIX B – AGE CLASS DISTRIBUTION

Introduction

The Case Camp Ridge Forest Management Project is located in Pisgah District Analysis Area 09 (9,816 acres), Compartments 73 (979 acres), 74 (1,053 acres), and 75 (736 acres). Analysis Areas 09 contains Management Areas 3B, timber emphasis, MA 4A scenery and timber emphasis, MA 4D wildlife and timber emphasis, and MA 18 embedded within the other management areas consists of aquatic and riparian ecosystems.

Management Area 4D, emphasizes high quality wildlife habitat, with timber management to provide early successional habitat (Forest Plan, page III-78) dominates the Pisgah District Analysis Area 09 (33%) and the Case Camp Ridge Project Area, Compartments 73, 74, and 75 (63%). Inventory data shows that the age-class distribution is unbalanced for Analysis Area 09.

This analysis is to determine the maximum harvest levels for the project area according to the Forest Plan. Both action alternatives would help to balance the age-class distribution to a lesser or greater degree.

Forest Plan Direction for Distribution of Early Successional Habitat

The Forest Plan contains specific desired conditions for the amount of 0-10 year age-class in management areas with timber production, 1B and 3B - at least 5% not to exceed 15%, 2A -at least 5% not to exceed 10% and 4A and 4D - not to exceed 10%, (Forest Plan Amendment 5, pages 29-32). The amount of 0-10 age class is regulated at three geographic scales: the analysis area; the management area within the analysis area; and the compartment(s) within the analysis area. Projects which create 0-10 year age class must meet analysis area, management area, and compartment regulations as directed by the Land and Resource Management Plan (Forest Plan) Amendment 5.

The tables below summarize the existing 0-10 year age-class and regeneration goals for Analysis Area 09 Pisgah Ranger District and for the Case Camp Ridge Forest Management Project in Compartments 73, 74, and 75. Acres in management areas not suitable for timber management are not considered in the analysis of 0-10 year old regeneration at the analysis area scale.

Analysis Area Analysis

For every analysis area with at least 250 acres in MAs 1B, 2A, 3B, 4A and/or 4D, the amount of 0-10 year age class allowed in the analysis area is calculated as follows:

For Management Areas 1B, 2A, 3B, 4A and 4D multiply the number of acres in each MA by the maximum percent allowed:

1B & 3B	~2,237 acres x 15%	=	336 acres
2A	~ 0 acres x 10%	=	0 acres
4A & 4D	~3,643 acres x 10%	=	364 acres
	5,880		**700 acres**

The sum of these is the amount of 0-10 year age class allowed in the AA.

Table B-1: AA 09 Calculations 0-10 Year Age-Class

		0-10 Year Age-Class[1]			Harvest Goals	
Analysis Area	Suitable Acres 1B, 2A, 3B, 4A & 4D	Min. Allowed	Max. Allowed	Existing 0-10 Yr.	Min.	Max.
09	5,880	112	700	74	48	626

1 – Minimum and maximum 0-10 allowed cannot exceed levels allowed under Compartment analysis, thus the lower number than 5%-15% allowed in each Analysis Area

Management Area Analysis

For every Management Area with at least 250 acres in the AA, the amount of 0-10 year age-class allowed in the Management Area is calculated by multiplying the number of acres in each Management Area in the Analysis Area by the maximum percent allowed. Each result is the amount of 0-10 year age-class allowed in that Management Area.

Table B-2: Management Area Calculations 0-10 Year Age-Class Pisgah District AA 09 (Compartments 70, 71, 72, 73, 74, 75, 76, 77, 78, and 81)

		0-10 Year Age-Class			Harvest Goals	
MA	Forested Acres	Min. Allowed[1]	Max. Allowed[1]	Existing 0-10 Yr.	Min.	Max.
3B	2,237	112	336	0	112	336
4A, 4D	3,643	-	364	74	-	290
2C, 4C, 13, 18	3,936	-	-	-	-	-
Totals	**9,816**	**112**	**700**	**74**	**112**	**626**

1 – Minimum and maximum 0-10 allowed cannot exceed levels allowed under Compartment analysis, thus the number lower than 5%-15% allowed in the Management Areas

Compartment Area Analysis

For every compartment with at least 250 acres in Management Areas 1B, 2A, 3B, 4A, or 4D, the amount of 0-10 year age-class allowed in each compartment is calculated by first determining which MA has the most acres in the compartment (1B, 3B, 2A, 4A, or 4D). If 1B and 3B have the most, then the maximum 0-10 year age-class is 15% of all acres in the compartment. If 2A, 4A, or 4D have the most acres, then the maximum amount allowed 0-10 year age-class is 10 percent of all acres in the compartment. The following table displays the allowable 0-10 age-class by compartment:

Table B-3: Pisgah District AA 09 Compartments 73, 74, and 75, 0-10 Year Age-Class

			0-10 Year Age-Class			Harvest Goals	
Compartment	MA	Forested Acres	Min. Allowed	Max. Allowed	Existing 0-10 Yr.	Min.	Max.
73	4A & 4D	737	-	73	0	-	73
74	4A & 4D	812	-	81	0	-	81
75	4D	540	-	54	0	-	54
Totals		**2,089**	**-**	**208**	**0**	**-**	**208**

Note: All suitable acres are in Management Areas 4A & 4D in these compartments

Comparison of Alternatives for Early Successional Habitat

The Forest Plan Amendment 5 General Direction for 0-10 age-class distribution states "*Assure a regular and sustained flow of habitats across the Forests through space and time for diversity*

and viability of plant and animal populations." (Forest Plan, page III-29)

This analysis compares the no-action and action alternatives to see which alternatives would best meet the desired future conditions for early successional habitat (0-10 age class) for acres at the three geographic scales and through time based on a 10 year entry cycle as directed by Forest Plan Standards listed on page III-75.

Table B-4 shows the acres of proposed regeneration by alternative with respective % by geographic scale. Both action alternatives meet the minimum percentage of 0-10 age class by AA, but the No-action Alternative does not meet the minimum percentage. The minimum percentage of 0-10 age class is 5% (112 acres) of the MA 3B land base, or 1.14% of the AA.

Table B-4: Percent of 0-10 age-class distribution by Alternative of Proposed Timber Harvest- Base Year 2007

Alternative	Acres Proposed Harvest & % 0-10 At Compartment Scale						% 0-10* at 4A/4D MA Scale 2089 ac	% 0-10* at AA Scale 9816 ac
	Compartment 73 979 ac		Compartment 74 1,053 ac		Compartment 75 736 ac			
A	0 ac	0 %	0 ac	0 %	0 ac	0 %	2.0 %	0.8 %
B	72 ac	7.4 %	91 ac	8.6 %	73 ac	9.9 %	8.5 %	3.2 %
C	68 ac	6.9 %	77 ac	7.3 %	38 ac	5.2 %	7.1 %	2.6 %

* Includes 74 acres of existing 0-10 age class.

The comparison of alternatives in Table 5 shows that Alternatives B and C meet Forest Plan Amendment 5 Direction and Standards for regulating the 0-10 age class distribution at three geographic scales. All Alternatives meet two of the geographic scales (Compartment Level and Management Area Level) because MA 4A and MA 4D have no minimum acreage requirement. But, only the action alternatives meet the 0-10 age class distribution at the analysis area.

Table B-5: Comparison of Alternatives by Age-Class Distribution – Base year 2007

Alternative	Acres Harvest	Acres of Existing 0-10 in AA	Total Acres of 0-10 in AA	Meets Forest Plan Direction for 112 Acres Minimum at AA?
A	0	74	74	No
B	236	74	310	Yes
C	183	74	257	Yes

In addition to meeting Forest Plan Standards for 0-10 age class distribution spatially at 3 geographic scales the project must also meet the 0-10 age class distribution over a time frame. The time frame for maintaining 112 acres in Management Area 4D is for 10 years into the future.

Tables B6, B7, and B8 display the effects of each alternative on the 0-10 age-class distributions in AA 09 over a 10 year period.

Table B6: Alternative A 0-10 Age-Class Distribution Over 10 year Period in Analysis Area 09 (Must maintain at least 112 acres or 1.14% of analysis area for 10 year period)

Future	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Acreage	**74**	**74**	**26**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
% AA	**0.8%**	**0.8%**	**0.3%**	**0.1%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Compartment 70 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 71 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 72 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 73 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 74 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 75 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 76 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 77 (% Compt.)	32 3.8%	32 3.8%	26 3.1%	12 1.4%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 78 (% Compt.)	42 4.5%	42 4.5%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 81 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

Table B7: Alternative B 0-10 Age-Class Distribution Over 10 Year Period in Analysis Area 09 (Must maintain at least 112 acres or 1.14% of analysis area for 10 year period)

Future	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Acreage	**74**	**310**	**262**	**248**	**236**	**236**	**236**	**236**	**236**	**236**	**236**	**236**
% AA	**0.8%**	**3.2%**	**2.7%**	**2.5%**	**2.4%**	**2.4%**	**2.4%**	**2.4%**	**2.4%**	**2.4%**	**2.4%**	**2.4%**
Compartment 70 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 71 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 72 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 73 (% Compt.)	0 0%	72 7.4%	72 7.4%	72 7.4%	72 7.4%	72 7.4%	72 7.4%	72 7.4%	72 7.4%	72 7.4%	72 7.4%	72 7.4%
Compartment 74 (% Compt.)	0 0%	91 8.6%	91 8.6%	91 8.6%	91 8.6%	91 8.6%	91 8.6%	91 8.6%	91 8.6%	91 8.6%	91 8.6%	91 8.6%
Compartment 75 (% Compt.)	0 0%	73 9.9%	73 9.9%	73 9.9%	73 9.9%	73 9.9%	73 9.9%	73 9.9%	73 9.9%	73 9.9%	73 9.9%	73 9.9%
Compartment 76 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 77 (% Compt.)	32 3.8%	32 3.8%	26 3.1%	12 1.4%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 78 (% Compt.)	42 4.5%	42 4.5%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Compartment 81 (% Compt.)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

Table B8: Alternative C 0-10 Age-Class Distribution Over a 10 Year Period in Analysis Area 09 (Must maintain at least 112 acres or 1.14% of analysis area for 10 year period)

Future	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Acreage	**74**	**257**	**209**	**195**	**183**	**183**	**183**	**183**	**183**	**183**	**183**	**183**
% AA	**0.8%**	**2.6%**	**2.1%**	**2.0%**	**1.9%**	**1.9%**	**1.9%**	**1.9%**	**1.9%**	**1.9%**	**1.9%**	**1.9%**
Compartment	0	0	0	0	0	0	0	0	0	0	0	0
70 (% Compt.)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compartment	0	0	0	0	0	0	0	0	0	0	0	0
71 (% Compt.)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compartment	0	0	0	0	0	0	0	0	0	0	0	0
72 (% Compt.)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compartment	0	68	68	68	68	68	68	68	68	68	68	68
73 (% Compt.)	0%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%
Compartment	0	77	77	77	77	77	77	77	77	77	77	77
74 (% Compt.)	0%	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%
Compartment	0	38	38	38	38	38	38	38	38	38	38	38
75 (% Compt.)	0%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
Compartment	0	0	0	0	0	0	0	0	0	0	0	0
76 (% Compt.)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compartment	32	32	26	12	0	0	0	0	0	0	0	0
77 (% Compt.)	3.8%	3.8%	3.1%	1.4%	0%	0%	0%	0%	0%	0%	0%	0%
Compartment	42	42	0	0	0	0	0	0	0	0	0	0
78 (% Compt.)	4.5%	4.5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compartment	0	0	0	0	0	0	0	0	0	0	0	0
81 (% Compt.)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Conclusion

Under Alternative A, Forest Plan early successional habitat standards are not met, nor would early-successional habitat be present within AA 09 after 2009. Both action alternatives would maintain early successional habitat above the minimum required for 10 years (2017) within AA 09.

APPENDIX C – OLD GROWTH ANALYSIS

APPENDIX C – OLD GROWTH ANALYSIS

Forest Plan Direction for Old Growth Restoration Patches

The Forest Plan contains specific directions for designating large, medium, and small old growth restoration patches (Forest Plan, pages III-26 – III-28). The Pisgah Ranger District is covered by Old Growth Patch 16 (Forest Plan, Appendix K, page K-5). The administrative watershed affected by this project is 74. The requirements for this project are as follows: (1) check for large old growth patches in Pisgah AA 09; (2) check for medium old growth patches in Pisgah AA 09; (3) select small old growth patches for Compartments 73, 74, and 75; and (4) field check stands in the initial inventory of old growth that may be directly affected by this project.

The purpose of the large patches is to serve as permanent reservoir of biological diversity and to provide preferred habitats for forest interior birds across the landscape. The intent is to allow the restoration of functional old growth ecosystems at the sub-regional, Forest and landscape scales.

The purpose of the medium patches is to serve as permanent reservoirs of biological diversity and to allow for the restoration of functioning old growth ecosystems at the landscape and Forest scales.

Large Patch

There are no large old growth patches within Pisgah District AA 09

Medium Patch

Pisgah AA 09 contains medium old growth patch #7401, Looking Glass Rock Patch. This medium size old growth patch does not fall within the activity areas within Compartments 73, 74, and 75. The following table displays information on this medium size old growth patch:

Table C1-Medium Size Old Growth Patch 7401, Looking Glass Rock Patch

Compartment	Stands	Acres	AA
70	1, 2, 3, 4, 15, 18	145	09
71	1, 14-16, 20, 22, 24	469	09
76	1, 2, 3, 4, 5, 6, 7	1,498	09
Total		**2,112**	

Initial Inventory of Old Growth and Small Patch Designation

There are several patches of initial inventory old growth identified by the Forest Plan within Analysis Area 09, but none are located within Compartments 73, 74 and 75. The following table displays information on the inventory of initial old growth within Analysis Area 09:

Table C2 – Inventory of Initial Old Growth Stands Analysis Area 09

Compartment	Initial Old Growth Identified Stands
70	5
71	14, 15

Compartment	Initial Old Growth Identified Stands
72	None
73	None
74	None
75	None
76	None
77	None
78	None
81	03, 05

The purpose of the small patches is to increase biological diversity and to provide structural components of old growth at the stand and landscape levels. There are currently no designated small old growth patches within Compartments 73, 74, and 75.

The following table displays stands that would be designated as small patches for long- term old growth retention in Alternative C to meet Forest Plan standards for old growth:

Table C-3: Small Size Old Growth Designated in Analysis Area 09, Compartments 73, 74, and 75 (Alt C)

Compartment	Minimum Acres	Designated Acres	Stand No(s)	Age in 2006	Initial Inventory?	Community Type
73	50	170	2, 5	133 years/ 98 years	No	Dry-Mesic Oak Forests
74	53	202	26	108 years	No	Dry-Mesic Oak Forests
75	50	85	26, 27	93 years	No	Mixed-Mesophytic Forests
Total Acres	**153**	**457**				

APPENDIX D – APPROPRIATENESS OF HARVEST METHODS

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Regeneration methods are discussed at length in Appendix E of the FEIS for the Forest Plan, and on pages E1-E2 in Amendment 5 of the Forest Plan. Choices include shelterwood cutting and clearcutting (even-aged management system), shelterwood with reserves (two-aged system), and group selection (uneven-aged system). At this time, single-tree selection (uneven-aged management) is not being considered as appropriate in meeting long-term regeneration needs to sustain productive stands of desirable tree species except in northern hardwood (beech-birch-sugar maple) or hemlock stands (all shade tolerant species). This is because regeneration objectives would not be met and single-tree selection does not work with the shade intolerant species that occur in the Case Camp Ridge Forest Management Project Area. Thinning and sanitation cutting may also occur, but they are intermediate treatments and would not establish regeneration.

With any method, there must be enough quantity and quality of timber to be removed to make a sale operable, i.e. economically feasible to log at a given stumpage price (stumpage is the price paid for standing timber). The minimum quantity would generally be three thousand board feet of sawtimber per acre, although markets may develop for lower value products. Sawtimber would be defined as trees that are large enough, free enough of defects, and of commercially valuable species which could be sawed into grade 3 or better lumber. Some species like scarlet oak seldom contain any grade 3 logs because of defect. Other species like sourwood seldom reach large enough diameter to become sawtimber. Changes in markets may change operability standards in a local area as well as affecting stumpage price.

Operability and stumpage price are also affected by transportation cost, logging cost, and size of the area being logged. Costs of getting logs from the stump to the mill are higher for timber in remote areas, where haul roads must be built, or for timber logged with specialized logging equipment, e.g. with cable systems or with a helicopter. As costs increase, prospective timber purchasers lower their bid prices on stumpage to compensate. If the price they can pay becomes less than the minimum acceptable stumpage price, the timber becomes inoperable (no one would buy it).

Each logging crew, depending on the size of their operation and the value of the timber to be logged, would have a minimum amount of timber that would be economical for them to move in and cut. For instance, in a given stand, it might be economical for a given logging crew to harvest a clearcut as small as 10 acres to obtain 50 MBF. If group selection is chosen, where only about 25 percent of the area is regenerated per entry, 40 acres would be needed to provide the crew with the same amount of sawtimber. Therefore, operability becomes an important factor in determining which regeneration methods are appropriate.

Much concern has been expressed over **clearcutting** as a management tool. Other regeneration methods would be used when management objectives can be met and when the other methods are economically feasible. In a memo to Regional Foresters dated June 4, 1992, the Chief of the Forest Service stated that *"Clearcutting would be limited to areas where it is essential to meet forest plan objectives and involve one or more of the following circumstances:*

1. *To establish, enhance, or maintain habitat for threatened, endangered, or sensitive species.*
2. *To enhance wildlife habitat or water yield values, or to provide for recreation, scenic vistas, utility lines, road corridors, facility sites, reservoirs, or similar development.*
3. *To rehabilitate lands adversely impacted by events such as fires, windstorms, or insect or disease infestations.*
4. *To preclude or minimize the occurrence of potentially adverse impacts or insect or disease infestations, windthrow, logging damage, or other factors affecting forest health.*
5. *To provide for the establishment and growth of desired trees or other vegetative species that are shade intolerant.*
6. *To rehabilitate poorly stocked stands due to past management practices or natural events.*
7. *To meet research needs."*

These circumstances would be referred to on a site-specific basis when showing that clearcutting is optimum for a given stand.

Regeneration using the **group selection** method is appropriate where logging costs are relatively low and where there is enough volume and value in the stands to make selection cutting operable. Group selection is not traditionally done in very small stands or on slopes greater than 40 percent where cable logging is necessary, where timber volume or value is low, or in stands where insect or disease hazards are high and widespread. It is also not appropriate where partial cutting and leaving a white pine seed source would result in conversion of mixed pine/hardwood stands to almost pure pine stands, if the accompanying long-term loss of mast production would be detrimental to local wildlife populations.

The **shelterwood** method of regeneration has been traditionally used where a residual seed source was needed for stand establishment or where new seedlings developed best with partial shade or protection from exposure. In the Appalachian Mountain region, seed from reserve trees (or "leave trees") are usually not needed to establish a new stand, but visual concerns often make shelterwood desirable. Leave trees must be those that would not likely be windthrown after having the adjacent trees cut. The residual overstory of a new shelterwood cut would look more park-like with the biggest and best trees evenly distributed across the landscape, rather than having a denuded appearance like a fresh clearcut might have. Regeneration would become established under the residual overstory. Then, at some later time depending on objectives, all or part of the overstory may be removed so it would not hinder further growth and development of the new stand. Some damage to the regeneration would occur during the overstory removal. Shelterwood is not appropriate on slopes greater than 40 percent where cable logging is necessary unless timber volume and values are very high. Shelterwood is not appropriate in stands where leaving an overstory would make the stands inoperable, or in stands where insect or disease hazards are high and widespread. It is also not appropriate where partial cutting and leaving a white pine seed source would result in conversion of mixed pine/hardwood stands to almost pure pine stands, if the accompanying long-term loss of mast production would be detrimental to local wildlife populations.

The shelterwood with reserves is a **two-age** regeneration method that is similar to the shelterwood method except the overstory removal is deferred until mid rotation (80 years for

cove hardwoods) or indefinitely. In many cases it would remain until a new age class reaches rotation. With the development and growth of a new age class in the understory along with the continued growth of the overstory, the stand takes on a two-aged structure. Since leave trees do not have to support another operable sale, they do not have to be merchantable and not as many have to be left. The type of leave trees retained would depend on site-specific objectives. Basal area of leave trees should not exceed 20-30 sq ft/acre fifteen years after harvest so they would not hinder further growth and development of the new stand. More than one harvest entry may be used to reduce basal area to this level. For example, a shelterwood removal could reduce basal area from 50 sq ft/ac to 15 sq ft/ac, thus perpetuating a two-aged stand. The two-age method is appropriate in operable stands on slopes less than 40 percent and whenever there are enough suitable trees to leave that would live to be a part of the stand for 40-80 years into the future. Two-age would be appropriate to meet objectives other than timber production, e.g. if continuous acorn production is needed within a stand, if den trees are scarce, or if aesthetics is a consideration. Two-age would be appropriate on slopes greater than 40 percent if timber value is high enough to offset increased costs of selective logging with cable systems, and if visual concerns or wildlife habitat objectives cannot be met by clearcutting. Two-age is not appropriate in stands where leaving an overstory would make the stands inoperable or in stands that require full sunlight for propagation of the management species.

The following table describes factors to be considered in determining appropriateness of regeneration methods for each stand:

Table D-1: Factors Considered in Determining Appropriate Regeneration Methods

Compt. -Stand	Alt B Acres	Alt C Acres	Vol./ac (CCF)	1/ Timber Quality	2/ Leave Trees	3/ Future Removal	4/ Access	5/ Special Concerns
73-03	16	15	16.53	H	Y	Y	Y	
73-08	6	0	10.07	M	Y	Y	Y	H
73-10	17	13	11.78	H	Y	Y	Y	
73-15	19	18	14.10	M	S	N	Y	
73-19	12	12	7.30	H	S	N	Y	V
73-29	20	22	13.34	H	Y	Y	y	
74-02	2	0	9.63	L	N	N	Y	H, V
74-07	16	0	20.18	H	Y	Y	Y	V, B
74-10	15	13	14.69	H	Y	N	Y	V
74-11	20	15	18.30	H	Y	N	Y	V
74-17a	14	23	21.35	H	Y	Y	Y	V
74-17b	3	4	21.35	H	Y	Y	Y	
74-20a	8	11	17.01	H	Y	Y	Y	B
74-20b	48	75	17.01	H	Y	Y	Y	B
74-25	13	11	13.54	H	Y	N	Y	V
75-01	0	24	11.93	H	Y	Y	Y	V
75-06	11	0	12.56	H	Y	C	Y	V
75-09	20	17	12.85	H	Y	N	Y	V
75-10	3	3	7.23	L	Y	Y	Y	H
75-13	20	0	7.57	M	S	C	Y	V
75-14	3	3	6.61	L	S	Y	Y	V, H
75-19	3	3	6,65	L	S	Y	Y	H, V
75-21	13	12	9.76	M	S	N	Y	V

1/ Timber Quality:	Very High	= ave dia > 20" - Northern Red Oak, White Oak, Black Cherry
	High	= ave dia > 18" - Northern Red Oak, White/Chestnut Oaks, Yellow-poplar
	Medium	= ave dia < 18" - Small Diameter Sawtimber, Mixed Oak
	Low	= ave dia does not come into play - Small Roundwood, Scarlet Oak, Chestnut Oak
2/ Leave Trees:	Y	= Well distributed, long-lived, meet objectives
	Spotty	= Available in clumps; not well distributed
	N	= Scarce, scattered, or high mortality risk
3/ Future Removal:	Yes	= Potential for operable removal of overstory
	No	= Removal would not be operable within 10 years
	Cable	= Slopes >40 percent require cable logging systems
4/ Access:	Good	= Less than 0.5 mile from existing haul road
	Fair	= 0.5-1.0 mile from existing haul road
	Poor	= Greater than 1.0 mile from existing haul road
5/ Special Concerns:	Conversion	= Risk that oak component be lost to pine
	Wildlife	= Modify to provide needs for wildlife
	Visual	= Modify to mitigate aesthetic concerns
	Insect/Disease	= High risk of loss due to SPB and/or loss due to oak decline
	Heritage	= High risk, existing sites or mitigate needed
	Botanical	= Modify to mitigate botanical concerns

The following table summarizes appropriate regeneration methods for each stand and what is proposed in each alternative:

Table D-2: Appropriate Regeneration Method by Stand by Alternative

Compt -Stand	Alt B Acres	Alt C Acres	Forest Type	Age	Method Of Logging	Overwood Removal	Sanitation Thinning	Selection	Two-Age
73-03	16	15	Cove Hardwood	83	RTS*				Alt B & C
73-08	6	0	Upland Hardwood	93	RTS			ALT B	
73-10	17	13	Cove Hardwood	93	RTS				Alt B & C
73-15	19	18	Upland Hardwood	98	RTS				Alt B & C
73-19	12	12	Cove Hardwood	75	RTS	Alt B & C			
73-29	20	22	Upland Hardwood	86	RTS				Alt B & C
74-02	2	0	Cove Hardwood	118	RTS			Alt B	
74-07	16	0	Cove Hardwood	98	RTS				Alt B
74-10	15	13	Upland Hardwood	98	RTS				Alt B & C
74-11	20	15	Cove Hardwood	143	RTS				Alt B & C
74-17a	14	23	Cove Hardwood	88	RTS				Alt B & C
74-17b	3	3	Cove Hardwood	88	RTS			Alt B & C	
74-20a	8	11	Upland Hardwood	98	RTS			Alt B & C	
74-20b	48	75	Upland Hardwood	98	RTS		Alt B & C		
74-25	13	11	Upland Hardwood	118	RTS				Alt B & C
75-01	23	24	Cove Hardwood	93	RTS		Alt B & C		
75-06	11	0	Cove Hardwood	82	Cable				Alt B
75-09	20	17	Cove Hardwood	123	RTS				Alt B & C
75-10	3	3	Upland Hardwood	93	RTS			Alt B & C	
75-13	20	0	Upland Hardwood	118	Cable				Alt B
75-14	3	3	Upland Hardwood	78	RTS			Alt B & C	
75-19	3	3	Upland Hardwood	103	RTS			Alt B & C	
75-21	13	12	Upland Hardwood	88	Alt B (Cable/RTS) Alt C (RTS)				Alt B & C

* RTS – Rubber-tired Skidder

Timber Cutting Methods Considered

The following is a list of timber cutting methods which were considered in this analysis. A brief description is provided to help the reader understand these terms as they are used in this document:

Cutting for Even-aged or Two-aged Regeneration

Clearcutting

Regeneration or harvest method that removes essentially all the trees in a single operation to establish a new stand in a fully exposed microclimate. All merchantable trees on an area are harvested, and remaining trees are treated in site preparation. This method would be used only when no other method is feasible.

Shelterwood Cutting

The cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment. Removal of the overwood is done in a sequence of treatments that can include three types of cuttings: (a) an optional preparatory cut to enhance conditions for seed production, usually 50-60 square feet per acre of basal area is left after this cut, (b) an establishment cut to prepare the seed bed and to create a new age class, usually 20-40 sq ft/acre of basal is left, and (c) a removal cut to release established regeneration from competition with the overwood. Normally, only healthy, wind-firm trees are left as overwood. The usual time frame for the preparatory cut, establishment cut to the removal cut falls within a 10 year period.

Two-Age Cutting

Similar to shelterwood cutting except fewer overstory trees are left in place, and they are not subsequently removed, so that two distinct ages of trees are maintained on the same site. Trees left as overwood should be long-lived since they may be expected to live 120 years or more (Beck 1986).

Cutting for Uneven Aged Regeneration

Uneven-aged (selection) methods regenerate and maintain a multi-aged structure by removing some trees in all size classes either singly, in small groups, or in strips. (*The Dictionary of Forestry, 1998).*

Group Selection Cutting

Cutting small openings between 0.2 and 1.0 acre each, distributed over a stand size area, with the intent to establish three or more distinct age-classes within a prescribed rotation. Width of an individual opening would be 1.5 - 2 times the average height of trees adjacent to the opening. Small trees having good growth potential may be left standing within openings, and priority for openings would be where mature timber occurs. The number of openings would depend on the size of the area where selection would be used, the frequency of timber sale entry, and the desired age of the oldest trees. Intermediate harvests to improve the condition of the residual stand or to establish advance regeneration may be done between openings when needed.

Intermediate Harvest

Cutting to anticipate mortality and improve the growth and vigor of the remaining trees without regard for the establishment of regeneration

Free Thinning

The removal of trees that are crowding desirable trees without regard to crown position as in selection thinning. The best trees in terms of species, size or quality are left to grow. Some minimum basal area is usually set using this type of cultural treatment.

Sanitation Thinning

Cutting trees that have been attacked or appear in imminent danger of attack from injurious agents (such as disease or insects) other than competition between trees. The best trees in terms of species or vigor are left to grow. No minimum basal area is set using this type of cultural treatment.

Selection or Crown Thinning

The removal of trees from the dominant and co-dominant crown classes in order to improve the growth of the remaining trees, but leaving enough desirable, healthy trees to recapture the potential of the site and develop into larger merchantable trees themselves in a reasonable time. This may be done with yellow-poplar on a good site, but only once during a rotation (Beck 1988).

Other Terms Used

Advance Reproduction

Young trees, usually seedlings and saplings, growing in the understory of existing stands.

Rotation

The time between regeneration and final harvest.

Stand

A community of trees sufficiently uniform in composition, age, site productivity, spatial arrangement, or condition to be distinguishable from adjacent communities, thereby forming a silvicultural or management entity.

APPENDIX E – FINANCIAL EFFICIENCY

APPENDIX E – FINANCIAL EFFICIENCY

Purpose

The purpose of the financial efficiency analysis is to present the estimated costs and revenues of the alternatives considered in the Environmental Analysis for the Proposed Case Camp Ridge Forest Management Project on the Pisgah Ranger District, Pisgah National Forest. As per Forest Service Handbook 2409.18, each timber sale in the project proposal expected to exceed $100,000 in advertised value requires a financial analysis to determine financial efficiency.

Assumptions

For the purpose of this analysis, the following assumptions would apply:

1. Discount Rate is 4%.
2. Inflation rate is 0% throughout the analysis period (60 years plus).
3. Estimated timber revenues for pine and poletimber were calculated using base prices from the Pisgah and Nantahala National Forests 2nd Quarter Adjustment Sheet for Fiscal Year 2006 and base prices for hardwood species from the Base Price Calculation Worksheet dated 05/12/2006 prepared by Forest Timber Staff at the Supervisor's Office National Forests in North Carolina, Asheville, North Carolina.
4. Sale preparation costs and timber harvest administration costs were obtained from Fiscal Year 2006 budget figures for the National Forests in North Carolina. Sale preparation costs (layout, cruising and marking) are funded at $8.95/CCF and $2,900.00 per sale package prepared. Timber harvest administration costs are funded at $5,600 per year of Sale (generally sales run 1-3 years depending on size and complexity).
5. Reforestation treatment costs are taken from current KV Plans that are similar in size and type of reforestation activities. Current overhead cost of 70.56% is included in this figure.
6. Road construction is estimated at and average of $45,000/mile and road reconstruction costs at an average of $25,000/mile. These are based on current road repair costs.
7. A 60-year long-term projection was used for comparison basis only. Many of these stands would be carried for a longer rotation period.

Limitations of Analysis

Any financial analysis must draw limitations on the amount of data to be included or the entire process would quickly become a mix of different alternatives and expected yields or losses. For instance, inflation rate is assumed to be 0% over the entire analysis period; a situation rarely encountered in the real world. The differences between the economic values of the alternatives remain the same, regardless of the inflation rate, so constant dollars were used for comparisons between alternatives. The following tables are an estimate of total project costs directly associated with a timber sale (sale preparation, essential reforestation and logging costs) and are used to determine timber sale financial efficiency.

Financial Analysis Worksheets

Table E-1: Sale Revenue Estimates for all Alternatives

Alternative	Timber Volume (CCF)	Revenue
A	0	$0
B	4,051	$307,263
C	3,530	$277,072

Table E-2: Sale Cost Estimates – Alternative B

Activity	Units	Number	Cost/Unit	Total Costs
Sale Preparation	CCF	4,051	$9.67	$39,173
Harvest Administration	Year	3	$5,600	$16,800
Site Preparation Natural– Herbicide & Handtools	Acres	242	$225	$54,450
Road Engineering and Design Construction	Miles	0	$45,000	$0
Road Engineering and Design Reconstruction	Miles	7	$25,000	$180,000
Temporary Road Construction	Miles	2	$3,000	$4,500
Total				**$294,923**

Table E-3: Benefit Cost Ratio – Alternative B

Year	Discount Factor	Revenue	Cost	Present Net Value	Benefit Cost Ratio
0	0	$307,263	$294,923	$12,340	1.04
60	4%	$12,291	$11,797	$494	1.04

Table E-4: Sale Cost Estimates – Alternative C

Activity	Units	Number	Cost/Unit	Total Costs
Sale Preparation	CCF	3,530	$9.77	$34,488
Harvest Administration	Year	3	$5,600	$16,800
Site Preparation Natural – Herbicide & Handtools	Acres	182	$225	$40,950
Road Engineering and Design Construction	Miles	0	$45,000	$0
Road Engineering and Design Reconstruction	Miles	7.2	$25,000	$180,000
Temporary Road Construction	Miles	1.5	$3,000	$4,500
Total				**$276,738**

Table E-5: Benefit Cost Ratio – Alternative C

Year	Discount Factor	Revenue	Cost	Present Net Value	Benefit Cost Ratio
0	0	$277,072	$276,738	$334	1.00
60	4%	$11,083	$11,070	$13	1.00

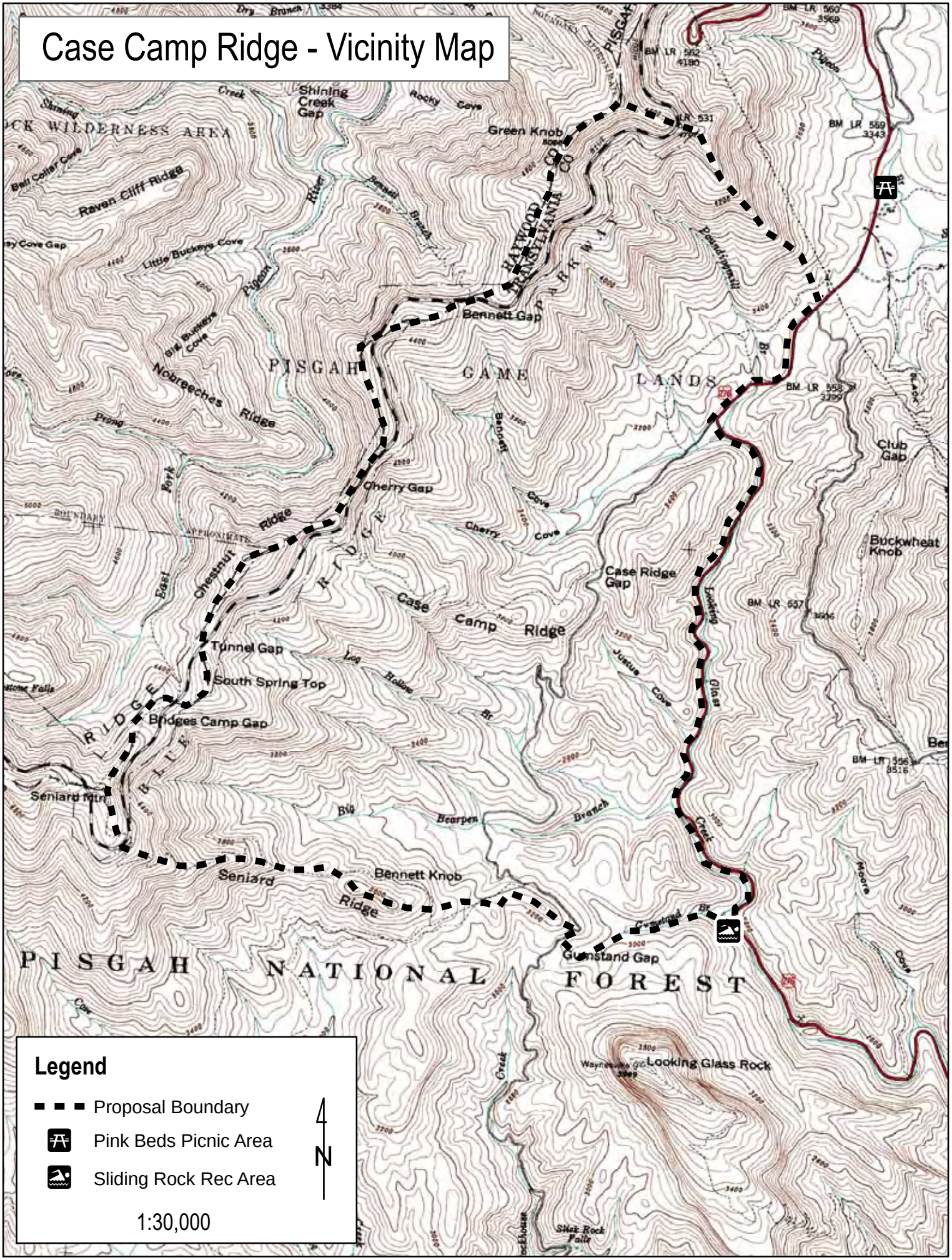
APPENDIX F – PROJECT DESIGN FEATURES FOR HERBICIDE USE

APPENDIX F – PROJECT DESIGN FEATURES FOR HERBICIDE USE

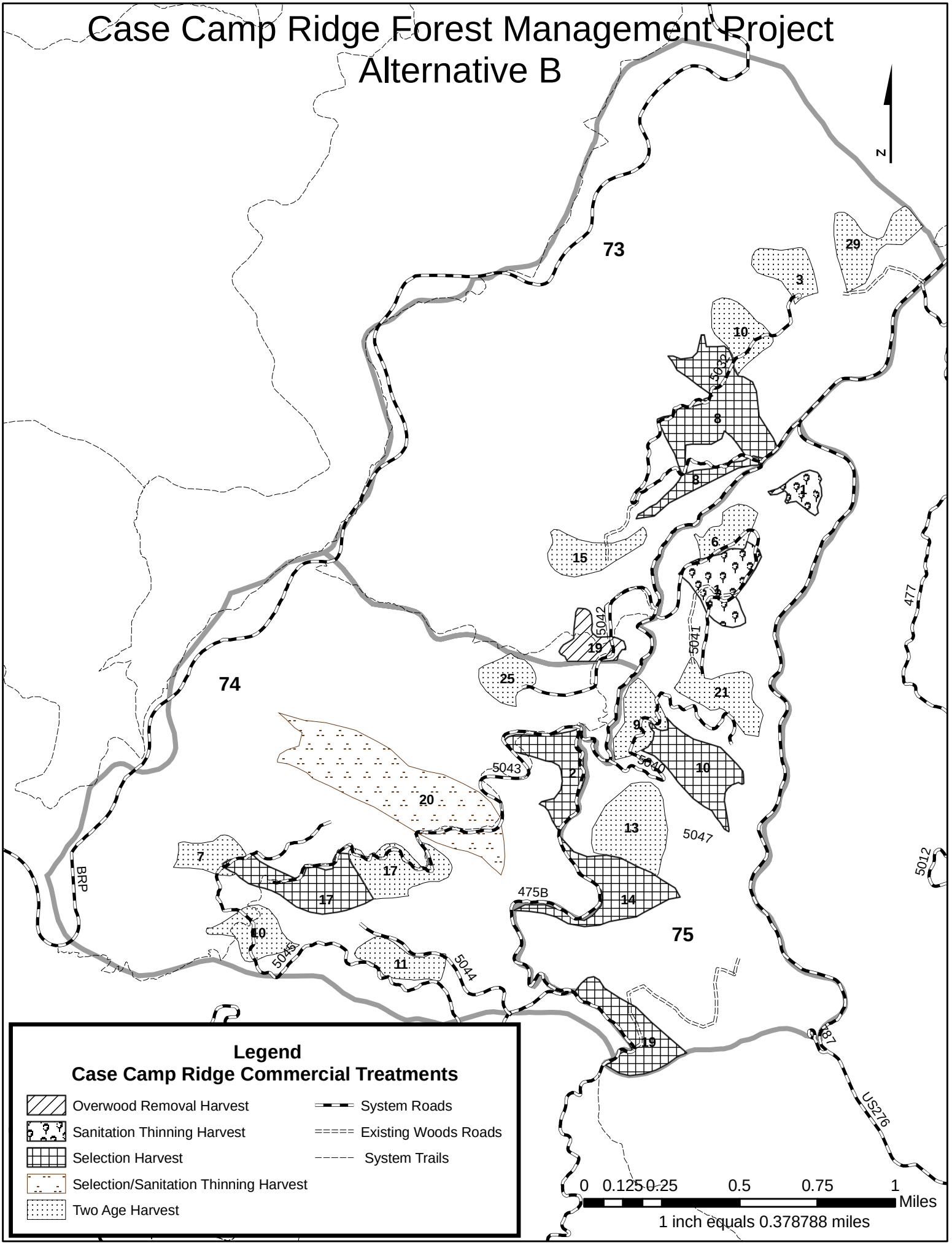
Herbicide Application Project Design Features

1. Herbicides are applied according to labeling information and the site-specific analysis done for projects. This labeling and analysis are used to choose the herbicide, rate, and application method for the site. They are also used to select measures to protect human and wildlife health, non-target vegetation, water, soil, and threatened, endangered, proposed, and sensitive species. Site conditions may require stricter constraints than those on the label, but labeling standards are never relaxed.
2. Only herbicide formulations (active and inert ingredients) and additives registered by EPA and approved by the Forest Service for use on National Forest System lands are applied.
3. Public safety during such uses as viewing, hiking, berry picking, and fuelwood gathering is a priority concern. Method and timing of application are chosen to achieve project objectives while minimizing effects on non-target vegetation and other environmental elements. Selective treatment is preferred over broadcast treatment.
4. Areas are not prescribed burned for at least 30 days after herbicide treatment.
5. A certified pesticide applicator supervises each Forest Service application crew and trains crew members in personal safety, proper handling and application of herbicides, and proper disposal of empty containers.
6. Each Contracting Officer's Representative (COR), who must ensure compliance on contracted herbicide projects, is a certified pesticide applicator. Contract inspectors are trained in herbicide use, handling, and application.
7. Contractors ensure that their workers use proper protective clothing and safety equipment required by labeling for the herbicide and application method.
8. Notice signs (FSH 7109.11) are clearly posted, with special care taken in areas of anticipated visitor use.
9. No herbicide is ground-applied within 60 feet of any known threatened, endangered, proposed, or sensitive plant. Buffers are clearly marked before treatment so applicators can easily see and avoid them
10. Application equipment, empty herbicide containers, clothes worn during treatment, and skin are not cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separate labeled containers.
11. No herbicide is ground-applied within 30 horizontal feet of lakes, wetlands, or perennial or intermittent springs and streams. No herbicide is applied within 100 horizontal feet of any public or domestic water source. Selective treatments (which require added site-specific analysis and use of aquatic-labeled herbicides) may occur within these buffers only to prevent significant environmental damage such as noxious weed infestations. Buffers are clearly marked before treatment so applicators can easily see and avoid them.
12. During transport, herbicides, additives, and application equipment are secured to prevent tipping or excess jarring and are carried in a part of the vehicle totally isolated from people, food, clothing, and livestock feed.
13. Only the amount of herbicide needed for the day's use is brought to the site. At day's end, all leftover herbicide is returned to storage.
14. Herbicide mixing, loading, or cleaning areas in the field are not located within 200 feet of private land, open water or wells, or other sensitive areas
15. During use equipment to store, transport, mix, or apply herbicides is inspected daily for leaks.

CASE CAMP RIDGE PROJECT MAPS


Case Camp Ridge - Vicinity Map
Shining Creek Gap
Green Knob
Bennett Gap
Cherry Gap
Case Ridge Gap
Tunnel Gap
South Spring Top
Bridges Camp Gap
Bennett Knob
Gunstand Gap
Looking Glass Rock
Buckwheat Knob
Club Gap
Raven Cliff Ridge
Nobrecches Ridge
Chestnut Ridge
Case Camp Ridge
Seniard Ridge
Looking Glass Creek
PISGAH GAME LANDS
PISGAH NATIONAL FOREST
Legend
Proposal Boundary
Pink Beds Picnic Area
Sliding Rock Rec Area
N
1:30,000

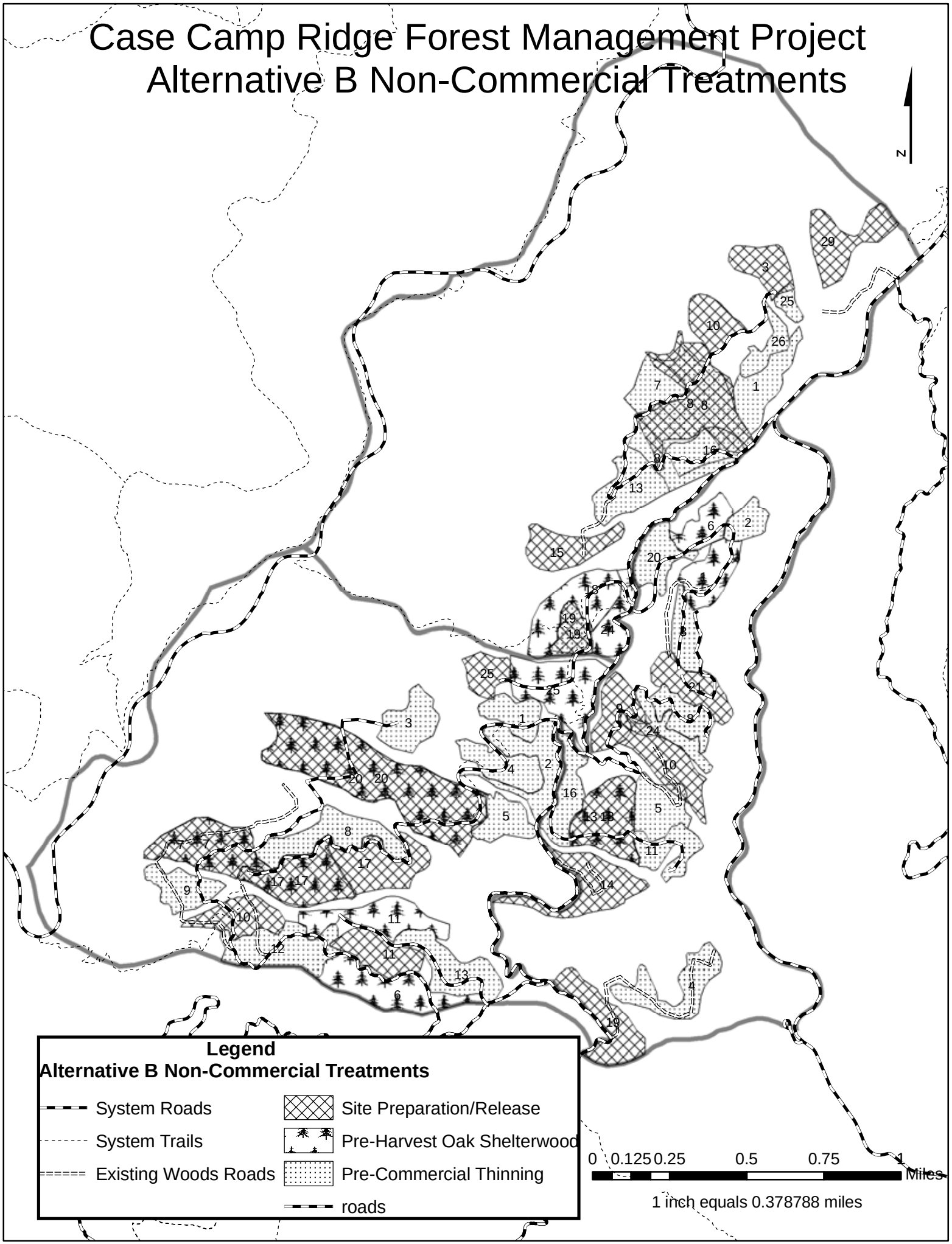
Case Camp Ridge Forest Management Project
Alternative B



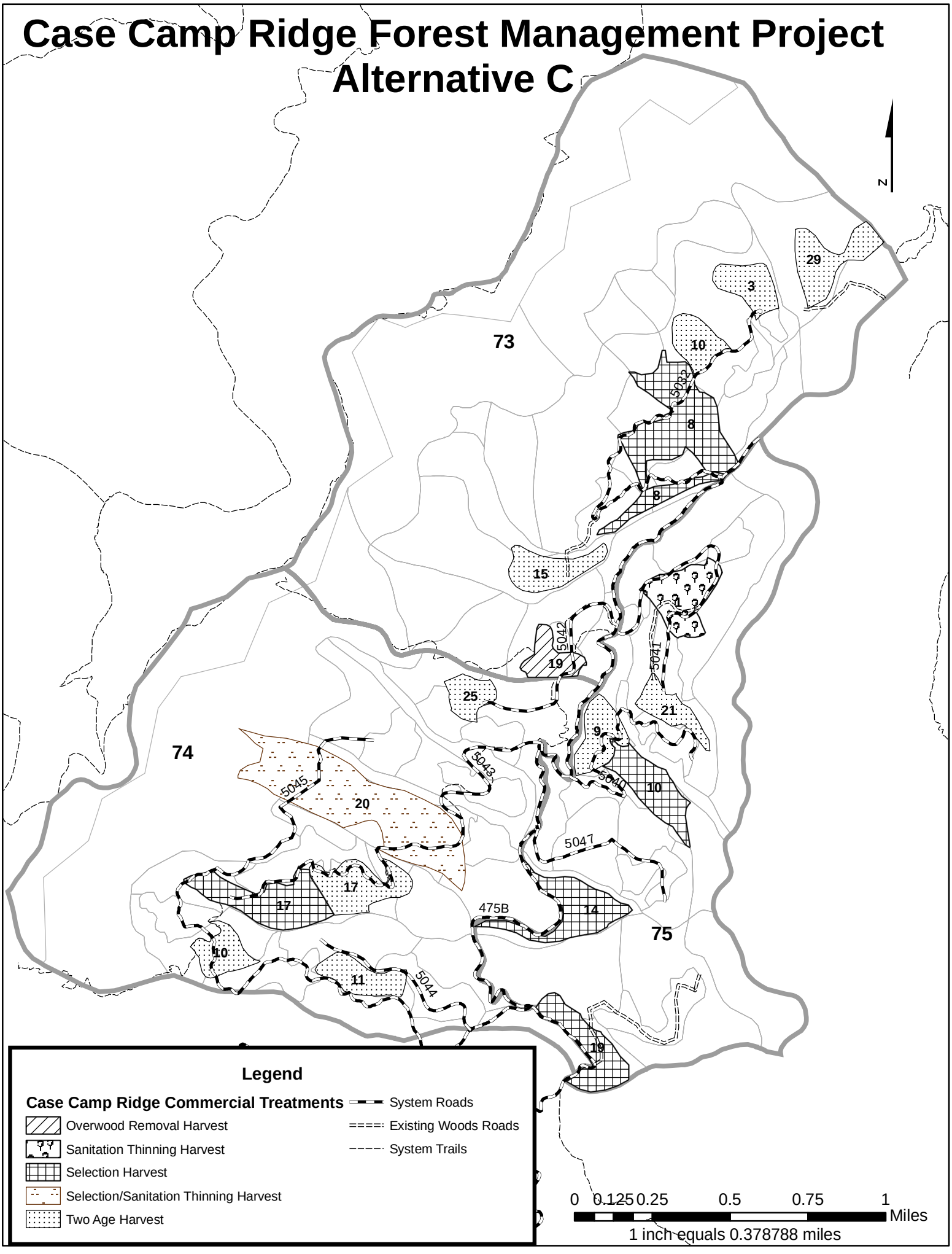
Legend
Case Camp Ridge Commercial Treatments

- Overwood Removal Harvest
- Sanitation Thinning Harvest
- Selection Harvest
- Selection/Sanitation Thinning Harvest
- Two Age Harvest
- System Roads
- Existing Woods Roads
- System Trails

Case Camp Ridge Forest Management Project
Alternative B Non-Commercial Treatments



Case Camp Ridge Forest Management Project
Alternative C



Case Camp Ridge Forest Management Project
Alternative C NonCommercial Treatments