



File: 1950

April 26, 2001

Dear Forest Shareholder:

Enclosed is the environmental assessment (EA) for the proposal to improve Forest Highway 50 (FH 50), more commonly known as the Davidson River Road (FS 475) and Indian Creek Road (SR 1321). At this time no decision has been made as to which alternative to implement. I am sending this EA to you for your review.

Many years ago these two roads were designated as FH 50 by the Federal Highway Administration, the North Carolina Department of Transportation (NCDOT), and the Forest Service. The Forest Highway program allows for the use of federal funds to upgrade main arterial roads on the National Forest to state standards with the understanding that NCDOT would assume maintenance responsibility for these roads if they are not already state roads.

In 1998, I asked for comments on the proposal to bring FH 50 up to NCDOT standards by widening it and paving it all of the way from US 276 to NC 215. We received many comments which we used to develop alternatives for this environmental study. About half of the commenters wanted all of FH 50 paved. The others preferred no improvements or something less than total paving. Those who preferred paving the full length raised the issues of safety and of sediment from the existing gravel road reaching the Davidson River. The primary issue from those who preferred no improvements or something less than full paving was to preserve the experience of traveling a narrow gravel road in a forested setting. They also raised the issues of safety and increased traffic levels.

This EA evaluates three alternatives. Even though no decision has been made, our preferred alternative is one that strives for a middle ground. In this alternative the existing paved section from US 276 to the fish hatchery would be repaved. The section from the hatchery to the entrance to Cove Creek Group Campgrounds would be paved. This was reconstructed a few years ago with a design to be paved. It has some of the steepest sections on the road and consequently is a source of sedimentation just above the hatchery intake. Its width is already to NCDOT standards so that no earthwork would be required before paving. The bridge at Cove Creek would be replaced. It started to fail structurally a few years ago and had to be repaired. The old bridge is at risk for that same failure again.

The key part of this alternative is that the rest of the Davidson River Road from Cove Creek across Gloucester Gap to the Shoal Creek Road would not be widened or paved. Other than some maintenance work for additional sedimentation control, it would remain like it is.

The Indian Creek section of FH 50 is a state road that crosses both National Forest and private land. NCDOT's objective is to eventually pave all gravel secondary roads. If this alternative is selected, federal funds could be used to upgrade and pave this road. Since the Forest Service has



no jurisdiction on private land, it would be up to NCDOT to secure the appropriate rights-of-way to do any widening through the private property sections.

Hopefully you will agree with me that this alternative does seek to reach a middle ground and does take into consideration the issues and concerns raised during the scoping process. Before we move to the decision stage, I want you to have an opportunity to review this document. If you have comments, please send them to me by May 29, 2001. At that time comments will be addressed, any necessary changes to the EA made, and an alternative selected. If you have questions, please contact me or Charley Bolen at 828-877-3350. Thanks!

Sincerely,

ART ROWE ☺
District Ranger

DRAFT

ENVIRONMENTAL ASSESSMENT

FOR

FOREST HIGHWAY 50 IMPROVEMENTS

PISGAH NATIONAL FOREST

TRANSYLVANIA COUNTY

NORTH CAROLINA

Responsible Official:

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CHAPTER 1: PURPOSE AND NEED

BACKGROUND

The Forest Highway program is a mechanism that provides for the use of federal funds to construct or reconstruct roads that serve National Forests and provide important arterial access for the state transportation system. It is a cooperative endeavor among the Forest Service, Federal Highway Administration (FHWA), and state departments of transportation. Several years ago the Forest Service, FHWA, and North Carolina Department of Transportation (NCDOT) determined that the Davidson River Road (FS 475) and Indian Creek Road (SR 1321) on the Pisgah Ranger District in Transylvania County qualify for Forest Highway designation. The Davidson River Road (FS 475) and Indian Creek Road (SR 1321) together are known as Forest Highway 50 (FH 50). One stipulation of the Forest Highway program is that NCDOT would assume maintenance responsibility for the roads after they have been constructed or reconstructed to state standards. At this time, the Forest Service has maintenance responsibility for FS 475 while SR 1321 is a state maintained road. There is a proposal and funds are available to make the improvements to FH 50 to bring it state standards.

FH 50 is a scenic, meandering forest road over much of its length. The road will be discussed in four segments for analysis purposes (See map included as Appendix B). Segments A and B closely follow the Davidson River and offer views of the rocks and clear water which characterize the river. Segment A is paved and passes two impressive granite domes, Looking Glass Rock and John's Rock. The Pisgah Forest Fish Hatchery and the Pisgah Center for Wildlife Education are co-located near the base of John's Rock and provide most of the available visitor parking to access their programs and nearby outdoor recreation opportunities. Segment B is unpaved and within a half mile leaves the river for approximately a mile, rejoining the river at the bridge crossing Cove Creek. Segment C is unpaved and runs from Cove Creek to the intersection with Shoal Creek Road (SR 1327). The portion of Segment C from Cove Creek to Lanning Ridge is adjacent to the river and receives heavy use by a variety of forest visitors. Segment C continues from Lanning Ridge and then climbs away from the river to Gloucester Gap and continues into the adjacent drainage to Shoal Creek Road. Segment D is SR 1321 and is unpaved. It goes from the Shoal Creek Road to the intersection with NC 215 and crosses some private property as well as National Forest System lands. Recreation use declines and the character of this western end of the road (part of Segment C and all of Segment D) is very different.

The entire road is 7.9 miles in length and traverses several Management Areas (MAs) described in the Nantahala and Pisgah National Forests Land and Resource Management Plan issued in 1986 and as amended (hereafter the Plan or Forest Plan). The majority of the road is in MAs 2A and 2C (approximately 5 miles) which emphasizes pleasant scenery for people who experience the forest by driving. Roads are generally open with the adjacent forest land managed to provide a pleasing visual experience. Road sections within 100 feet of perennial streams also are in MA 18, the riparian management area, which is embedded within the other MA's. Other MAs traversed by FH 50 include MA 3B, MA 4D, and MA 13. Management Area 3B emphasizes forest management but with few open roads and limited disturbance associated with motorized vehicles. Some opportunities for motorized use on forest roads and four-wheel-drive ways will be provided. In MA 4D, most roads are closed to motor vehicles and a somewhat remote setting is provided. Management Area 13 includes lands that are special interest areas managed to

protect, and where appropriate, foster public use and enjoyment of unique scenic, geological, botanical or zoological attributes. Looking Glass Rock is a geologic feature protected in this management area.

Specifically, Segment A, from US 276 to the fish hatchery, is located in MA 2C (to the south) and MA 13 (to the north). Segment B, from the hatchery to Cove Creek, is in MA 2A. Segment C from Cove Creek Campground to the intersection with Shoal Creek Road is in MAs 2A, 3B and 4D. Segment D, from Shoal Creek road intersection with NC 215 into private land, is in MA 3B with a small portion of MA 2C at the end near NC 215.

PAST ACTIONS AND INFLUENCES

On August 16 and 17, 1994, more than eleven inches of rain from Tropical Storm Beryl fell over parts of the Pisgah Ranger District, causing excessive runoff and many streams to overflow their banks. This storm event caused damaging mud and debris flows along several sections of the Davidson River Road. The damage was severe enough to warrant closing the road just west of the intersection with FS 475B to the Cove Creek Group Camp. Most of the material that sloughed off the road ended up in the Davidson River below.

In 1995, the decision was made to relocate a portion of the road away from severely damaged and unstable areas. The existing roadbed was rehabilitated and a bike trail, the Davidson River Trail, was created. The new road, completed in 1997, was located upslope and away from the river.

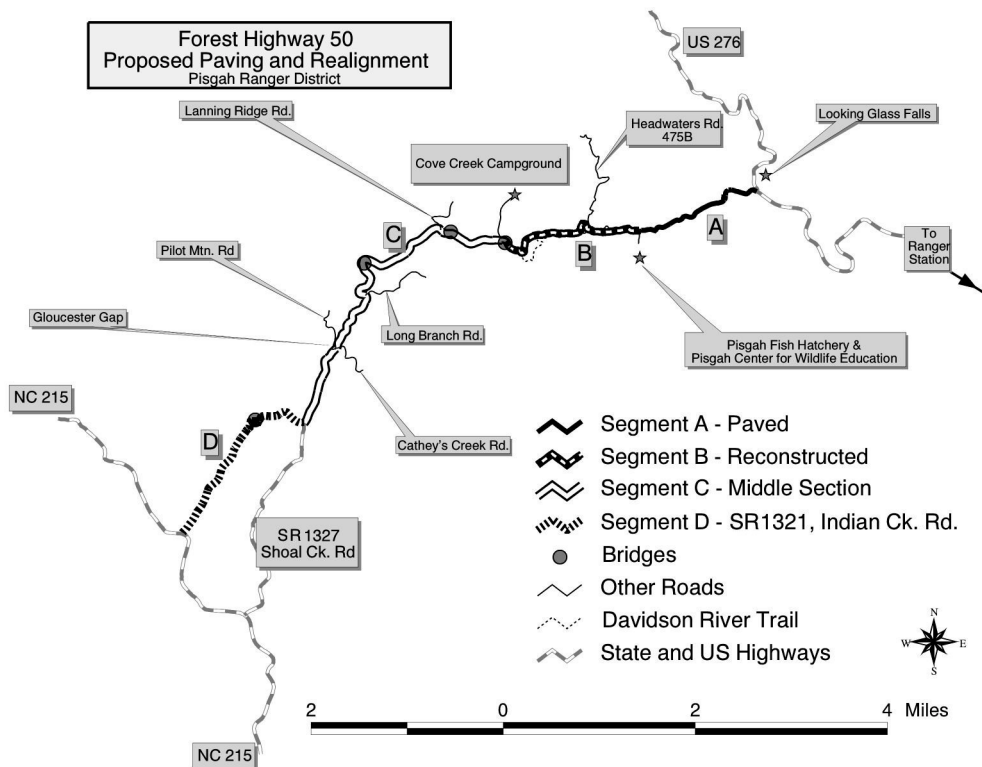


Figure 1

PROPOSED ACTION

The Pisgah Ranger District proposes to repave, straighten and widen, pave, and replace a bridge and a culvert on segments of Forest Highway 50. The FHWA would fund this project and a Public Road Easement would be issued to the NCDOT. This easement would allow the NCDOT to operate and maintain the road on the public transportation system. Individual segments and the proposed activities are as follows:

Segment A - US 276 to the Fish Hatchery (1.4 miles *)

Resurface existing paved road and turnouts;

Segment B - Fish Hatchery to entrance to Cove Creek Campground (1.3 miles*)

Pave, replace the bridge at intersection with the campground road;

Segment C - Cove Creek Campground to the intersection with Shoal Creek Road (3.8 miles*)

Correct problems with sedimentation entering the Davidson River;

Segment D - Shoal Creek road to intersection with NC 215 (1.4 miles*)

Widen, straighten, and pave those portions located on National Forest System land and those portions on private land where NCDOT can obtain easements. Replace an existing box culvert.

Details of the proposal are described more fully under Alternative 2 (Proposed Action).

(*miles are each segment length; total road length = 7.9 miles)

PURPOSE AND NEED

FH 50, approximately 7.9 miles long, is a Forest Road that begins where US 276 turns north, 1.4 miles east of the fish hatchery and crosses through the Forest to and along SR 1321, Indian Creek Road, to North Carolina 215 in the vicinity of the Balsam Grove Community.

The proposed changes to FH 50 are needed to:

- Reduce sedimentation into the Davidson River, Shoal Creek, and Indian Creek and improve water quality;
- Improve habitat for aquatic species in the Davidson River, Shoal Creek, and Indian Creek;
- Reduce risks to the driving and recreating public;
- Improve access for developed and dispersed recreation;
- Reduce maintenance costs and raise the traffic service level of the road.

Until Segment B was reconstructed in 1997, the Davidson River Road followed the river from the Fish Hatchery to Lanning Ridge Road. The road had been a source of sediment to the river in a number of places along this route. In extreme events, such as the storm that ultimately led to the reconstruction of Segment B, large amounts of soil reach the river. Although Segment B

was relocated above the river to higher ground, portions of the road further west follow the river and remain a source of sediment. Segment C from Cove Creek to Lanning Ridge is a contributor to sediment to Cove Creek and the Davidson River. Segment C from Gloucester Gap to Shoal Creek Road is a constant source of sediment into Shoal Creek. Segment D, also gravel, is a significant source of sediment to Shoal and Indian Creeks.

FH 50 currently is paved from the intersection of US 276 to the fish hatchery and the Pisgah Center for Wildlife Education (Segment A). Segment B, relocated and reconstructed in 1997, has an 18 foot travel surface but is unpaved and experiences wash boarding on the steeper parts. Segment C, which follows the original road to Shoal Creek Road, is unpaved and, in general, narrow and winding. Forest visitors, Forest Service staff and local area residents encounter blind curves, narrow bridges and rough road conditions. The remainder of the road, Segment D, currently is an unpaved State road. Table 1 summarizes the segments and existing condition of FH 50.

Table 1. Individual Segments of FH50

<u>SEGMENT</u>	<u>LENGTH</u>	<u>EXISTING CONDITION</u>
A US 276 to Hatchery	1.4 miles	paved
B Hatchery to Cove Creek	1.3 miles	unpaved, wash boarded
C Cove Creek to Shoal Creek Road	3.8 miles	unpaved, narrow, some sections wash boarded
D Shoal Creek Road to NC 215	1.4 miles	unpaved

A desired future condition of the general forest area is to emphasize the protection of all developed stream channels. The proposed improvements to FH 50 would decrease the amount of sediment entering the Davidson River, Shoal Creek, and Indian Creek and result in increased water quality and improved aquatic habitat. The construction and maintenance of sediment catch basins along Segment C would decrease the amount of sediment reaching the Davidson River and Shoal Creek.

The Davidson River Road is used to access popular recreation and camping areas and experiences large traffic volume, especially during the high use months of May through October. Anglers frequent the river above the fish hatchery. The Cove Creek Group Campground receives heavy use and is most often accessed from the east. This camping area must be reserved and is usually booked throughout the season. Because this area accommodates large groups, buses may be encountered on their way to and from the camping area. Improving this road would decrease the risk of vehicular accidents and would make access to the Cove Creek Group Campground and other points of interest along the river safer and easier.

The Forest Plan gives direction to respond to special use requests giving the highest priority to those that relate to public safety, health and welfare. The proposed improvements to FH 50 would improve safety by eliminating wash boarding on unpaved sections of the road and rough road conditions along paved and unpaved segments of the road. In addition, widening segments of the road would further improve safety. Replacing the bridge at Cove Creek would improve safety by straightening the approach and alignment and widening the bridge.

The proposed actions would reduce the maintenance needs of the road; thus, reducing the maintenance costs. The costs for the maintenance of an improved FH 50 would become the responsibility of the NCDOT.

DECISION TO BE MADE

This documented analysis will provide the Forest Supervisor with the information to make an informed decision regarding the proposed paving, widening, and bridge replacement on segments of FH 50. Possible decisions could include:

1. Defer all activities to another time.
2. Approve specific management activities or combinations of activities and associated mitigation measures included in this analysis.
3. Require additional information from the interdisciplinary team responsible for this document if information presented is not sufficient to make an informed decision.
4. Require the development of an Environmental Impact Statement.

SCOPING

A letter was mailed on January 26, 1998 asking for comments about widening and paving the entire length of FH 50. In addition, a letter describing the resurfacing of Segment A was sent out February 17, 1999. The proposal to improve FH 50 also has appeared in the Schedule of Proposed Actions for the National Forests in North Carolina. The following groups of issues were identified from public comment and from management concerns.

MAJOR ISSUES RELATED TO THE PROPOSED ACTION

Issue A - Water Quality

There is a desire to maintain or improve water quality in all streams adjacent to the proposed project but especially to the Davidson River. Currently, sedimentation from the gravel road enters the streams. Paving could increase short-term sedimentation (during the construction process) but reduce long-term sedimentation. Comments received generally were in favor of paving to reduce sediment input to the river but cautioned that mitigation measures to prevent soil movement were vital during construction and until vegetation is re-established on any disturbed soils. There were concerns that runoff from a paved surface may mean more pollutants from vehicles would enter the river, the water might be warmer, and the volume of water may be greater.

This issue will be discussed in terms of estimates of the amount of road runoff flowing directly into a stream channel. These estimates will be based on visual observations by a hydrologist and will be used as a surrogate to sediment loading. (See Ch. 3, Environmental Effects, p. 14-17)

Issue B - Impacts to Biodiversity, Wildlife, and Aquatic Species

Several commenters stated that a wider, paved road would mean more traffic and higher speeds which would increase wildlife road kill, increase the possibility for poaching, and create fragmentation detrimental to wildlife including black bear, Threatened and Endangered (T&E) species, and rare ecosystems. (See Ch. 3, Environmental Effects, p. 18-32)

Issue C - Changes to the Recreation Experience/Amount of Use

A variety of users, including hikers, mountain bikers, and anglers expressed concern that the quality of their experience along the Davidson River Road would change drastically if the road were widened and paved. Having a paved road would change their experience from one of being "in the wild" to being on a highway. In addition, there is concern that improving the road will increase use, further tax an already crowded area, and increase garbage and roadside litter. There is also concern that paving some of the road now would set a precedent in the future for paving the rest of the road. There is a concern that there is a cumulative loss of portions of the forest that are relatively inaccessible. Mountain bikers suggested that if the paving did occur, an adjacent bike path would increase safety for bikers and other non-motorized users.

This issue will be addressed through a subjective evaluation of current and future use patterns, available experiences, and levels of use. (See Ch. 3, Environmental Effects, p. 34-37)

Issue D - Access

There is a concern among residents of Balsam Grove that the community needs a quicker and safer access route for residents, local commuters and emergency vehicles. (See Ch. 3, Environmental Effects, p. 34-37)

Issue E - Public Safety and Traffic Volume

There is concern regarding increased traffic and speed as a result of widening and paving the road. Comments ranged from "traffic volume is increasing anyway, so why not manage the problem now", to "widening and paving will create a highway with unsafe conditions for all non-motorized users". (See Ch. 3, Environmental Effects, p. 34-37)

OTHER ISSUES

Some comments brought up during the public involvement process are addressed below but will not be discussed further in this document. Such comments and the reasons for not discussing them further are described.

Mistrust of NCDOT and concern about long-term maintenance by NCDOT.

Several commenters expressed concern about the NCDOT's role in construction and maintenance of FH 50. The FHWA may contract all or parts of the proposed projects with the NCDOT or may have the National Forests in North Carolina contract with appropriate construction companies to complete the work. In either case, the Forest Service will administer a contract that will provide for protection of resources, including all of the mitigation measures decided in this environmental analysis. Easements granted for the operation and maintenance of this road on the public system are limited to the confines of the existing roadbed. This limitation requires the NCDOT to have all future improvements or changes in operation and maintenance approved by the Forest Service prior to implementation. For example, the NCDOT will not be allowed to use herbicides for vegetation control. If at a later date there is a need for herbicide use, that need and its environmental consequences would be evaluated and its use approved or denied.

More traffic will increase the likelihood of introducing exotic pests such as gypsy moth.

Exotic pests, such as the gypsy moth, may be introduced to the area, but there would be no increased risk of infestation above current risk levels. Typically, introduction is through vehicles (campers, RV's) coming from an infested area carrying egg masses and staying for an extended period (days or weeks) of time in the new area. There is no proposal to increase camping sites along this road corridor; therefore, implementation of this proposal would not raise the risk of gypsy moth introduction.

Use the money to maintain roads rather than improve them or use alternate sources of labor, such as volunteers, to maintain the roads.

Funding available from the FHWA for FH 50 is for upgrading only and not for maintenance. Therefore, the Forest Service's using the money for maintenance is not an option. Alternate sources of labor such as volunteers are used widely on the Pisgah District. Generally the Forest Service furnishes materials and equipment and the volunteers furnish the labor. However, road maintenance requires heavy equipment and skills above the level of a volunteer workforce.

Close the road, all or in part, to vehicular traffic to maintain the wilderness experience of the area.

The Forest Plan has designated a large portion of the Davidson River Road as Management Area 2A, with an emphasis on providing pleasant scenery for people who experience the forest by driving through it. Closing the Davidson River Road is not consistent with Forest Plan standards and guidelines. Motorized access to the array of recreation resources along the river would be eliminated, essentially limiting access to only those Forest users most physically fit. Currently, over one quarter of the Pisgah District's 156,000 acres is designated wilderness, semi-primitive non-motorized, bald, or other special area without roads (Looking Glass, etc.) with numerous opportunities for remoteness and solitude.

Conduct an EIS to address effects.

Based on the information disclosed in the Environmental Assessment (EA), the Decision Maker will determine whether or not it would be appropriate to issue a Finding of No Significant Impact (FONSI). If a FONSI cannot be issued, at that time the next appropriate step would be to prepare an Environmental Impact Statement (EIS).

CHAPTER 2: ALTERNATIVES

This Chapter describes the alternatives developed by the interdisciplinary team in response to the issues and concerns regarding the proposed action. Mitigation measures for activities in each alternative also are described in this chapter. Alternatives were developed in response to specific concerns from the public and Forest managers. The range of alternatives comes as close as possible to meeting concerns for individual segments of the project while remaining within the scope of the overall project.

ALTERNATIVES CONSIDERED

ALTERNATIVE 1 - NO ACTION

The projects listed in the proposed action would not be accomplished. Routine maintenance would continue on the existing road.

ALTERNATIVE 2 - PROPOSED ACTION

This alternative was developed to improve portions of FH 50 while maintaining the overall character of the existing road and somewhat more primitive experience. This analysis took into account the types and intensity of recreation use and the existing public safety concerns and resource degradation as well as the need for ongoing road maintenance. The following activities are proposed for Alternative 2:

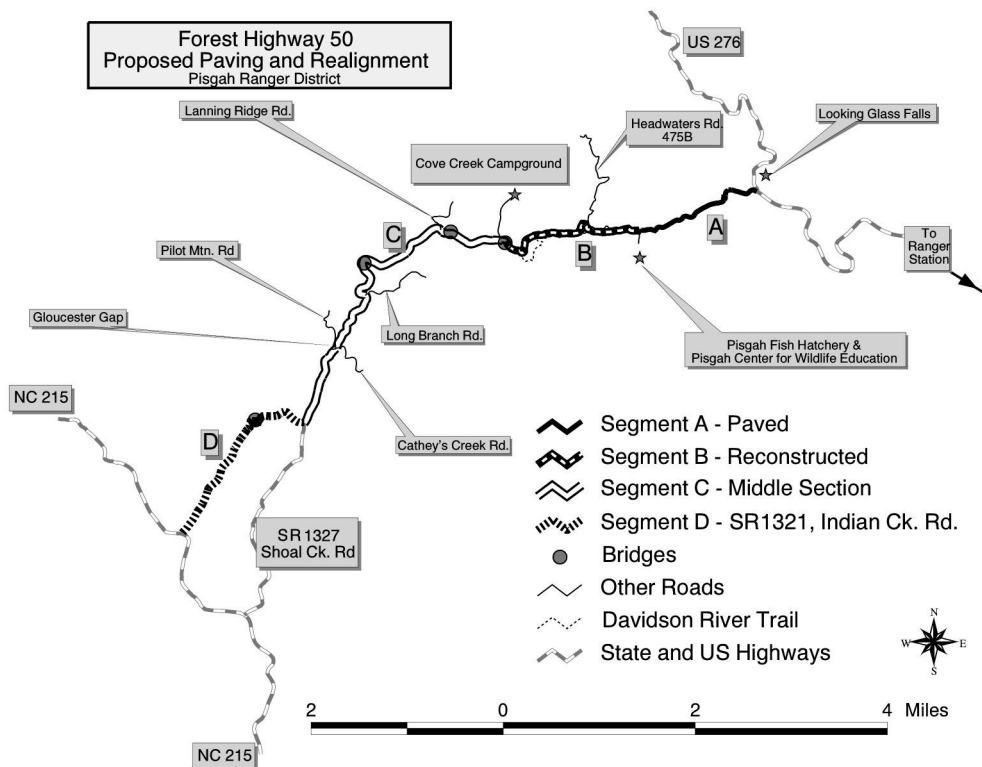


Figure 2

Table 2. Summary of activities for Alternatives 2 and 3.

- Segment A:
 - * Repave the existing 20 foot wide surface, including the pullouts.

- Segment B:
 - * Create 3 pullout parking spaces opposite the hatchery intake to provide parking closer to the Davidson River Trailhead. These parking spaces would be paved and would help reduce crowded parking at the Pisgah Center for Wildlife Education parking lot.

 - * Pave this segment reconstructed in 1996. Pavement width would be 18 feet. No widening or curve realignment is necessary. Paving this section would eliminate the wash boarding occurring on the steeper portions of the road, increase vehicle safety and reduce sediment loading. Paint foglines on the road edges for driving safety.

 - * Replace the bridge at Cove Creek. The approach and alignment would be straightened and the new bridge would be wider and higher above the surface of the river.

 - * Design and pave a parking lot across from the entrance to the Cove Creek Group Campground. The parking lot would be in the existing pull-off area but would be paved to minimize sediment reaching the stream. It would be aligned to allow the maximum number of vehicles to park. This area would also offer the visitors using the Cove Creek Group Camp Area a safe place to pull off the road while they unlock the gate.

- Segment C:
 - * Construct and maintain sediment catch basins where needed to trap road sediment before it reaches the Davidson River and nearby streams.

- Segment D:
 - * Widen and pave this segment. Segment D is a State road and would be widened to a 20-foot travel way with six-foot shoulders. Paint foglines on the road edges for driving safety.

 - * Replace the existing box culvert with another box culvert or an arched culvert. The new culvert would have head walls to retain road fill, improve culvert flow characteristics during storm events and limit sediment reaching the stream.

Mitigation Measures

Mitigation measures are management actions required to maintain compliance with environmental laws and regulations. The following mitigation measures would be implemented on National Forest System lands under Alternative 2:

1. Implement sedimentation and erosion control measures prior to any ground-disturbing activities. Place silt fence or other acceptable barrier along the length of the project where soil disturbance is within 300 feet of live water. Inspect and maintain structures regularly, especially after rainfall events, to minimize downstream impacts. Maintain all temporary silt fences and sediment traps whenever they have less than half their original capacity.
2. Do not obtain rock, sand, or other material from the stream channel for use as fill or stabilizing material.
3. Do not allow wet concrete (e.g. at culvert headwalls and bridge abutments) to contact any live water. Uncured concrete affects water quality and is toxic to most aquatic organisms.
4. Prohibit construction within 25 feet of flowing water, including stream crossings, during the trout spawning seasons of September 15 through November 1 and January 1 through April 15 to protect reproducing fish and hellbender populations.
5. Leave trees within the ROW whenever they are immediately adjacent to or rooted in the streambank, to promote mechanical stability against erosive high flows, as well as provide shade to the stream.
6. Direct storm water and road surface runoff to buffer areas or retention basins. Do not route road runoff directly into the Davidson River, Shoal Creek, or Indian Creek.
7. Provide sufficient ditch relief culverts to minimize the volume of ditch flow that reaches a stream channel. The locations will be designated after reviewing the more final design plans. No relief culverts will be outletted directly into any streams.
8. Fertilize and seed cut and fill slopes within 15 days of final shaping. Where possible use native seed mixtures for roadside planting. Possible choices include *Sorghastrum nutans* (Indian grass), *Tridens flavus* (purple top), *Schizachyrium scoparium* (broom sedge), and *Andropogon virginicus* (broomstraw).
9. Include a forest landscape architect in the design review of the road.
10. Minimize clearing limits and leave shrubs and trees along the clearing edge to provide overstory shade.
11. Remove visible slash from road construction up to 150 feet on either side of the road unless it is used for brush barriers to trap sediment.
12. Retain power lines within the road clearing limit; do not clear additional overstory for power line relocation.
13. Slope cut banks to allow for revegetation. The disturbed area may be increased, but it allows for faster and more complete revegetation.

14. For safety considerations to bikers, install “Share the Road” signs along Segments A & B.
15. During soil disturbing operations, have a person on site who has the knowledge and authority to ensure that erosion and sediment control activities are monitored and enforced. This person would have the authority to suspend operation until required erosion and sediment control activities are current.

ALTERNATIVE 3 – PAVE ENTIRE LENGTH

Alternative 3 includes paving the entire length of FH 50 from US 276 through to NC 215. This alternative emphasizes ease of public access, safety, and long-term resource protection. The following activities are proposed for Alternative 3:

The proposal in alternative 3 for Segments A, B and D is the same as in Alternative 2.

- Segment A:
 - * Repave the existing 20 foot wide surface, including the pullouts.
- Segment B:
 - * Create 3 pullout parking spaces opposite the hatchery intake to provide parking closer to the Davidson River Trailhead. These parking spaces would be paved and would help reduce crowded parking at the Pisgah Center for Wildlife Education parking lot.
 - * Pave this segment reconstructed in 1996. Pavement width would be 18 feet. No widening or curve realignment is necessary. Paving this section would eliminate the wash boarding occurring on the steeper portions of the road, increase vehicle safety and reduce sediment loading. Paint foglines on the road edges for driving safety.
 - * Replace the bridge at Cove Creek. The approach and alignment would be straightened and the new bridge would be wider and higher above the surface of the river.
 - * Design and pave a parking lot across from the entrance to the Cove Creek Group Campground. The parking lot would be in the existing pull-off area but would be paved to minimize sediment reaching the stream. It would be aligned to allow the maximum number of vehicles to park. This area would also offer the visitors using the Cove Creek Group Camp Area a safe place to pull off the road while they unlock the gate.
- Segment D:
 - * Widen and pave this segment. Segment D is a State road and would be widened to a 20-foot travel way with six-foot shoulders. Paint foglines on the road edges for driving safety.
 - * Replace the existing box culvert with another box culvert or an arched culvert. The new culvert would have head walls to retain road fill, improve culvert flow characteristics during storm events and limit sediment reaching the stream.

- Segment C: Herein lies the difference between Alternative 2 and Alternative 3.

* Straighten, widen, and pave from Cove Creek Campground to Shoal Creek Road. This would require widening on both sides of the existing road. Paving this section of road would eliminate numerous chronic areas where sediment is getting into the river. It also would make the road safer by eliminating blind curves and paving a steep and rough section of road at Gloucester Gap. Although the road would be widened and dangerous curves would be straightened, many curves would be left in to lower speeds. Paint foglines on the road edges for driving safety.

* Replace the bridge near the Lanning Ridge Road.

* Realign the approach at the Laurel Fork bridge. This bridge is sound and would not be replaced.

Mitigation Measures

Mitigation would remain the same as discussed in Alternative 2 for proposed activities with the addition of items 16 & 17

1. Implement sedimentation and erosion control measures prior to any ground-disturbing activities. Place silt fence or other acceptable barrier along the length of the project where soil disturbance is within 300 feet of live water. Inspect and maintain structures regularly, especially after rainfall events, to minimize downstream impacts. Maintain all temporary silt fences and sediment traps whenever they have less than half their original capacity. .
2. Do not obtain rock, sand, or other material from the stream channel for use as fill or stabilizing material.
3. Do not allow wet concrete (e.g. at culvert headwalls and bridge abutments) to contact any live water. Uncured concrete affects water quality and is toxic to most aquatic organisms.
4. Prohibit construction within 25 feet of flowing water, including stream crossings, during the trout spawning seasons of September 15 through November 1 and January 1 through April 15 to protect reproducing fish and hellbender populations.
5. Leave trees within the ROW whenever they are immediately adjacent to or rooted in the streambank, to promote mechanical stability against erosive high flows, as well as provide shade to the stream.
6. Direct storm water and road surface runoff to buffer areas or retention basins. Do not route road runoff directly into the Davidson River, Shoal Creek, or Indian Creek.
7. Provide sufficient ditch relief culverts to minimize the volume of ditch flow that reaches a stream channel. The locations will be designated after reviewing the more final design plans. No relief culverts will be outletted directly into any streams.

8. Fertilize and seed cut and fill slopes within 15 days of final shaping. Where possible use native seed mixtures for roadside planting. Possible choices include *Sorghastrum nutans* (Indian grass), *Tridens flavus* (purple top), *Schizachyrium scoparium* (broom sedge), and *Andropogon virginicus* (broomstraw).
9. Include a forest landscape architect in the design review of the road.
10. Minimize clearing limits and leave shrubs and trees along the clearing edge to provide overstory shade.
11. Remove visible slash from road construction up to 150 feet on either side of the road unless it is used for brush barriers to trap sediment.
12. Retain power lines within the road clearing limit; do not clear additional overstory for power line relocation.
13. Slope cut banks to allow for revegetation. The disturbed area may be increased, but it allows for faster and more complete revegetation.
14. For safety considerations to bikers, install “Share the Road” signs along Segments A & B.
15. During soil disturbing operations, have a person on site who has the knowledge and authority to ensure that erosion and sediment control activities are monitored and enforced. This person would have the authority to suspend operation until required erosion and sediment control activities are current.
16. Manage blasted material that inadvertently reaches the Davidson River so that it does not adversely affect stream hydraulics.
17. In Segment C, widen the road from below (using fill) to extent possible, to minimize amount of new cut banks.

SEGMENT	ACTIVITIES	ALTERNATIVE
A US 276 to Hatchery	Repave, including pullouts	2 & 3
B Hatchery to Cove Creek	Create 3 pull-out parking spaces adjacent to hatchery	2 & 3
	Pave	2 & 3
	Replace bridge at Cove Creek	2 & 3
	Create parking lot at Cove Creek	2 & 3
C Cove Creek to Shoal Creek Road	Straighten, widen and pave	3
	Replace bridge at Lanning Ridge Road	3
	Realign approach to Laurel Fork Bridge	3
	----- Construct/maintain sediment catch basins	----- 2
D Shoal Creek Road to NC 215	Widened and pave	2 & 3
	Replace box culvert	2 & 3

ALTERNATIVES NOT CONSIDERED IN DETAIL

This section discusses alternatives that were brought up at various times and were considered, but not developed fully. The reasons vary by alternative and are mentioned with the discussion of each of these alternatives.

1. Paving the western portion of segment C, from Shoal Creek Road up to Gloucester Gap was briefly considered but was dismissed. It was concluded that this portion of segment C would be best left undeveloped at this time, in order to better match the character of the rest of segment C, a more rustic, undeveloped character.
2. Initially, there was some discussion of just paving the road to the existing width, resulting in a much narrower road. This alternative was dropped from further consideration since such an alternative would not meet State Transportation Department standards. In addition, such a project could pose a potential safety hazard, particularly if the resulting paving was variable in width.
3. Considerable discussion arose surrounding the issue of who would maintain the road and the right-of-way after the paving was completed. Some respondents did not want the State Department of Transportation (DOT) to do the maintenance because they felt that DOT would undertake more aggressive maintenance than would the Forest Service and that the character of the roadside would be adversely impacted. However, this project would be done using Federal Forest Highway Funds and one of the stipulations of such funding is that the maintenance responsibilities be shifted to the State.

CHAPTER 3: ENVIRONMENTAL EFFECTS

This section forms the scientific and analytic basis for the comparison of the alternatives in the previous section. The environmental effects described here include both the beneficial and detrimental effects. Environmental effects include ecological, aesthetic, historical, social, and human health related effects, which directly, indirectly, or cumulatively result from the proposed action. The environmental effects discussion will focus on the issues identified for this project during the scoping phase of the National Environmental Policy Act (NEPA) process. This chapter is divided into three sections; the Physical Environment, the Biological Environment, and the Cultural Environment. The effect on each of these environments is summarized in the tables below.

PHYSICAL ENVIRONMENT

Evaluation Factor	Alternative 1 No Action				Alternative 2 Pave Segments B & D				Alternative 3 Pave Segments B, C & D			
	A	B	C*	D	A	B	C*	D	A	B	C*	D
Segment												
Surface Type	<i>paved</i>	<i>gravel</i>	<i>gravel</i>	<i>gravel</i>	<i>paved</i>	<i>paved</i>	<i>gravel</i>	<i>paved</i>	<i>paved</i>	<i>paved</i>	<i>paved</i>	<i>paved</i>
% of runoff reaching a stream	20%	25%	50% 20% 60%	35%	20%	5%	50% 20% 60%	20%	20%	5%	25% 2% 15%	<10%

* - see footnote on page 16

BIOLOGICAL ENVIRONMENT

Evaluation Factor	Alternative 1 No Action	Alternative 2 Pave Segments B & D	Alternative 3 Pave Segments B, C & D
Rare Plants	No Effect	No Effect	May affect <i>Carex woodii</i>
Fragmentation	No change	No change	Minor fragmentation from clearing on Segment C
Roadkill	No change	Slight increase, but less than US 276	Slightly greater increase above Alternative 2, but still less than US 276
Poaching	No change	Reduced due to greater public presence & Law Enforcement	Reduced still further, due to even greater public presence & Law Enforcement
PETS	No effect	No effect	No effect
Aquatic Habitat and Populations	Natural fluctuations, including suppressed populations in Shoal Ck. and Indian Ck.	Additional 100 lbs. of fish production in the Davidson River. Trout populations in Indian Creek may be severely depressed or extirpated in the short term, but reduced sediment input and sediment flushing will greatly improve long term conditions	Additional 100 lbs. of fish production in the Davidson River. Trout populations in Indian Creek and Shoal Creek may be severely depressed or extirpated in the short term, but reduced sediment input and sediment flushing will greatly improve long term conditions

CULTURAL ENVIRONMENT

Evaluation Factor	Alternative 1 No Action	Alternative 2 Pave Segments B & D	Alternative 3 Pave Segments B, C & D
Heritage Resources	No sites affected	7 sites affected, 4 Class II, 3 Class III	23 sites affected 20 Class II, 3 Class III
Recreational Experience			
- remoteness	Remote	Slight loss of remoteness	Major loss of remoteness
- scenic quality	Scenic	Scenic	Slight loss of scenic quality
- angling	No Impact	No Impact	Slight negative impact from noise & litter
- hiking	No Impact	No Impact	Slight negative impact from noise & increased traffic
Number of Users	Increase at current rates	Increase above current rates	Increase well above current rates
Amount of Through Traffic	Current level	Slight increase	Greater increase
Safety	Loose gravel and washboarding, undefined road edge	Greater speed on paved sections	Greater speed on paved sections
ROS	No change	No change	Slight shift from RN2 to RN1
VQO	Meet retention, partial retention & modification	Meet retention, partial retention & modification	NOT meet retention, Meet partial retention & modification
Forest Plan Consistency	Yes	Yes	No

PHYSICAL ENVIRONMENT

Evaluation Factor	Alternative 1 No Action				Alternative 2 Pave Segments B & D				Alternative 3 Pave Segments B, C & D			
	A	B	C*	D	A	B	C*	D	A	B	C*	D
Surface Type	<i>paved</i>	<i>gravel</i>	<i>gravel</i>	<i>gravel</i>	<i>paved</i>	<i>paved</i>	<i>gravel</i>	<i>paved</i>	<i>paved</i>	<i>paved</i>	<i>paved</i>	<i>paved</i>
% of runoff reaching a stream	20%	25%	50% 20% 60%	35%	20%	5%	50% 20% 60%	20%	20%	5%	25% 2% 15%	<10%

- * - This set of numbers represents portions of Segment C which, from top to bottom, are:
- C₁ - Cove Creek to FS 137 (Lanning Ridge Road)
 - C₂ - FS 137 to Gloucester Gap
 - C₃ - Gloucester Gap to SR 1321

Water Quality and Hydrology – Issue A

Existing Condition

FH 50 traverses parts of the Davidson River and the Upper French Broad watersheds. Precipitation ranges to greater than 60 inches annually and is normally fairly uniformly distributed throughout the year. Local precipitation amounts are controlled by aspect and elevation, with the highest precipitation at the highest elevations. Snowfall occurs but does not last long enough to form a snow pack.

Except for sediment, water quality is considered good to excellent throughout the project area. Historically, the area's streams were impacted by human activity, including farming and timber harvesting. Roads and railroads were built adjacent to the streams with little regard to stream protection. Many of these same travel corridors are still in use today and the gravel roads are a chronic source of sediment in each rainstorm.

No dependable, efficient method exists to estimate the precise amount of sediment currently being produced by FH 50. For this analysis, visual estimates were made by a hydrologist to determine the amount of road runoff flowing directly into a stream channel and are used as a surrogate to sediment loading. It is assumed that reducing the amount of road runoff that directly reaches a stream channel also reduces the sediment loading by a similar amount.

Runoff estimates:

Segment A (276 to Hatchery): Not more than 20 percent of the runoff directly reaches a stream channel and this is basically clean non-sediment laden water.

Segment B (Hatchery to Cove Creek): It is estimated that as much as 25 percent of the road runoff directly reaches a stream. Since much of this is relatively new construction, the water is carrying a lot of sediment both from the road surface and from the ditches.

Part of Segment C (Cove Creek to FS 137, Lanning Ridge Road): It is estimated that 50 percent or more of the road runoff directly reaches a stream channel.

Part of Segment C (intersection with FS 137 to Gloucester Gap): It is estimated that about 20 percent of the road runoff directly reaches a stream channel and this is mostly in the vicinity of stream crossings.

Part of Segment C (Gloucester Gap to SR 1321): It is estimated that about 60 percent of the road runoff directly reaches a stream channel. This is due to long ditch lines and proximity of the road to the stream.

Segment D (SR 1321 to NC 215): It is estimated that about 35 percent of the road runoff directly reaches a stream channel.

Direct and Indirect Environmental Effects

Alternative 1: Davidson River: Current trends in sediment loading and water quality would continue. Sediment loading may actually increase slightly given the past and probable future reduction of road maintenance funds. The minor road runoff control projects that may be implemented in the project area would not significantly reduce the overall sediment loading. In the long term, sediment would tend not to accumulate, but would continue to be transported through the system.

Shoal Creek and Indian Creek: Current trends in sediment loading and water quality would continue. Continued development of private land may increase sediment loading as well as increase threats to water quality due to greater use of chemicals within the watershed.

Effects Common to Alternatives 2 and 3: The proposed actions would reduce the sediment loading of the Davidson River, its tributaries, Shoal Creek and Indian Creek. Temporary, short-term increases in visible sediment loading may occur during construction, especially if applied control practices fail during a storm. Loading by heavier sediments, such as large sand or greater material, should not occur. Over time the project area streams would tend to flush presently stored sediments from their channels due to the overall reduced sediment loading. Stream peak flows and flow timing should not change observably with any of the proposed actions. Total stream flow volume would not be changed.

Segment A (276 to Hatchery): Resurfacing this section of the FH50 would have no effects on the Davidson River. This action would not change the runoff quantity, quality or timing from the present regime since no new drainage or ground disturbance is proposed.

Pave Segment B (hatchery to Cove Creek bridge): Paving Segment B would reduce the overall sediment loading of Davidson River. Most of this section was built to NCDOT specifications when the road was relocated away from the river. However, because of the gravel road surface, the surface drainage on the road is not easily maintained and presently is ineffective. Paving would eliminate or greatly reduce the problem of berms along the road edge keeping runoff out

of ditches and appropriate outlets. It is estimated that 75 percent or more of the runoff currently reaching the river or a tributary would be eliminated with this new or reestablished drainage.

Sediment loading would be greatly reduced since the runoff that does reach a channel via surface flow would carry only sediment detached in the ditch line or other ephemeral channel. The dispersed runoff that infiltrates would take longer to reach the river through the soil, which would tend to reduce the river's peak flow rates and increase the baseflow or ground water flow rates. Overall, the total volume of water reaching the river would not be observably changed from present. Paving should not adversely affect the water quality, since road runoff would, for the most part, not reach the stream. Chemicals leached from the fresh pavement should be trapped with the organic material in the soil.

Replacing Cove Creek Bridge: The stream channel should only be minimally disturbed by the bridge replacement since the existing abutments would be left in place. Replacement would allow road runoff to be directed away from the stream channel, thereby eliminating or greatly reducing the sediment loading at the Cove Creek crossing. Except for sediment reduction, water quality, quantity or timing would not change from present.

Widen and pave Segment D (SR 1321 to NC 215): This section is contributing heavy sediment loads to Indian Creek by way of long eroding ditch lines, which empty directly into stream channels. Additional ditch relief culverts would disperse this flow, reduce the ditch erosion and reduce the sediment loading of Indian Creek. It is estimated that this reduction can be 75 percent or more from present loading. This reduction assumes the proper and timely implementation and maintenance of temporary erosion control before during and after construction. Paving this section would further increase this estimated sediment reduction since the road surface no longer would be erodible. Dispersion of runoff would tend to reduce the stream's peak flow rates since the road runoff would not reach the channel as rapidly as at present. The sediment loading reduction would allow Indian Creek to flush sediment presently stored in its channel from this affected section. Note however that sediment loading rates in the stream at the Forest property line would not be increased from present and would over time be reduced since new sediments are not entering the stream. The flushing is possible because the reduced entry of new sediment allows the stream's sediment transport capacity to be used to carry sediment presently stored in the channel.

Alternative 2: Segment C (Cove Creek to the intersection with Shoal Creek Road): Constructing and maintaining sediment catch basins where needed would trap the majority of road sediment before it reaches Cove Creek, Shoal Creek and the Davidson River.

Alternative 3: Widen and pave part of Segment C (Cove Creek to FS 137 Lanning Ridge Road): Widening and paving this section would require extensive earth movement. The road centerline would be moved about 10 feet away from the river side of the road to provide the required width. This slight realignment would still provide little or no space for handling road runoff in many places since the road is immediately adjacent to the river. Additional ditch relief culverts would be needed to outlet the runoff into areas where it can be at least partially infiltrated and to reduce the volume of runoff flowing directly to the river. Extensive use of temporary erosion control such as silt fence and sediment traps would limit the sediment loading of the river.

Widening the road surface would reduce runoff and sediment loading by about 50 percent from current. This reduction would allow the river to flush some of the sediments stored in its channel from this section. Except for sediment loading, river water quality, quantity, or timing would not be affected. Paving would further reduce the sediment loading since the road surface would no longer be erodible. With less sediment loading than results from just widening the road, the river would have more capacity to transport sediment and would tend to flush this section more quickly. Paving would not otherwise affect water quality, quantity, or timing any more than the widening action.

Replacement of Davidson River Bridge near FS 137: The stream channel should only be minimally disturbed by the bridge replacement since the existing abutments would be left in place. Replacement would allow road runoff to be directed away from the stream channel, thereby eliminating or greatly reducing the sediment loading at this Davidson River crossing. Except for sediment reduction, water quality, quantity, or timing would not change from present.

Widen and pave part of Segment C (intersection with FS 137 to Gloucester Gap): Widening this section of FS 475 would provide better dispersion of road runoff than currently exists. Additional ditch relief culverts would reduce the ditch flow that goes directly into a stream channel and the sediment loading of the river's tributaries. It is estimated that 90 percent of more of the sediment loading from this section can be eliminated by improved drainage control and paving. This reduction assumes the proper and timely implementation and maintenance of temporary erosion control before during and after construction.

Widen and pave part of Segment C (Gloucester Gap to SR 1321): The road from Gloucester Gap to the first culvert above FS 5012 appears to be having little effect on the adjacent water resources. Therefore, widening and paving from Gloucester Gap to FS 5012 would have little or no effect, positive or negative, on the water resources.

Widening and paving from FS 5012 to SR 1321 would have similar effects as those described for Segment D under Alternatives 2 and 3 except that the affected stream is Shoal Creek.

BIOLOGICAL ENVIRONMENT

Evaluation Factor	Alternative 1 No Action	Alternative 2 Pave Segments B & D	Alternative 3 Pave Segments B, C & D
Rare Plants	No Effect	No Effect	May affect <i>Carex woodii</i>
Fragmentation	No change	No change	Minor fragmentation from clearing on Segment C
Roadkill	No change	Slight increase, but less than US 276	Slightly greater increase above Alternative 2, but still less than US 276
Poaching	No change	Reduced due to greater public presence & Law Enforcement	Reduced still further, due to even greater public presence & Law Enforcement
PETS	No effect	No effect	No effect
Aquatic Habitat and Populations	Natural fluctuations, including suppressed populations in Shoal Ck. and Indian Ck.	Additional 100 lbs. of fish production in the Davidson River. Trout populations in Indian Creek may be severely depressed or extirpated in the short term, but reduced sediment input and sediment flushing will greatly improve long term conditions	Additional 100 lbs. of fish production in the Davidson River. Trout populations in Indian Creek and Shoal Creek may be severely depressed or extirpated in the short term, but reduced sediment input and sediment flushing will greatly improve long term conditions

Rare Plants – Issue B

Existing Condition

The natural plant communities found along FH 50 include Acidic Cove Forest, Chestnut Oak Forest, Montane Oak-Hickory Forest and anthropogenic roadside. These are common community types on the National Forests in North Carolina. The most common communities encountered are Chestnut Oak and Acidic Cove Forests. The weedy, anthropogenic roadside flora is, in part, derived from the early successional species of these communities and also planted or invasive weed species. There are minor areas of riparian habitat where streams cross the road.

Of the total of 105 PETS plant species known or likely to occur in Transylvania Co., all but 18 species were dropped from the list for further consideration and discussion for one of the following reasons: 1) lack of suitable habitat for the species in the project area, 2) the species has a well-known distribution that does not include the project area, or 3) based on field surveys of potential habitat, no habitat was seen in the activity areas. Based upon habitat information, 18 PETS or Forest Concern plant species could occur in the project area but only one, *Carex woodii*, is known to occur in the activity area.

Direct and Indirect Environmental Effects

Alternative 1: If no activities occur there will be no effects to rare plants. In time, especially in the segment of the project reconstructed in 1995, the occurrence of ruderal (weedy) species will decrease. Road shoulders will be maintained, which will cause weedy species to persist directly adjacent to the road.

Alternative 2: Implementation of this alternative will have no effect on rare plants. Field surveys indicate no rare plants in the area of direct activity. There may be a temporary increase of ruderal (weedy) species of plants associated with the widening and paving in Segment D of the project. These species are often prevalent during the initial stages of succession, particularly near constructed roads. A high percentage of these ruderal species are non-native. However, as succession progresses, most ruderal species tend to become much less prevalent and generally do not persist. Most ruderal plant species are expected to decrease to minimal population levels within ten years after the initial disturbance.

The persistence of most non-native plant species is undesirable. Two species of invasive non-native plants occur in the analysis area: *Lonicera japonica* and *Microstegium vimineum*. It is not likely that these activities will cause these species to spread. Other non-native plants may persist in the project area by continual disturbance. For example, a maintained road shoulder often has persistent ruderal and non-native plant species. Maintenance of road shoulders may slightly increase the persistence of non-native vegetation. To mitigate this effect where possible, native plant seed should be used for roadside erosion control plantings.

Alternative 3: Implementation of this alternative may affect a small population of *Carex woodii* located in a Montane Hickory Forest in Compartment 95. Since there are five other known stable populations of *Carex woodii* within the Davidson River Watershed, possible elimination of this population along FS road 475 will not affect viability of either the local (Davidson River drainage) or the Forest population.

Cumulative Effects

Past Forest actions, within the Davidson River watershed, have had minor impacts on two populations (Searcy Creek timber harvest and the reconstruction of Looking Glass trail) of *Carex woodii*. However, the cumulative effect of these actions is thought to be minimal because these impacted populations were found to still be viable after the actions.

Wildlife – Issue B

This is an analysis summary including effects to Management Indicator Species (MIS) and Forest PETS (Potential, Endangered, Threatened, and Sensitive Species). A more detailed analysis including habitat descriptions and a quantitative effects analysis can be found in the attached biological evaluation (BE) and the Wildlife analysis (WILDA).

Existing Condition

FH 50 traverses a variety of wildlife habitats including mature hardwoods and mixed conifer and dense rhododendron. Although limited tree harvest has occurred in the road corridor, most of FH 50 has an open canopy, especially those sections which follow along the Davidson River and the power line. Only Segment C, which moves away from the river in the western portion, has a mostly closed canopy.

Changes in land-use patterns affect the distribution and abundance of organisms and human activities may fragment natural habitats altering the size, shape, and spatial arrangement of habitat types. Effects of fragmentation are very species specific. Some fragmentation occurred when the Davidson River Road was built initially and the proposed road improvements should not further fragment existing habitats. Large mammals (e.g., white-tailed deer, black bear, bobcat, fox) and small mammals (e.g., squirrel, chipmunk, opossum, rabbit, and raccoon) will cross roads (although many may tend to avoid roads). Sightings of these species are reported often crossing US 276 and the Blue Ridge Parkway. Many bird species, including forest interior birds, fly through road corridors.

The Forest Plan guidelines list a group of potential MIS for each Management Area (MA). Given specifics of the proposal, including the elevation and current habitat condition of the potentially affected area, a subset of those MIS listed may be appropriate indicators for the MA's within the project. Because of its linear form, FH 50 crosses through or borders portions of several MA's including 2A, 2C, 3B, 4D, and 13.

MA 2 emphasizes pleasant scenery for people who experience the forest by driving. Roads are generally open with the adjacent forest land managed to provide a pleasing visual experience. Wildlife compatible with or which benefit from these conditions (generally older forests with much human disturbance) and are likely to be present include songbirds, gray squirrels and woodpeckers.

MA 3B emphasizes a managed forest with limited motorized access and provides habitat for species such as eastern wild turkey, deer, and a variety of small mammals. Black bear also use these areas as travel corridors and for foraging, though they do not provide the best bear habitat.

In MA 4D, most roads are closed to motor vehicles and a somewhat remote setting is provided. Emphasis is on providing high quality habitat for black bear. Desired conditions includes freedom from the disturbance of motorized vehicles, some areas of older forest, a sustained supply of hard mast (such as acorns from oaks), den trees, and small, widely dispersed openings providing soft mast (fruits and berries) typically found in very young forests.

MA 13 includes lands that are special interest areas managed to protect, and where appropriate, foster public use and enjoyment of unique scenic, geological, botanical or zoological attributes. Looking Glass Rock is a geologic feature protected in this management area.

Nine MIS are known to occur near the proposed project area, including pileated woodpecker, white-breasted nuthatch, gray squirrel, eastern wild turkey, black bear, white-tailed deer, solitary vireo, northern parula warbler, and ovenbird. These MIS were chosen because they represent the MAs that the project runs through. The habitat requirements for each of these species vary, and some requirements overlap. Four Forest PETS or Forest Concern wildlife species have a

likelihood of occurrence in the project area, including bog turtle, Cooper's hawk, Indiana bat, and peregrine falcon.

Direct and Indirect Environmental Effects

A general discussion of the environmental impacts is documented in Chapters II and IV of the Final Environmental Impact Statement for the Land and Resources Management Plan 1986-2000 for the Nantahala and Pisgah National Forests, as amended.

Alternative 1: There would be no further fragmentation of wildlife populations, including PETS species and MIS in addition to that caused by the existing road and power line right-of-way. Since the speed and the amount of traffic would not be changed by the proposed project, the amount of road kill will remain at its current minimal level. The amount of access will not increase with this alternative; therefore, the likelihood of poaching will remain the same. There will be no effects to the four PETS and Forest Concern species and nine MIS.

Alternative 2: No new access points would be created as a result of this alternative. However, there may be an increase in the number of vehicles traveling along FH 50. Typically, areas that are more secluded with more difficult access and limited law enforcement visibility have a higher risk for poaching and other illegal activities. FH 50 is traveled regularly by the general public and law enforcement. Increases in traffic likely should further curtail opportunities for poaching in this area. The western end of FH 50 occurs in MA 3B, which is a turkey and white-tailed deer emphasis area. Paving this end of the road would not have any significant effect on turkey or deer populations in this area because of the small amount of habitat involved.

With this alternative, repaving and paving would occur on Segments A and B respectively. No widening or tree removal would occur. Segment D would be widened and paved. The widening of this section would require some trees be removed along most of the 1.4 miles to accommodate a 50-foot maximum clearing limit. Segment D is located in MA 3B, which emphasizes earlier successional habitat. This part of the District is already somewhat fragmented and widening the road likely would not further fragment wildlife populations.

The project area is not in a black bear patch, but it is in an area of the District that is considered high quality bear habitat west of FS 475B to the Transylvania County line, and north of FH 50. The area from US 276 to FS 471 south of FH 50 is considered to be a large patch (approximately 10,000 acres) with a mix of habitats. The rest of the area, US 276 to FS 475B north of FH 50 and FS 471 west to NC 215 south of FH 50, is in small patches (less than 10,000 acres) of a mix of habitats. Road corridors, such as FH 50, are small patches with a mix of habitats.

The quality of habitat is affected by the amount of human-bear interaction, which is related to the density of roads and trails and the degree to which they are used. This part of the District is not in a bear sanctuary, so bears may be hunted. There are other parts of the district where bear hunting is more popular because there is less recreational activity occurring there than along the Davidson River corridor. The implementation of this project would not affect the high quality bear habitat that is to the north of FH 50.

None of the project area is currently in a designated Forest Interior Bird Patch (FIBP), as presented in the recent Plan amendment. The project area is "a mix of habitats" and "habitat with limited edge." Habitat quality for forest interior species varies due to the amount and

location of larger canopy openings or edge. Habitat with limited edge means that high quality conditions are provided by restricting canopy openings to 10% or less over a large area. Currently, Segment C, from where the power line leaves the road to Gloucester Gap, has a closed canopy. Since this segment would not be treated in this alternative, the habitat with limited edge would remain connected across FH 50 through this section of road.

Two PETS species, the peregrine falcon and the bog turtle, are known to occur near the project area but not in the immediate vicinity of any of the proposed activities. Implementation of this alternative would not affect these species. One Forest concern species, the Cooper's hawk, may occur within or near the project area. Cooper's hawks may benefit from opening up the canopy since this species forages in openings within the forested landscape.

The Indiana bat, a federally endangered species may occur within or near the project area. On July 25, 1999, two Indiana bats were captured in a mist-net located in the upper Santeetlah Creek drainage in Graham County, North Carolina. A post-lactating female and a juvenile male were captured, banded, and released at the capture site. A radio transmitter was attached to the female prior to release for tracking her movements. On July 26, researchers were successful in locating the roost site of the female, which was in a large dead Canadian hemlock in a riparian area. Later on July 26, a third Indiana bat (a juvenile female), was captured in a mist-net about 75-100 yards from the original capture site. Monitoring of the roost documented use by 28 bats. Given the communal roosting habits of the bat, it is probable that all 28 bats were Indiana bats (pers. comm. Dr. Michael Harvey, 1999).

Because the Indiana bat is a federally listed species, the Forest Service (FS) is required by Section 7 of the Endangered Species Act of 1973, as amended, to go through formal consultation with the U.S. Fish and Wildlife Service (FWS) as to the effects of FS management activities on the bat. Please refer to the Biological Opinion (BO) issued by the FWS for the consultation history.

According to the BO, road widening or reconstruction activities could potentially remove roost trees and convert potentially suitable roosting habitat (i.e., snags) to unsuitable nonforested habitat. Depending on the type of road and level of activity, increased motorized activity could have an adverse impact on maternity colonies. Gardner et al. (1991) reported that the spatial relationships of roost trees to roads (paved or unpaved) and streams may predetermine their suitability as roost trees. Colonial (>5 bats) maternity roosts occupied by pregnant or lactating adult females occurred at least 1,477 feet from paved roads.

This type of activity is limited in scope and represents a very small loss of potential roosting habitat. The amount of habitat potentially affected annually across the Forests comprises less than 0.035% of the total forested area on the Nantahala and Pisgah National Forests, and this likely represents an insignificant impact on Indiana bat habitat.

The FWS does not have evidence that summer populations, specifically maternity colonies, are present on the Nantahala and Pisgah National Forests outside of Graham, Macon, Swain and Cherokee Counties (4-county area). Additionally, the FWS believes there are relatively few Indiana bats using the forests outside of the 4-county area because (1) there are only four records for Indiana bats in the last 40+ years in western North Carolina; (2) the area is on the edge of the species' range; (3) there is only one Priority III hibernaculum south of the Nantahala and Pisgah National Forests, and no more than four Indiana bats have ever been found there (only one in the

past five decades); and (4) the area is not between known summer habitat and any Priority I or II hibernacula.

With the probability that Indiana bats occur outside the 4-county area on the forests being so low and the quantity of habitat able to support them being so high, the probability of any event actually “taking” an Indiana bat, much less the take being detected or measurable, is discountably small. Further, should Indiana bats be present in an undetectably low level or should they begin using the area in the future, an abundance of suitable habitat will be available even if the Forest Plan is fully implemented.

Any time the amount and speed of traffic increases, the chance for road kill also increases. The majority of animals hit by vehicles are opossums, squirrels, skunks, raccoons, and snakes. Since the middle section of FH 50 would not be paved under this alternative, speeds would only increase at each end of FH 50 where the road would be paved. Many animals would cross paved roads. There are occasional sightings of black bear, red and gray fox, gray squirrels, opossums, skunks, white-tailed deer, and even bobcats crossing US 276, where the speed limit is 55 mph, and on the Blue Ridge Parkway, where the speed limit is 45 mph. Most road kills along US 276 are opossums, skunks, squirrels, and raccoons. In the last decade there are no documented cases of a bear and few cases of large mammals of any kind being hit by a vehicle on US 276. The chance for road kills on FH 50 may increase somewhat, but would be less than along US 276, since the speed limit along FH 50 would be less than 55 mph.

Alternative 3: Currently, Segment C, from where the power line leaves the road to Gloucester Gap, has a closed canopy. If this segment of road were widened, realigned and paved, up to a 50 foot clearing limit would be created by the road work. Clearing the trees for the road would still keep the canopy openings to less than 10% (for habitat with limited edge), but opening up the road corridor would bisect the habitat in this area.

The chance for road kills may increase somewhat over the risk in Alternatives 1 and 2, but it would not be to the level that occurs along US 276, since the speed limit along FH 50 would be less than 55 mph.

Cumulative Effects

The combined effects from all activities within the analysis area, including those that have occurred in the past 10 years and those that may occur in the reasonably foreseeable future, that may directly or indirectly affect forest habitats, individual animals, or species viability in the project area or on the Forest, have been considered cumulative effects in this analysis. Implementation of the proposed project would result in no negative cumulative effects on Forest Concern or MIS species since no direct or indirect effects would occur.

Aquatic Resources – Issue B

Existing Condition

The proposed project lies within two drainage basins: the Davidson River watershed (LRMP Watershed # 34) and the upper French Broad River watershed (LRMP Watershed # 31). While both of these areas are part of the French Broad River Basin, potential effects of the proposed

project are more local. Therefore, this analysis will focus on two "effects areas," referred to in this document as the Davidson River Area and the North Fork French Broad River Area. Principal streams considered in this analysis within the Davidson River Area include the Davidson River, Rockhouse Creek, Cove Creek, and Laurel Fork. Principal streams considered in this analysis within the North Fork French Broad River Area include Shoal Creek, Indian Creek, and the North Fork French Broad River.

Aquatic Habitat and Populations:

Davidson River Area

The Davidson River watershed is almost entirely forested from its origin downstream to the Forest boundary and supports excellent water quality within this area. Three rare aquatic species the hellbender (*Cryptobranchus alleganiensis*), French Broad crayfish (*Cambarus reburus*), and Jocassee caddisfly (*Agapetus jocassee*) are known to occur within the Davidson River. These species require clean, well-oxygenated water to survive.

The Pisgah Forest Fish Hatchery withdraws part of its water supply from and discharges its effluent into the Davidson River just upstream of the project area boundary. This nutrient-enriched effluent helps supports higher than average standing crops of fish within the Davidson River below the hatchery. The Davidson River is recognized by anglers for its higher than average angling success rates and its potential to produce trophy-sized (>18 inches long) brown and rainbow trout. Because of the Davidson River's natural hydrology and channel morphology, the area is especially conducive to fly-fishing, which also contributes to its popularity among anglers. Aquatic habitat within Cove Creek and Laurel Fork is similar to the upper reaches of the Davidson River. Brook, brown, and rainbow trout and blacknose dace are known to occur in these streams.

North Fork French Broad River Area

Shoal Creek and Indian Creek have heavy sediment deposits. Riparian vegetation along Shoal Creek is dominated by rhododendron and other woody vegetation. Brook and brown trout, and blacknose dace are known to occur within the upper reaches of Shoal Creek (i.e. on Forest Service land). Indian Creek has riparian vegetation dominated by patchy rhododendron and woody vegetation on Forest Service land and by grass and scarce woody vegetation on private land. Brook, brown, and rainbow trout and blacknose dace are known to occur within the upper reaches of Indian Creek.

The North Fork French Broad River has riparian vegetation dominated by hemlock, white pine, laurel, and rhododendron. Land uses such as farming, rural development, and trout farming occur on most of the private land adjacent to the North Fork French Broad River. Local water quality data and area resident observations show that the North Fork French Broad River supports some of the highest turbidity levels in western North Carolina during and after rain events. This is thought to be largely attributable to land uses on private land in this area; however, some of this turbidity is associated with existing old roads and unauthorized off-road vehicle use on the Forest. Although there is no pre-development aquatic habitat or population data to compare to, it is likely that aquatic habitat quantity and quality have been lost and aquatic populations have been suppressed since development of the upper French Broad Valley. Two

examples of this are the distribution of native salmonid fish (i.e. brook trout) and freshwater mussels within the upper French Broad Valley.

Today, brook trout are largely confined to less-developed headwater reaches, above natural migration barriers within the West Fork French Broad River drainage. Historically, this species was the only salmonid present in area streams. Its range has largely been affected by the introduction of rainbow and brown trout during the development of the upper French Broad Valley. Freshwater mussels were once abundant throughout the upper French Broad Valley. Today, considerable effort is being given to locating live mussel populations in this area. Some dead shells have been found as recently as 1997 in muskrat middens, but most recent surveys have been unsuccessful in locating live mussels. This loss of an entire community is attributed largely to historic effects on chemical water quality (mostly industrial runoff). While these land uses have been removed from the area and water quality is greatly improved, the freshwater mussel community has not recovered.

Land use patterns within the upper French Broad Valley have not only historically affected native species distributions in the area, but they also continue to contribute sediment to area streams and degrade riparian vegetation and bank stability. These factors combined, are the major forces shaping today's aquatic habitats and communities within the North Fork French Broad River drainage.

Rare Species:

Ninety-four rare aquatic species have been listed as occurring or potentially occurring in Transylvania County. Of the 94 aquatic species included on the original list for analysis, 40 were dropped as a result of a likelihood of occurrence evaluation based on preferred habitat elements and field survey results (likelihood of occurrence determined to be does not occur or not likely to occur).

Management Indicator Species:

Brook, brown, and rainbow trout and blacknose dace are known to occur within the aquatic analysis area. Brown trout, rainbow trout, and blacknose dace were chosen as project-level aquatic management indicator species since they are sensitive to changes in water quality and habitat condition and since at least one of these species occurs in each of the streams considered in this analysis. Therefore, potential effects of the proposed project on three aquatic MIS, six rare aquatic species, and one aquatic community type will be analyzed in this report. These species are listed in Table 3.

Table 3. Aquatic species included in the Aquatic Resource Analysis (AQUA) for the Forest Highway 50 Improvement Project.

<u>Species</u>	<u>Scientific Name</u>	<u>Status*</u>
Brown trout	<i>Salmo trutta</i>	MIS
Rainbow trout	<i>Oncorhynchus mykiss</i>	MIS
Blacknose dace	<i>Rhinichthys atratulus</i>	MIS
French Broad Crayfish	<i>Cambarus reburus</i>	S
Cherokee clubtail	<i>Gomphus consanguis</i>	S
Green-faced clubtail	<i>Gomphus viridifrons</i>	S

<u>Species</u>	<u>Scientific Name</u>	<u>Status*</u>
Spicilose seratellan mayfly	<i>Serratella spicilosa</i>	S
Jocassee caddisfly	<i>Agapetus jocassee</i>	FC
Hellbender	<i>Cryptobranchus alleganiensis</i>	FC
Aquatic insect community (48 species)		FC

* MIS = Management Indicator Species; S = Sensitive; FC = Forest Concern

Direct and Indirect Environmental Effects

Of the miles of road proposed for improvement, approximately 4.6 miles parallel the Davidson River, Shoal Creek, or Indian Creek, most within 100 feet of the water's edge. Nine stream crossings exist along this corridor, of which 3 (33%) are proposed for replacement or improvement. Table 4 summarizes proposed activities for all alternatives.

Table 4. Proposed activities within the Forest Highway 50 Improvement Project that have the potential to affect aquatic habitat and populations.

<u>Activity</u>	<u>Alt. 1</u>	<u>Alt. 2</u>	<u>Alt. 3</u>
Resurfacing Segment A		X	X
Pave Segment B		X	X
Widen and pave Segment C			X
Widen and pave Segment D		X	X
Replace Cove Creek bridge (bridge)		X	X
Replace Davidson River bridge (bridge)			X
Replace Shoal Creek culvert (arch or box culvert)		X	X

Effects of Alternative 1:

Natural fluctuations in population stability and habitat quality and quantity would continue. As a result of natural forces such as drought and flood cycles, it is possible that population levels may drop below what is necessary to maintain viable populations, especially for species that naturally support low densities within the aquatic analysis area (e.g. rare species). Populations of species such as fish and some amphibians that live through more than one reproductive cycle can suffer the loss of a single year-class without jeopardizing population viability (at the local level) in most cases. However the loss of two or more year-classes, especially consecutively, can result in the loss of local population viability, particularly among relatively short-lived species such as brook trout and blacknose dace. Long-term fish population monitoring data from across the Forests reveals single year-class failures for brown trout, rainbow trout, and blacknose dace in one stream or another at some point, but successive year class failures were not found on any stream for any aquatic MIS during the monitoring period.

With species that live through only one reproductive cycle (as is the case for most aquatic invertebrates), the loss of one year's reproductive efforts can have marked effects on local population viability. In extreme cases, this can result in the local extirpation of rare species, should they occur. Landscape-level population viability may or may not be affected, depending on the known distribution of the particular species.

Unlike the acute large sediment inputs on the Davidson River, Shoal Creek and Indian Creek are suffering from chronic sediment inputs from poorly placed, degrading State-maintained roads. Runoff from SR 1327 (Shoal Creek) and SR 1321 (Indian Creek) is a constant source of sediment to the streams. Aquatic habitat has been and is being affected by this sedimentation, and until runoff is controlled on the portions of these roads adjacent to the streams, aquatic habitat quality and quantity will not recover (despite the streams' sediment transport capacity). It is likely that degraded habitat within Shoal Creek and Indian Creek is limiting brown and rainbow trout and blacknose dace populations. These species continue to exist within Shoal Creek and Indian Creek, although it is very likely that population levels are suppressed as a result of reduced spawning habitat.

Effects Common to Alternatives 2 and 3:

There are two activities proposed that would have no effect on aquatic resources. These activities include: (1) creating a small parking area (3-4 vehicles) opposite the hatchery for mountain bike trail users, and (2) creating a small parking area across from the Cove Creek Group Campground entrance for mountain bike trail users. There are no aquatic resources involved with these proposed activities; therefore, they will not be addressed in this analysis.

Effects of Alternative 2:

Davidson River Area

Resurfacing Segment A (276 to Pisgah Forest Fish Hatchery)

Resurfacing this portion of FS 475 would allow the NCDOT to maintain current runoff control and traffic patterns to the Pisgah Forest Fish Hatchery. Wide filter areas exist between the road and the Davidson River for the length of this road segment; therefore it is not likely that runoff from this segment of road is affecting the River. There are two culverts across small tributaries where runoff may enter an unnamed tributary and Fate Osteen Cove during high runoff events, and eventually enter the Davidson River. The amount of water these two streams carry and the area of road surface draining towards the culverts is small in comparison to the Davidson River. Road runoff from these two points is not likely to affect aquatic habitat or populations within the tributaries or the Davidson River.

Pave Segment B (Pisgah Forest Fish Hatchery to Cove Creek)

This segment of road is the one that was relocated after a large slide. The new road was built to the wider and straighter standards required by the NCDOT so additional ground disturbance along this segment would be minimal. Segment B would be paved, with no additional right-of-way clearing or widening. The stream crossing over Rockhouse Creek has stabilized and would not be replaced.

This section of road remains a sediment source to the Davidson River, although the amount of sediment entering the River is much less now than from the old road and subsequent slides. Along with improved runoff control, there are several small slide areas along the new road that would benefit from stabilizing the roadbed with pavement. Paving Segment B would reduce the amount of sediment entering the Davidson River, which would allow existing sediments to be flushed downstream (to where they are less measurable) and aquatic habitat to improve above the

hatchery. Sediment deposits behind the hatchery dam accumulate over time, reducing aquatic habitat quality and quantity for at least 1000 feet above the dam. Elimination of the primary sediment sources between the hatchery and Cove Creek would improve approximately 1.2 acres of stream habitat, which translates into a potential for the Davidson River to support an additional approximately 46 kg (101 lbs) of fish in the reach above the hatchery. This would also translate into improved habitat for the aquatic community in general, which would improve conditions for the hellbender, French Broad crayfish, and Jocassee caddisfly, which are known to occur in this section of the River. Paving this section of FS 475 would increase the amount of impervious surface draining to the Davidson River. Wide, vegetated filter areas exist along this length between the road and the River. Therefore, the risk of increasing toxic runoff from increased traffic levels and impervious surface area to the Davidson River is minimal.

Replace Cove Creek Bridge

An abutment for the existing bridge over Cove Creek was undermined in the past but has been repaired. The Jocassee caddisfly is known to occur directly under this bridge, and the hellbender and French Broad crayfish are known to occur just downstream. Any erosion occurring at the old abutments may affect habitat for these species; however, the local viability of these populations does not appear to be affected (as evidenced by their persistence in the area and evidence of reproduction).

Failure of the existing bridge would, however, likely result in an acute input of sediment into Cove Creek and Davidson River, which would devastate local populations of the Jocassee caddisfly and may affect local populations of hellbenders and French Broad crayfish near the mouth of Cove Creek.

Populations of species such as fish and some amphibians that live through more than one reproductive cycle can suffer the loss of a single year-class without jeopardizing population viability (at the local level) in most cases. With species that live through only one reproductive cycle (as is the case for most aquatic invertebrates), the loss of one year's reproductive efforts can have marked effects on local population viability. In extreme cases, this can result in the local extirpation of rare species. Landscape-level population viability may or may not be affected, depending on the known distribution of the particular species.

Landscape and range-wide viability would not be affected by the loss of a single population of hellbenders; however, based on the number of known populations across the Nantahala and Pisgah National Forests and the species' regional range. Because the French Broad crayfish and Jocassee caddisfly are considered to be more rare than the hellbender, it is possible that landscape and range-wide viability could be affected by the loss of a single population, at least until more surveys are done for the species across their predicted ranges and more is learned about the species.

Proposed replacement of the Cove Creek Bridge includes minimizing new bank disturbance by leaving the old abutments in place and removing the old deck. New abutments would be constructed behind the old ones, and a new deck laid on the abutments. Ground disturbance would be minimal and further away from the creek. Replacement of the bridge would not affect aquatic habitat or populations and would avoid the potential effects associated with bridge failure.

North Fork French Broad River Area

Widen and Pave Segment D (SR 1321 to NC 215)

The proposed widening and paving of SR 1321 requires that extensive soil disturbance occur immediately adjacent to Indian Creek for approximately 0.5 mile. Given that most of Indian Creek is already stressed from current road runoff and surrounding land uses, further sedimentation could eliminate pool and spawning habitats. This loss of habitat would affect fish community stability by reducing trout spawning success, which over time, will extirpate or severely depress local, reproducing populations of brown and rainbow trout within the aquatic analysis area. It is likely that blacknose dace would survive changes in habitat quality and quantity, although in potentially lower numbers, since they occupy many different microhabitat types; however as habitat shifts occur to more homogenous distributions, generalist fish species such as the Central stoneroller would compete with the dace for habitat. Recent fish population monitoring of NCDOT and TNDOT activities within the I-26 corridor, as well as less recent and historical monitoring records, suggests that the Central stoneroller and other minnow species will occupy habitats opportunistically and compete with local resident species as long as there are no barriers to instream migration, and that fish community structure and diversity can be greatly affected by changes in habitat quality and quantity (i.e. shifting from heterogeneous habitat distributions to more homogenous ones).

Long-term effects of the improvement include improved runoff and sediment control along upper Indian Creek on Forest Service land. The proposed road improvements include sediment control structures that would reduce the amount of sediment entering upper Indian Creek and its tributaries. Over time, as natural high flows flush existing sediments from the area, aquatic habitat quality and quantity may improve, which may be reflected in improved trout reproductive success and more stable aquatic insect community locally within upper Indian Creek. However, it is unlikely that any improvements to aquatic habitat and populations within lower Indian Creek or its tributaries would be measurable or attributable to improved conditions on Forest Service lands because the proposed improvements do not include parts of SR 1321 adjacent to lower Indian Creek (which will perpetuate existing runoff and sedimentation problems).

Replace Shoal Creek Culvert

Culvert manipulation on Shoal Creek may increase stream sedimentation locally on these streams, which would affect aquatic habitat quality and quantity. Channel aggradation is already present upstream of the culvert to be modified, so it is unlikely that any potential changes to upstream habitats would be measurable. However, since the soil would also be disturbed on the downstream side of culverts, there is the potential for downstream sedimentation. Aquatic habitat may be degraded temporarily from this sedimentation and turbidity if the stream bottom is disturbed. The loss of interstitial space within the substrate would alter invertebrate community structure locally (even temporary losses can affect community structure since aquatic insects are so short-lived) and may affect fish spawning habitats. It is unlikely that there would be any direct effects to individual organisms that would affect community stability or species viability since the area potentially disturbed is so small. Habitat conditions are expected to return to pre-project conditions quickly once implementation is complete. It is unlikely that any effects of culvert manipulation on Shoal Creek would be noticeable or measurable within the stream, except for the temporary increased in turbidity.

Additional Effects of Alternative 3:

Davidson River Area

Widen and Pave Segment C (Cove Creek to Shoal Creek Road)

The proposed widening and paving of the above segment of FS 475 requires that extensive soil disturbance occur adjacent to the Davidson River. Of this length, approximately 1.7 miles are immediately adjacent to the River, with current runoff being routed directly into the River. This is the main source of sediment to the upper Davidson River. Sedimentation of aquatic resources reduces the amount of habitat available to fish and other aquatic organisms. This includes the loss of interstitial space within the substrate, which is particularly important for aquatic invertebrates (including crayfish), as well as for fish and salamander spawning and rearing areas. The long-term loss of suitable habitat can result in a decline in fish, invertebrate, and other aquatic organism productivity.

The movement of mobile organisms such as juvenile and adult fish and crayfish to more suitable areas may influence community dynamics if the duration of potential effects on local habitats exceeds what is predicted within the upper Davidson River. Local competition for food and habitat can shift aquatic invertebrate community structure, favoring species that are less specialized and can adapt to varying conditions (e.g. some caddisflies, dragonflies, and stoneflies). This effect, while not desirable overall, may in fact, improve habitat for the species listed in Table 3 that prefer finer substrate sizes (e.g. *Agapetus jocassee*, *Serratella spicilosa*, and *Gomphus consanguis*). Species such as the French Broad crayfish, which require more specialized habitats, may occur at reduced densities if habitat changes exceed the duration suggested in the hydrological analysis, and could eventually be locally extirpated, should it occur.

It would be difficult to control 100% of sediment input and runoff into the Davidson River during project implementation. Therefore, increased attention to erosion control structure installation and maintenance will be necessary. Improper installation and maintenance of erosion control structures can lead to increased sedimentation of aquatic habitats. Given that aquatic habitat and populations within the upper Davidson River already suffer from sedimentation resulting from road runoff, further sedimentation could affect pool and spawning habitats. This loss of habitat would affect fish community stability by reducing trout spawning success, which over time, could depress local, reproducing populations of brown and rainbow trout within the aquatic analysis area. It is likely that blacknose dace would survive changes in habitat quality and quantity, although in potentially lower numbers, since they occupy many different microhabitat types.

Long-term effects of the improvement include improved runoff and sediment control along the upper Davidson River. The proposed road improvements include sediment control structures that would reduce the amount of sediment entering the Davidson River and its tributaries. Over time, as natural high flows flush existing sediments from the area, aquatic habitat quality and quantity may improve, which may be reflected in improved trout reproductive success and more stable aquatic insect community.

Paving this section of FS 475 would increase the amount of impervious surface draining to the upper Davidson River. Vegetated filter areas between the road and the River would reduce the

amount of toxic runoff along most of this section; however, there is approximately 300 feet of road that is immediately adjacent to the River where no filter area exists. Road drainage would have to be directed away from the River to minimize effects of toxic runoff in this stretch. Physical aquatic habitat would not be affected, and it is unlikely that effects on aquatic populations would be local. Rather, as toxins are flushed downstream, they may cumulatively affect local communities in the Davidson River. Species that are sensitive to changes in water quality (e.g. trout, dace, some aquatic insects) may be affected; however such changes are not likely to be measurable in a stream the size of the lower Davidson River.

Replacement of Davidson River Bridge at Lanning Ridge

Replacement of the Davidson River bridge would include minimizing new bank disturbance by leaving the old abutments in place and removing the old deck. New abutments would be constructed behind the old ones, and a new deck laid on the abutments. Ground disturbance would be minimal and further away from the creek. Replacement of the bridge would not affect aquatic habitat or populations and would avoid the potential effects associated with bridge failure.

North Fork French Broad River Area

Widen and pave part of Segment C (Cove Creek to SR 1327)

The proposed widening and paving of the above segment of FS 475 requires that extensive soil disturbance occur adjacent to Shoal Creek for approximately 0.4 miles. Given that aquatic habitat and populations within Shoal Creek already suffer from sedimentation resulting from road runoff, further sedimentation could affect pool and spawning habitats. This loss of habitat would affect fish community stability by reducing trout spawning success, which over time, could depress local, reproducing populations of brown and rainbow trout within the aquatic analysis area. It is likely that blacknose dace would survive changes in habitat quality and quantity, although in potentially lower numbers, since they occupy many different microhabitat types.

Long-term effects of the improvement include improved runoff and sediment control along the upper reaches of Shoal Creek. The proposed road improvements include sediment control structures that would reduce the amount of sediment entering Shoal Creek from Forest Service land. Over time, as natural high flows flush existing sediments from the area, aquatic habitat quality and quantity may improve, which may be reflected in improved trout reproductive success and more stable aquatic insect community. However, because a substantial portion of the drainage area is in private ownership with varying land uses occurring, it is unlikely that any improvements to aquatic habitat and populations within Shoal Creek would be measurable or attributable to improved conditions on Forest Service lands or within the road corridor.

Paving this section of FS 475 would increase the amount of impervious surface draining to Shoal Creek. Vegetated filter areas between the road and Shoal Creek are minimal, which may result in an increase in toxic runoff from impervious surface area into the stream. Physical aquatic habitat would not be affected, and it is unlikely that effects on aquatic populations would be local. Rather, as toxins are flushed downstream, they may cumulatively affect local communities in the North Fork French Broad River. Species that are sensitive to changes in water quality (e.g.

trout, dace, some aquatic insects) may be affected; however such changes are not likely to be measurable in a stream the size of the North Fork French Broad River.

Cumulative Effects

Water quality within the Davidson River drainage has been and is affected by past and present land uses. For example, in 1994, Tropical Storm Beryl caused landslides along the Davidson River corridor that resulted in the input of tremendous amounts of sediment into the River. And later, road relocation efforts resulting from the slides suffered construction difficulties and erosion control failures that input another slug of sediment into the River. Although aquatic habitat was undeniably affected within the upper Davidson River by these sediment inputs, the effects were relatively short-term. For example, habitat inventory data from the Davidson River above the hatchery before and after Tropical Storm Beryl showed no differences in habitat variables such as pool/riffle ratio, large woody debris distribution, and substrate particle size although the location and distribution of habitat types had changed significantly. This indicates that the Davidson River has the inherent capability to move sediments downstream, where negative effects on aquatic habitat quality and quantity would be less measurable.

Water quality and aquatic habitat have been affected in the North Fork French Broad River by a variety of past land uses, including farming, road building, and land clearing on private land and existing old roads on Forest land. While many of these land uses have changed and water quality has improved inputs turbidity levels remain high, especially after rain events.

Implementation of either of the action alternatives proposed for the FH 50 Improvement Project would not have long-term impacts on aquatic sensitive or Forest concern species. Habitat for these species, should they occur within the project area, could be temporarily affected, with conditions quickly returning to normal upon site rehabilitation. Long-term improvements in runoff and stream sedimentation would outweigh any short-term effects during project implementation given mitigation measures are implemented successfully.

CULTURAL ENVIRONMENT

Evaluation Factor	Alternative 1 No Action	Alternative 2 Pave Segments B & D	Alternative 3 Pave Segments B, C & D
Heritage Resources	No sites affected	7 sites affected, 4 Class II, 3 Class III	23 sites affected 20 Class II 3 Class III
Recreational Experience			
- remoteness	Remote	Slight loss of remoteness	Major loss of remoteness
- scenic quality	Scenic	Scenic	Slight loss of scenic quality
- angling	No Impact	No Impact	Slight negative impact from noise & litter
- hiking	No Impact	No Impact	Slight negative impact from noise & increased traffic
Number of Users	Increase at current rates	Increase slightly above current rates	Increase well above current rates
Amount of Through Traffic	Current level	Slight increase	Greater increase
Safety	Loose gravel and washboarding, undefined road edge	Greater speed on paved sections	Greater speed on paved sections
Evaluation Factor	Alternative 1 No Action	Alternative 2 Pave Segments B & D	Alternative 3 Pave Segments B, C & D
ROS	No change	No change	Slight shift from RN2 to RN1
VQO	Meet retention, partial retention & modification	Meet retention, partial retention & modification	NOT meet retention, Meet partial retention & modification
Forest Plan Consistency	Yes	Yes	No

Heritage Resources

Existing Condition

Proposed improvements along Forest Highway 50 would have an effect on heritage resources. Where Class II sites are located within the proposed impact corridor, archeological testing and/or data recovery will be required. Sites will require data recovery if determined eligible to the National Register of Historic Places (NRHP). In the case with alignment changes, it is possible that large scale data recovery will be required.

The potentially affected area includes the existing FH 50 corridor from its junction at US 276 to its junction with NC 215. The focus area for this analysis covers the segment beginning at the intersection with FS 809 (Cove Creek parking area) and ending at NC 215 (Segments C&D). Proposed repaving of the segment from US 276 to the Fish Hatchery is considered a categorical exclusion for National Forests in North Carolina (NFsNC) heritage resources and there are no archeological objections to repaving. Segment B was surveyed prior to its construction (Snedeker, Ashcraft, Noel, Dyson and Harmon 1997) and resulted in the location of three archeological sites. No significant sites were affected by this construction as agreed upon by the NFsNC and N.C. State Historic Preservation Office (December 4, 1997).

Background research conducted for the proposed FH 50 improvements located 10 previously recorded archeological sites (31TV82, 31TV87 - 93, 31TV95, 31TV97, 31TV98, and P106-1-90). These sites are all potentially eligible to the NRHP until further evaluated in the field. In addition, three historic structures were identified on historic maps along this road. The Forest Service acquired these lands between 1916 and 1925.

Direct and Indirect Environmental Effects

Alternative 1:

No heritage resources would be affected and there are no archeological objections to this alternative.

Alternative 2:

Seven archeological sites have been identified within the area covered by this alternative. Four of these are Class II sites and require further testing and evaluation to determine eligibility to the National Register, and would require test excavations and/or data recovery prior to any impact. The other three are classified as Class III sites and are not considered eligible to the National Register.

Alternative 3:

Alternative 3 may affect an additional sixteen archeological sites. These 16 sites are Class II, potentially eligible to the National Register, and would require test excavations and/or data recovery prior to any impact.

Approximately 70% of Segment C is rated high or moderate probability for containing archeological sites. Five existing sites have been recorded in this segment (31TV82, 31TV87, 31TV95, 31TV97, and 31TV98) and all are rated Class II pending further testing and evaluation. Site 31TV98 was re-evaluated during the Searcy Creek Timber Sale (Ashcraft 1997) and was determined to be potentially eligible to the NRHP. With exception of 31TV98, none of Segment C has been formally surveyed for archeological sites. Based on proximate survey results, and landforms indicated on the USGS quadrangle, it is predicted that at least 10 archeological sites will be recorded along Segment C. This is in addition to the existing known sites and thus a total of fifteen sites are expected. All Class II sites will require archeological testing to determine NRHP eligibility. If determined eligible, the portion of the site in the impact corridor will require data recovery.

As described by the NC DOT Division 14 District 1 Office in the "U.S. Forest Service Highway 50 Improvement for Paving and Proposed Alignment Change" document, two specific areas are planned for alignment changes. The largest (in scale) of these changes would include the landform with sites 31TV98 and 31TV97. A proposed "cut and fill" solution is recommended here to straighten curves. As proposed, this action would require extensive testing and mitigation measures for both sites. Testing and potential mitigations would involve well over an acre of site coverage. The large scale and expense of archeological recovery at sites 31TV97 and 31TV98 should be considered when evaluating this alternative.

Recreation Resources – Issues C, D, E

Existing Condition – Recreational Use

FH 50 provides primary access west off US 276 to the Pisgah Center for Wildlife Education, Pisgah Fish Hatchery, high quality fishing areas, group campgrounds, and several trails. Highest recreational use occurs from US 276 to Lanning Ridge with low use from Lanning Ridge to Gloucester Gap, and almost no recreational use the rest of the road corridor.

Fishing use focuses along Davidson River from US 276 to Lanning Ridge. Davidson River is one of North Carolina's prime trout streams. Popularity of the river stems from its easy access from US 276 and FH 50, high water quality, and the variety of fishing opportunities it provides. Opportunities range from hatchery supported stretches of the river to flyfishing - catch and release only. The lower reaches of the river are also popular for swimming and tubing and, during times of high water, canoeing and kayaking.

Upper Cove and Lower Cove Creek Group Campground is located about 3 miles west of US 276. It has two group sites each of which will permit up to 100 people, but averages are about 30-40 people. Amenities include water and vault toilets. It is a fee site, by reservation only. This popular campground is booked a year in advance for holidays. Use figures for the period March through November, 1998 indicate over 6,000 campers using the campground. Counts over the past few years show an increase in use.

Four parking areas along FS 475 access about 28.5 miles of hiking and mountain bike trails and the 19.5 mile Art Loeb trail that crosses the road at Gloucester Gap. Mountain bikers ride the graveled FH 50 itself or use it as a link between trail segments. Since the 1.3 mile road relocation in 1997 bikers and hikers use the old segment as a trail. They park at the Pisgah Center for Wildlife Education Center and take off onto the old segment approximately 0.5 mile west of there. Counts indicate a growing number of mountain bikers and hikers using FH 50. Buses and vans with hikers park at Lanning Ridge to access the trails. In addition to individual use, commercial guides under special use permit use the trails throughout the summer season.

Input from scoping and phone calls with individuals who use the area indicate this is a special place for them in terms of natural appearing scenery, and relatively easy access to semi-remote areas off the main road. This is consistent with the recreation opportunity spectrum (ROS) setting for the recreational experience in this area. ROS class along FH 50 from US 276 to Lanning Ridge is "roaded natural 1 (RN1)" which indicates a moderate to high opportunity to be in contact with other users. Off the road corridor to Lanning Ridge, and the rest of the area west

to private land including the road corridor, is ROS class "roaded natural 2 (RN2)". It indicates managing for a low to moderate probability of contact with other users. Current recreation uses including fishing access, mountain bike and hiking trails, wildlife viewing, scenic driving, and camping are all consistent with RN1 and RN2. Although these uses are allowed in MA3, which includes the road corridor west of Gloucester Gap, the standard indicates a low level of private vehicular access on system roads.

Looking Glass Rock and John Rock Scenic Areas are located on either side of FH 50 from US 276 to FS 475B, almost 2 miles. Both of these areas include large monolithic rocks that afford outstanding views of the Davidson River basin. They are managed to maintain the high scenic quality and for low impact, non-motorized recreational use such as hiking and nature study.

Existing Condition – Scenery

All national forest landscapes have value as scenery - some more than others. The Scenery Management System (SMS) is a tool to inventory and classify the importance, or value, of landscapes as they relate to people and the ecosystem.

The Visual Quality Objectives (VQO's) describe the variation from a natural condition that is permitted in the landscape. VQO's are based on management area designation along with an inventory matrix combining scenic attractiveness with distance zones and concern or sensitivity levels.

The scenery management objectives for almost the entire project area or basin are retention and partial retention. This indicates a high concern for viewing naturally appearing scenery, and when management activities, including roads, occur they must blend in with the surrounding natural landscape and not dominate the view. Retention provides for management activities that are not visually evident. Activities repeat only those characteristics found in the natural landscape, and changes in size, amount, intensity, direction, and pattern should not be evident. For partial retention management activities remain visually subordinate to the characteristic landscape. The portion of the project area in MA3 has a VQO of modification in which management activities may dominate the characteristic landscape, but must borrow from natural elements occurring within the surrounding area.

Direct and Indirect Environmental Effects – Recreational Use & Scenery

Alternative 1:

If the road work is not done, the impact to the remote and scenic experience for recreationists would not change. Use would continue to increase at the current rate and would be limited by existing parking. The road would not be any more desirable to through travelers than it is now. The safety issue of multiple users on the road would not be addressed. No action does for the short term relieve the concern over loss of more difficult to access areas of the forest. The ROS classes and VQO's would remain the same.

Cumulative effects

Long term maintenance and safety concerns with portions of the road template (tight curves) could require some heavy maintenance or changes other than grading and gravelling the road.

Increased recreational use would continue to put pressure on recreation managers to provide additional parking and resource and safety protection. As marketing draws people to the Cradle of Forestry and as local populations and visitation increases these scenic places with water access will become more and more popular. Over time the remote experience would change because of increased demand and use of the area. As management scenarios are explored, future demand could cause these same issues to resurface.

Alternative 2:

The road, bridge, and parking activities listed would not have an effect on the scenic experience. The road template in segment A is ready to pave with no additional changes and the other activities would meet the scenic objectives of retention and partial retention if mitigation measures are followed.

The remote experience for some recreationists would change if the road paving extended to Cove Creek, although the ROS class of RN1 along the road corridor would not change. A paved road would invite more use, and some increase in through traffic could occur. Higher speeds on paved portions would increase safety problems when combined with increased numbers of users. Improved signing and designated speed limits would help with these concerns. Not paving Segment C is consistent with the Forest Plan.

Widening and paving Segment D could cause a slight increase the amount of traffic on that section of the road. Segment D is not a main access route for recreationists. It is used primarily by local residents. The topography in Segment D is flatter and the dramatic changes with cuts and fill would not occur. Short-term the impact to scenic quality would be noticeable, but long term the road could blend into the natural surroundings.

Cumulative effects

Facilities in place to manage use (parking lots, signing) would help future management as demand continues to grow. User concerns about loss of remote areas or the eventual pressure to pave the whole road are not addressed and would probably resurface in the future.

Alternative 3

Paving the entire road would have a dramatic negative effect on the scenic quality of the area. Most of the road except for Segments A and B and some of Segment D would have to be widened, creating large cutbanks. The closed canopy and roadside vegetation would be lost, and many interesting features and curves would be compromised. It is doubtful the VQO of retention would be met in one growing season and the scale of disturbance in many areas would dominate the viewed scene. Partial retention (views of the road from middleground situations) would be met in two growing seasons if cutslopes were minimized. Modification (MA 3) would be met.

Of all the alternatives this one would increase the potential for additional recreational use and through traffic. There would be concentrated bike use along the portion from Cove Creek to Lanning Ridge, which would increase the safety and user conflicts between bikes and vehicles. Use as a through road would increase noise and litter, and would negatively affect the recreational experience for trail users and anglers. The work to improve use of the old road as a trail would only benefit that portion of the road, and wouldn't offset the increased problems

created on other road portions. Paving Segment C is not consistent with Forest Plan standards for limited private vehicular use on that portion of road. The ROS class of RN 1 would probably not change unless use dramatically increased. The portions of the area in RN 2 (outside the immediate road corridor) could change to RN 1 with increased numbers of users.

Cumulative effects

Easier access would, over time, increase demand and use of the area. Ability to manage the area would be more difficult and solutions would probably continue to change the character and experience of the area and facilities, resulting in a change in ROS class as noted above. User concerns about setting a precedent for paving the whole road would be moot, but concern over loss of difficult to access areas of the forest would be heightened.

RESOURCES NOT AFFECTED

The following resource areas were considered during the analysis process, but it was determined that the environmental effects would be either so minimal as to not warrant further consideration or else there would be no effect.

Air
Soils
Special Areas
Special Habitats
Timber

CHAPTER 4: PREPARERS AND PERSONS CONSULTED

The following persons comprise the interdisciplinary team and participated in the formulation and analysis of issues, alternatives, and environmental effects.

Art Rowe - District Ranger
Scott Ashcraft - Archeologist
Sheryl Bryan - Fisheries Biologist
Marella Buncick - NEPA Coordinator
Richard Burns - Forest Hydrologist
David Danley - Botanist
Mae Lee Hafer - Wildlife Biologist
Kathy Ludlow - Recreation Planner

Other persons consulted include:

Mickey Martin - Engineer
Rodney Snedeker - Forest Archeologist
Chuck Dumas - NCDOT
Ed Green – NCDOT

APPENDIX A

BIOLOGICAL EVALUATION FOREST HIGHWAY 50 PISGAH RANGER DISTRICT PISGAH NATIONAL FOREST

The Pisgah Ranger District proposes to improve Forest Highway (FH) 50, (Davidson River Road-FS 475 and Gloucester Road-SR 1321), located in Transylvania County, North Carolina. Segments of FH50 will be straightened and widened, paved, and bridges will be replaced. After improvement work is completed, the Forest Service would grant an easement to the North Carolina Department of Transportation for ongoing maintenance. Proposed, endangered, threatened, and sensitive species (PETS) and Forest concern species considered in this Biological Evaluation (BE) are those identified on the National Forests in North Carolina PETS and Concern species list.

Proposed Action

The FH50 Project includes the following activities:

1. Repave the surface of Segment A, including the four pullouts and the parking area at the Looking Glass Rock trailhead.
2. Create 3 pull-out parking spaces adjacent to the hatchery to facilitate parking closer to the Davidson River Trailhead.
3. Pave Segment B, the segment reconstructed in 1996. No widening or curve realignment is necessary.
4. Replace the bridge at Cove Creek.
5. Pave a parking lot across from the entrance to the Cove Creek Group Camp and a path to connect the parking area to the end of the Davidson River Trail.
6. Widen and pave Segment D (SR 1321).
7. Replace the existing box culvert in Segment D.

See the Environmental Assessment and the Decision Notice for the FH50 Project for a complete detail of the preferred alternative.

Forest PETS and Concern Species Evaluated

Potentially affected PETS and Forest concern species were identified after (1) reviewing the list of PETS and Forest concern species of the National Forest in North Carolina and their habitat preferences, (2) consulting element occurrence records of PETS and Forest concern species maintained by the North Carolina Natural Heritage Program, (3) consulting with individuals both in the public and private sectors who are knowledgeable of the area and its flora and fauna, and (4) conducting field surveys in areas designated for ground disturbance. The project area was surveyed by Dave Danley, Forest Service Botanist; Sheryl Bryan, Forest Service Fisheries Biologist; and Mae Lee Hafer, Forest Service General Biologist to identify PETS and Forest concern species or suitable habitat within the project area. As a result of a likelihood of occurrence evaluation based on preferred habitat elements, filed records, and survey results, 54

aquatic, 18 plant and 3 terrestrial wildlife species are known to or may occur within or near the project area (Table 1).

Table 1. PETS and Forest concern species and their likelihood of occurrence.

SPECIES	TYPE	PROBABILITY OF OCCURRENCE
<i>Agapetus jocassee</i>	caddisfly	known to occur near project area
Aquatic Insect Community (48 species)	insects	may occur
<i>Cambarus reburrus</i>	crustacean	may occur
<i>Cryptobranchus alleganiensis</i>	amphibian	known to occur in project area
<i>Gomphus consanguis</i>	dragonfly	may occur
<i>Gomphus viridifrons</i>	dragonfly	may occur
<i>Serratella spiculosa</i>	mayfly	may occur
<i>Agalinis decmloba</i>	herb	may occur
<i>Aster shortii</i>	herb	may occur
<i>Bryocrumia vivicolor</i>	moss	may occur
<i>Campanula aparinoides</i>	herb	may occur
<i>Carex biltmoreana</i>	sedge	known to occur in project area
<i>Carex woodii</i>	sedge	known to occur in project area
<i>Drepanolejeunea appalachiana</i>	liverwort	may occur
<i>Hexastylis contracta</i>	herb	may occur
<i>Hexastylis rhombiformis</i>	herb	may occur
<i>Juglans cinerea</i>	tree	known to occur in project area
<i>Lysimachia fraseri</i>	herb	may occur
<i>Macrocoma sullivantii</i>	moss	may occur
<i>Plagiochila caduciloba</i>	liverwort	may occur
<i>Plagiochila echinata</i>	liverwort	may occur
<i>Plagiochila virginica var. caudiloba</i>	liverwort	may occur
<i>Schlotheimia lancifolia</i>	moss	may occur
<i>Smilax biltmoreana</i>	vine	may occur
<i>Thermopsis fraxinifolia</i>	herb	may occur
<i>Accipiter cooperii</i>	bird	may occur
<i>Myotis sodalis</i>	mammal	may occur
<i>Clemmys muhlenbergii</i>	reptile	known to occur near project area
<i>Falco peregrinus</i>	bird	known to occur near project area

Potential Effects and Mitigation

Aquatic PETS and Forest Concern Species:

Please refer to the attached Aquatic Analysis (AQUA) for a detailed discussion of the effects of this project on aquatic resources.

Mitigation for Aquatic PETS and Forest Concern Species:

1. Sedimentation and erosion control measures must be implemented prior to any ground-disturbing activities. Silt fence or other acceptable barrier must be placed along the length of the project where soil disturbance is within 300 feet of live water. Structures must be inspected and maintained regularly, especially after rainfall events, to minimize downstream impacts.
2. Under no circumstances should rock, sand, or other material be dredged from the stream channel for use as fill or stabilizing material. Instream dredging affects aquatic habitat quality and quantity and can alter local hydrology.
3. Blasted material that inadvertently reaches the Davidson River should be managed so that it does not impact natural streamflow. Changes in local hydrology can affect aquatic habitat quality and quantity and can result on increased erosion.
4. Under no circumstances should wet concrete be allowed to come in contact with Cove Creek, the Davidson River, or Shoal Creek (e.g. at culvert headwalls and bridge abutments). Uncured concrete affects water quality and is toxic to most aquatic organisms.
5. Construction within 25 feet of flowing water, including stream crossings, is prohibited during the trout spawning seasons of September 15 through November 1 and January 1 through April 15 to protect reproducing fish and hellbender populations and critical life stages.
6. Given the above, no trees immediately adjacent to or that are part of the streambank should be removed, even if they are within the ROW. These trees promote mechanical stability against erosive high flows, as well as provide shade to the stream.
7. Stormwater and road surface runoff will be directed to buffer areas or retention basins and will not be routed directly into the Davidson River, Shoal Creek, or Indian Creek.
8. The same erosion and sediment control practices will be implemented on private land to protect National Forest water resources downstream

Botanical PETS and Forest Concern Species:

Please refer to the attached Botanical Analysis (BOTA) for a detailed discussion of the effects of this project on botanical resources.

Mitigation for Botanical PETS and Forest Concern Species:

This project will have no effect upon any of the PETS and Forest concern plant species. No risk to plant population viability will occur as a result of implementing this proposal, therefore no mitigation is required for botanical species.

Management Recommendations for Botanical Species:

Where possible use native seed mixtures for roadside planting. Possible choices include *Sorghastrum nutans* (Indian grass), *Tridens flavus* (purple top), *Schizachyrium scoparium* (broom sedge), and *Andropogon virginicus* (broomstraw).

Terrestrial Wildlife PETS and Forest Concern Species:

Please refer to the attached Wildlife Analysis (WILDA) for a detailed discussion of the effects of this project on terrestrial wildlife resources.

Mitigation for Terrestrial Wildlife PETS and Forest Concern Species:

This project is not likely to affect any of the PETS and Forest concern wildlife species. No risk to terrestrial wildlife population viability will occur as a result of implementing this proposal, therefore no mitigation is required for terrestrial wildlife species.

Management Recommendations for Terrestrial Wildlife Species:

1. Maintain a lower speed limit of 35-45 to reduce the chance of roadkill.
2. Sign FH50 with an "animal" crossing sign (e.g., deer crossing) at each end of the road to warn travellers of the potential for animals to cross the road. Hopefully people will be more aware and on the lookout for animals crossing the road and take action to avoid hitting them.

Cumulative Effects

The combined effects from all activities within the analysis area, including those that have occurred in the past 10 years and those that may occur in the reasonably foreseeable future, that may directly or indirectly affect forest habitats, individual animals, or species viability in the project area or on the Forest, have been considered cumulative effects in this analysis. Implementation of the proposed project will result in no negative cumulative effects on FSC or MIS species since no direct or indirect effects will occur.

All connected actions in the project area have been identified in the alternatives. Past actions that have occurred within or near the project area include the Indian Creek Timber Sale (1990),

the Cove Creek Timber Sale (1992), the Fish Hatchery Bridge Replacement (1995), the relocation of Davidson River Road (1997), Long Loeb Timber Sale (1997), Searcy Creek Timber Sale (1997), and Regroups Timber Sale (1998). The Lanning Branch Timber Sale is scheduled for 2002. No other projects will occur in Compartments 76, 83, 85, 95, 104, 106, and 107 within the reasonably foreseeable future (5 years).

Table 3. Major projects within the analysis area by year.

1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
9	9	9	9	9	9	9	9	9	9	9	0	0	0	0	0	0
8	9	9	9	9	9	9	9	9	9	9	0	0	0	0	0	0
9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
	A															
			B	B	B	B										
						C										
								D								
								E	E	E						
								F	F	F	F					
									G	G						
											H					
													I	I	I	I

- A - Indian Creek Timber Sale (Compartments 106)
- B - Cove Creek Timber Sale (Compartments 83-85)
- C - Fish Hatchery Bridge Replacement (Compartment 76)
- D - Davidson River Road Relocation (Compartments 83)
- E - Long Loeb Timber Sale (Compartments 96)
- F - Searcy Creek Timber Sale (Compartments 96)
- G - Regroups Timber Sale (Compartment 85)
- H - FH50 (Compartments 76, 83, 85, 95, 104, 106, and 107)
- I - Lanning Branch Timber Sale (86, 87, and 94)

Much of the area was harvested earlier in this century when it was in private ownership. The cessation of harvest under public ownership resulted in a long term decline of early successional habitat through the mid part of this century. Associated with that, species dependent upon such habitat decreased. Timber harvests on National Forest land in the 1960's and early 1970's greatly improved conditions for most game species. Populations of wildlife dependent upon late successional forest habitat were most likely unaffected by these early harvests as their habitat was still abundant. Recreation opportunities and usage began to increase dramatically during this period.

The Forest Service timber harvest in the 1980's continued the gradual reintroduction of early successional habitat into the landscape. The resultant increase in habitat diversity improved conditions for those species dependent upon a variety of successional types. Black bear do well with a mix of both types of habitat while other species such as gray squirrel, pileated woodpecker and many forest interior birds require late successional forests.

This improvement in habitat diversity has resulted in a slight reduction of late successional habitat; however, the gradual maturation of earlier harvests will offset this in the long term, provided a balance of age classes across forest types is maintained. This trend will continue with present and future forest management activities.

Determination of Effect

Implementation of either of the action alternatives will not have long-term impacts on aquatic sensitive or Forest concern species. Habitat for these species, should they occur within the project area, could be temporarily affected, with conditions quickly returning to normal upon site rehabilitation. Long-term improvements in runoff and stream sedimentation will outweigh any short-term effects during project implementation given that the mitigation measures listed above are implemented successfully.

This proposal will have no effect on any Federally listed or proposed listed plant species. Past Forest actions, within the Davidson watershed, have had minor impacts to two populations of *Carex woodii*. However, the cumulative effect of these actions is thought to be minimal because these impacted populations were found to still be viable after the actions. Therefore, this proposal will not have a cumulative effect to *Carex woodii* in the Davidson River watershed because there are several known viable population that will not be impacted by this, or other, Forest proposals.

This project could remove potential Indiana bat habitat. But, since this road project will occur in Transylvania County, which is outside the 4-county area, and the likelihood of Indiana bats occurring outside the 4-county area is very low, this project **is not likely to adversely affect the Indiana bat**. There will be no negative effect on other federally threatened or endangered wildlife species, nor is it likely to result in a trend towards federal listing of sensitive species. This project will have no impact on any sensitive, state-listed, or forest-listed species if project implementation is in compliance with the Endangered Species Act and Forest Service Manual 2670. Informal consultation with the U.S. Fish and Wildlife Service is required.

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Date