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Service

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# **Environmental Assessment**

## **Breedlove Road Access**

**Monroe County, Indiana**

**Brownstown Ranger District**

**Hoosier National Forest**

**March 12, 2003**

Abstract: Mr. Roscoe Breedlove, Jr. requests access across National Forest System (NFS) land to property he owns. We propose to approve a private road easement on NFS lands on a route called Knight Ridge. He would then construct a single lane, gravel-surfaced road across private, State, and Federal lands.

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# Preface

In 1991, the Hoosier National Forest completed a comprehensive land management planning effort with the publishing of the Hoosier National Forest Land and Resource Management Plan (*Forest Plan*) that replaced the 1985 *Forest Plan* with a significant amendment (USDA FS 1991b). During this effort, we made a concerted effort to seek out public involvement. With the public's help, we identified issues and alternative approaches to management of the Hoosier National Forest. An environmental impact statement (EIS) was prepared in conjunction with the *Forest Plan* to document the analysis (USDA FS 1990 and USDA FS 1991a). We developed the EIS in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality implementing regulations for NEPA.

The approval of the Record of Decision (USDA FS 1991c) for the final EIS on April 8, 1991 represents the first level of decision-making related to land and resource management planning. This decision determined the desired future condition of the Hoosier National Forest and established the guidance under which we implement future projects.

The second, and final, level of decision-making focuses on the analysis and implementation of management practices and projects designed to achieve the goals and objectives of the *Forest Plan*. This involves site-specific analysis to meet the requirements of the National Environmental Policy Act and specific on-site resource needs.

The environmental assessment (EA) for the proposed Breedlove Road Access project documents the site-specific analysis for project implementation occurring at the second level of decision-making. This EA was initiated because of environmental analysis of the proposed project in accordance with NEPA procedures. These procedures afforded interested and affected publics the opportunity to participate. This report was prepared outlining the alternatives for implementing this project, noting any needed mitigation measures and predicting the relevant environmental consequences. The decision maker may now consider the results of this analysis in making an informed decision.

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# **Environmental Assessment Breedlove Road Access**

## **Introduction**

Our primary responsibility is to provide healthy, sustainable ecosystems for Americans, present and future. While doing this, we sustain the vitality and diversity of the Hoosier National Forest in perpetuity.

This proposal implements the USDA Forest Service Natural Resource Agenda. The publication, “Charting Our Future...A Nation’s Natural Resource Legacy,” is the latest and most detailed presentation of the Forest Service Natural Resource Agenda (USDA FS 1998b). Two agenda items apply to this proposal for road access. The first item is Watershed Health and Restoration, and second is National Forest Road System. Watershed health must be evaluated and safeguarded in new road construction and existing road maintenance. While evaluating the National Forest Road System, the first objective of the road policy is to more carefully consider decisions to build new roads. A proposed road may become an essential part of the transportation system. The overriding objective is to work with local people to provide a road system that best serves the management objectives and public uses of Hoosier National Forest while protecting the health of the Lake Monroe watershed.

This analysis was initiated in response to a request from Mr. Roscoe Breedlove, Jr. for access. Our Office of General Council (OGC) (Almario 2001) informed us that the Alaska National Interest Lands Conservation Act (ANILCA), 16 U.S.C.3210 (a) does not apply to Mr. Breedlove because these rights were waived to the US Army Corps of Engineers (COE). Therefore, the Forest Supervisor has discretionary authority to consider this access request.

This environmental assessment displays the direct, indirect, and cumulative effects of the proposed action, five alternatives to the proposed action, and a no action alternative. The proximity map, alternative map, slope map, and ownership map are displayed in Figures 1, 2, 3, and 4 respectively. We propose to grant a private road access easement across National Forest System (NFS) land to property owned by Mr. Breedlove. Mr. Breedlove requests access across NFS land from State Route (SR) 446 north of Lake Monroe (Township 8 North, Range 1 East, Sections 29 and 30).

An easement would be issued under the Federal Land Policy and Management Act of 1976 (FLPMA) with an annual fee. The road would have a 12-foot wide, single lane, all season, gravel surface with a twenty-two foot to thirty-two foot clearing based on the road design to be developed by an engineer for the applicant and approved by the Forest Supervisor. The environmental analysis would include several alternatives to Mr. Breedlove’s proposal, including the route he used under a temporary permit in 1997 to remove timber.

Note: Environmental impacts are expected to be similar on private, State, and Federal land. The applicant would need to obtain access across the private and State land and comply with Monroe County zoning ordinance as a condition of acquiring an easement from the USDA Forest Service.

## **Purpose of the Proposed Action**

The purpose of this action is to provide a road easement across portions of NFS land to property owned by Mr. Breedlove in Township 8 North, Range 1 East, Section 30, bounded on the west by Lake Monroe. This proposal would carry out the Hoosier National Forest (HNF) guidance to provide access to adjacent property owners when no reasonable access exists.

This policy is stated in the *Forest Plan*, on page 2-22, under the goal of “Provide a Useable Landbase,” within the section entitled “Transportation System” under the sub-heading “Protection Of Outstanding Access Rights” (USDA FS 1991b):

“Requests for easements or special-use permits for new or improved road access across National Forest System land by State or local units of government, by private landowners, or by other interests, are handled on a case-by-case basis.”

“Access will be provided to other ownerships across National Forest System land when no other reasonable access exists. Alternative access, management area objectives, and public input are considered when evaluating requests for access.”

## Need for the Proposed Action

Mr. Breedlove requested a road easement, by submitting an application on January 16, 2001, across NFS land from SR 446 north of Lake Monroe, located in Township 8 North, Range 1 East, Sections 29 and 30, as shown in Figure 4. Mr. Breedlove stated that he desires an access right that is transferable to successors in interest.

## Breedlove Property

Roscoe and Mildred Breedlove (Mr. Breedlove’s parents) sold a tract of land to the COE in 1963 for the impoundment of Lake Monroe. The senior Mr. Breedlove agreed, at that time, that he would waive access to the remainder of his estate **across the tract he sold to the COE**. He did not waive access rights across any of his other property. His estate included the two tracts analyzed in this EA.

The two tracts are landlocked as they are surrounded by Federal land (either COE or NFS). Mr. Breedlove, Jr. requested a special use permit to access the two tracts owned by him and his family without crossing the COE land sold by his father in 1963. There are no deed restrictions on these two tracts regarding access.

The Breedlove property consists of two adjoining parcels. One parcel is in the name of Roscoe Breedlove Jr. and contains 19 acres. The other parcel is in the name of Roscoe Breedlove Jr., Charles George Breedlove, and Violet Viola Zinn and contains 73 acres. NFS lands adjoin the Breedlove property on the east and south. The western boundary is Lake Monroe. The small northern portion is bounded by land administered by the COE. The NFS land was acquired in 1949.

Roscoe and Mildred Breedlove conveyed a portion of their property to the COE for the Lake Monroe impoundment on February 27, 1963 (Monroe County deed record, Book 149, Pages 546-550). The deed from Roscoe and Mildred Breedlove to the COE waived their right of access **across the property conveyed to the COE**. This deed included the following language on page 549:

“The GRANTORS, for and in consideration recited above, hereby waive their right to any way of necessity they may have over the herein described land as a means of ingress and egress to any other lands of the GRANTORS abutting or adjoining thereto and agree that the consideration herein recited liquidates in full all damages (if any) due to restriction or loss of access to any of the GRANTORS abutting or adjoining land.”

The above “waive of rights” applies only to the property conveyed to the COE and not all lands that adjoin the remainder of the estate.

Roscoe Breedlove and Mildred Breedlove conveyed the 19-acre property to Roscoe Breedlove and Betty Lou Breedlove, husband and wife, on July 1, 1963 (Monroe County deed record, Book 152, Page 348).

Mildred Breedlove, surviving spouse of Roscoe, conveyed the 73-acre property to Roscoe Breedlove Jr., Charles George Breedlove, and Violet Viola Zinn on June 7, 1988 (Monroe County deed record, Book 348, Pages 135-137).

There is no legal requirement to grant an easement to the Roscoe Breedlove, Charles George Breedlove, and Violet Viola Zinn property (Almario 2001), but the aforementioned now request permanent access. The Forest Supervisor has discretionary authority to review and analyze the request for access under FLPMA authority.

## **Federal Land Policy Management Act**

The USDA Forest Service has discretionary authority to grant access across NFS lands under the FLPMA, 43 U.S.C. 1761-1771. FLPMA authorizes the Forest Service to grant, issue, or renew rights-of-way over NFS lands. FLPMA (43 U.S.C. 1764) authorizes the Secretary of Agriculture to regulate the use of the right-of-way under such “terms and conditions as the Secretary concerned may prescribe regarding extent, duration, survey, location, construction, maintenance, transfer, or assignment and termination.”

FLPMA authority allows the Forest Supervisor to grant Mr. Breedlove access across NFS land on an environmentally protected, preferred route.

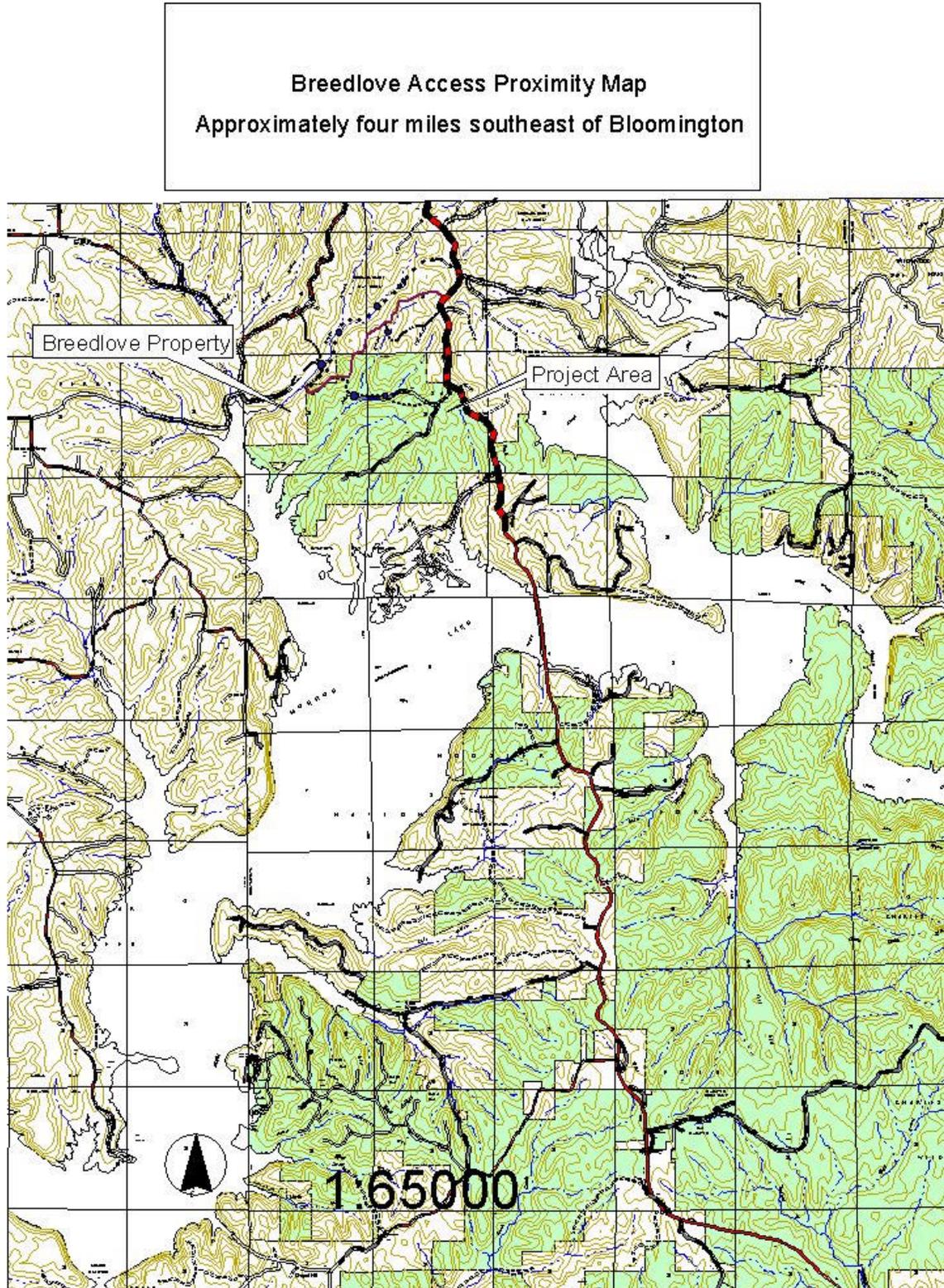
## **Roads Analysis**

“When proposed road management activities would result in changes in access, such as changes in current use, traffic patterns, and road standards, or where there may be adverse effects on soil and water resources, ecological processes, or biological communities (road construction, reconstruction, and decommissioning), those decisions must be informed by roads analysis (FSM 7712.1) except as provided by section 7712.13c” (FSM 7712.13). The interdisciplinary (ID) team used the forest-scale road analysis to provide a context for road management in the Pate Hollow area (USDA FS 2001a).

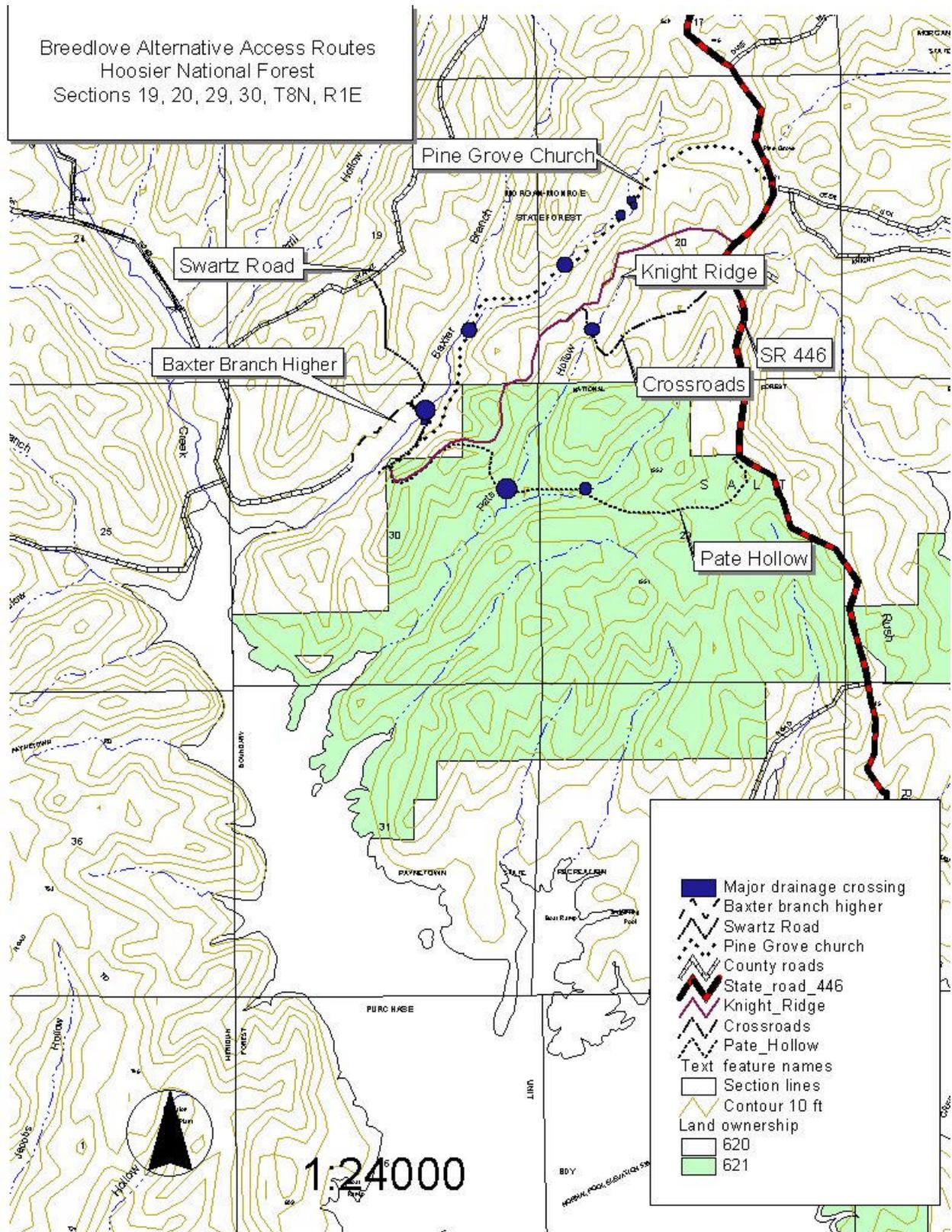
Currently, public access is limited to walk in access from State Highway 446, walk-in access from Paynetown State Recreation Area, and boat-in access from Lake Monroe. There are several miles of existing road constructed to access the area for timber sales about 1985. These roads are gated and available only for administrative use and walk-in access. The road analysis team did not identify any additional transportation investments for meeting resource management needs in the forest-scale road analysis. In the near future, we plan to construct a hiking trail at Pate Hollow. There may be a need to provide a parking lot for users of the proposed hiking trail. However, this would be addressed in future analysis.

The ID team believes this environmental assessment and the forest-scale road analysis provide the information needed to make an informed decision. The ID team has not done additional road analysis because the proposed road construction as described in the proposed action is unlikely to make major changes to public access, current use of the area, traffic patterns, road standards, or cause major adverse effects on soil, water resources, ecological processes, or biological communities. This proposed action provides only landowners access to their private property. Therefore, it does not change public access.

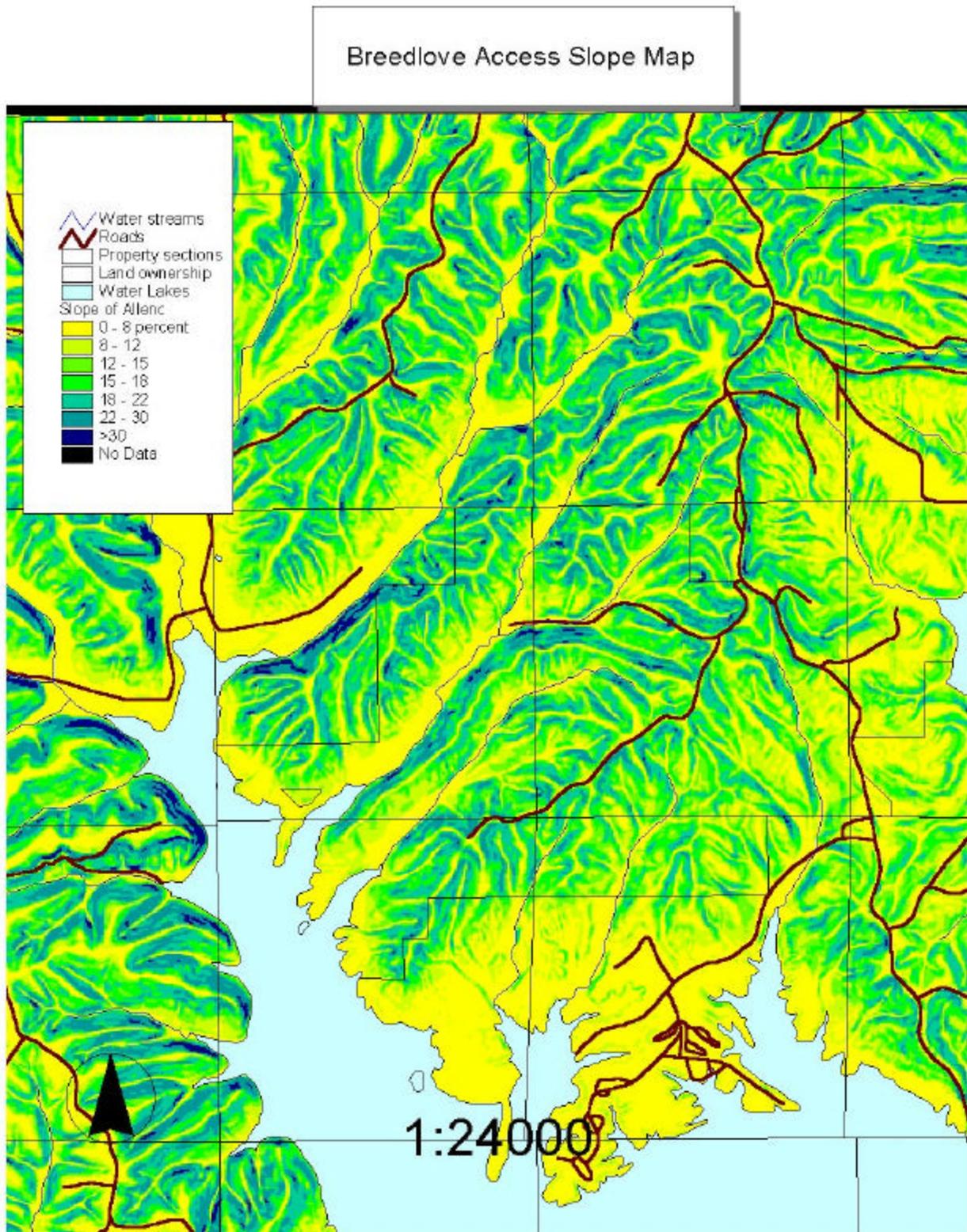
**FIGURE 1: PROXIMITY MAP OF PROPOSED ALTERNATIVES BREEDLOVE ACCESS**



**FIGURE 2: PROPOSED ALTERNATIVE ACCESS MAP**

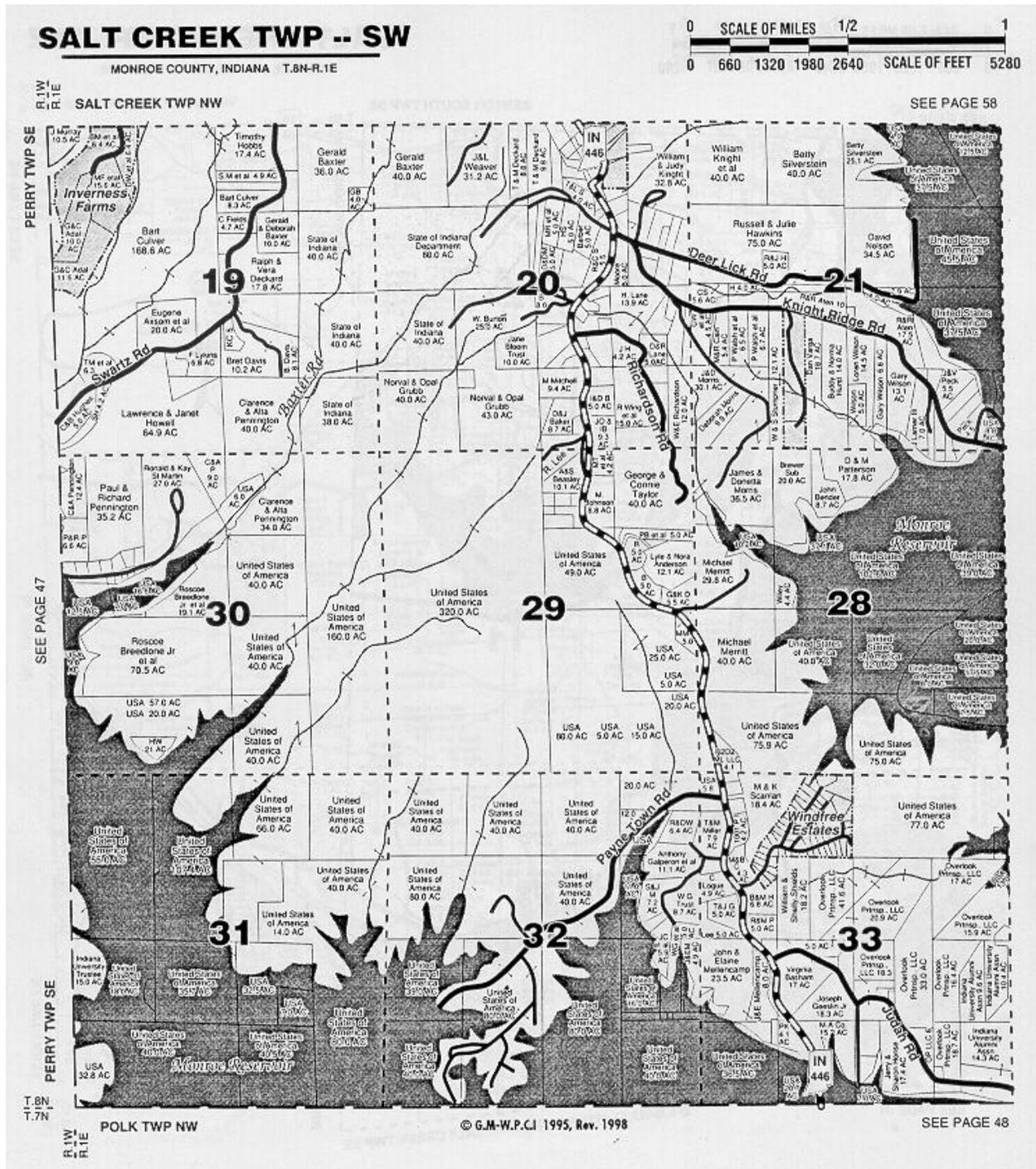


**FIGURE 3: PROPOSED BREEDLOVE ACCESS SLOPE MAP**



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**FIGURE 4: MONROE COUNTY PLAT OWNERSHIP MAP**



## **Proposed Action**

The proposal is to grant an easement across NFS lands on a route called Knight Ridge to Mr. Breedlove. Mr. Breedlove would need to obtain access across the private lands and State land, obtain all required zoning and construction permits from Monroe County (for private lands), and provide engineering drawings for road construction to the Forest Supervisor for approval across NFS land.

He could then construct a single lane, gravel-surfaced road on and across approximately 2,900 feet of NFS land according to approved engineering drawings. This would affect about 1.65 acres of clearing for the road. After crossing the William Burton property, the road would cross 1,700 feet on a ridge on NFS land at five percent grade. Proper design requires a culvert every 180 feet or nine culverts (IDNR 1998). The road crosses 500 feet of the Alta Pennington property and then crosses an 800-foot flat segment of NFS land requiring two culverts. Finally, it crosses a 400-foot, 12 percent downhill segment of NFS land to the Breedlove property. Proper design requires three culverts for this segment (IDNR 1998).

## **Connected Non-Federal Actions**

We speculate that the applicant would also construct a single lane, gravel-surfaced road across private lands and State land. A right-of-way is required across the first property called Knight Ridge Campground for about 2,000 feet of existing road. This road is narrow and has a crushed asphalt base and cross drain structures in place. There are trailers on each side of the road in the campground. There are water and sewer pipes running under and along the campground access road and other utilities are located along the road on poles.

The second property belongs to the State of Indiana (State). This portion of existing road is a 1,100 foot single-lane road, spot surfaced with gravel. A right-of-way would be required from the State.

The next property belongs to Norval Grubb and a right-of-way would be needed to cross this segment of road. His property boundary is fenced with a gate at each crossing and a 1,000-foot long native surface road across a pasture on the ridge. There is a 12 percent grade to climb to the next property.

The fourth road segment is 1,400 feet across State land, but there is no existing road. A new road would need to be built along the sidehill of the higher knobs to avoid excessive slope changes. A right-of-way would be required from the State. The road would then cross the Federal land portion before entering the Pennington property. A fifth right-of-way would be required from the Pennington's for about 500 feet of new road construction.

The road then crosses NFS land before entering the Breedlove property. This alternative would be along a dry ridge system extending from SR 446 to the Breedlove property. There are nine high knobs to sidehill around to minimize slope change on the road. We also understand that Mr. Breedlove intends to sell the land in parcels for about three or four home sites.

We estimate the 4,000 feet of non-surfaced or non-existing road would affect about 2.27 acres of land on the ridge or sidehill. A map review of the route indicated there would be about 1,900 feet of sidehill road with eight percent grade around the knobs along the narrow ridge as shown on the map in Figure 3. This would require one culvert every 150 feet at eight percent grade or 13 culverts on the sidehill (IDNR 1998). There is about 2,100 feet of road on the ridge with about three percent average grade and this requires one culvert every 233 feet or nine culverts (IDNR 1998). We recommend 30-foot long, 18-inch diameter culverts for 20-foot wide roads, as smaller culverts tend to clog easily with leaves and twigs. In addition, about three or four lots may be large and flat enough for house sites to meet Monroe County Planning Department guidance of 1 contiguous acre of less than 12 percent slope (Monroe County 1997).

This means that 3 to 4 acres of land would be disturbed for house sites. The home sites would require utility rights-of-way for phone and electric service across the road access route or a cross-country route. A waterline would likely be cost prohibitive to service three to four homes. Deep wells or cisterns (storage tanks) may be feasible. Septic would likely be a mound system for each house site. Monroe County requires undisturbed soil 50 feet by 80 feet on less than six percent slope with a 25-foot buffer to 12 percent slope for a mound system (Heneger 2000). Septic systems require Monroe County Health Department permits.

## **Mitigations Included in the Proposed Action**

The HNF requires the following before issuing a road easement across NFS land:

1. Obtain access across private lands and State land.
2. Provide proof of all required zoning and construction permits from Monroe County.
3. Provide engineering drawings for road construction on NFS land to the Forest Supervisor for approval.
4. Protect soil from erosion by seeding and mulching exposed soil and culvert inlets and outlets as soon as the road is constructed and graded.
5. Avoid potential take of Indiana bat (*Myotis sodalis*) by not removing trees greater than three inches in diameter between April 15 and September 15 on NFS land.
6. Use HNF Road Design Guidelines (USDA FS 2001a) for setting road design standards on NFS lands in Indiana. The guidelines were derived from the *Forest Plan*, particularly Appendix K, Forest Service manuals and handbooks, and the Indiana field guide for best management practices (IDNR 1998).
7. Use standard mitigation measures applicable to road construction described in the *Forest Plan* Appendix K (USDA FS 1991b) to protect soil and water quality.
  - a. Use natural drainage and drainage dips or culverts during layout and construction.
  - b. Use temporary sediment basins during construction when necessary to retain sediment in the construction area.

Other mitigations for the proposed action are discussed in the environmental effects section of this document and a list of mitigations is included in Appendix B.

## **Mitigation on Non-Federal Lands**

The applicant would need to acquire easements or rights-of-way across State and private lands. The State may have permit requirements similar to the HNF for access and mitigation measures. Monroe County has guidance for mitigation on private land. Similar to HNF, Monroe County may specify distance between cross drainage, surfacing needs, and soil and water protection measures required to construct an all-weather road on private land. Monroe County also has building code guidance for lands in the area around Lake Monroe. These include specific restrictions for sensitive lands (Monroe County 1997). About 1 acre of relatively flat ground is needed for home site and septic system. A mound system requires undisturbed soil 50 feet by 80 feet on less than six percent slope with a 25-foot buffer to 12 percent slope (Heneger 2000). Septic systems require Monroe County Health Department permits.

## **Decision to be Made**

The decision to be made is whether to issue an easement for the Knight Ridge route, an alternative route, or the no action alternative.

## Forest Plan Background

This proposal would carry out the HNF policy to provide access to adjacent landowners when no reasonable access exists. As explained above in the section labeled, “Purpose of the Proposed Action,” the forestwide guidance for access is: “Access will be provided to other ownerships across National Forest land when no other reasonable access exists. Alternative access, management area objectives, and public input are considered when evaluating requests for access” (*Forest Plan*, p 2-22).

The proposal is in Management Area 2.4. In this management area, the transportation system guidance states on page 2-30 that: “National Forest lands in Management Area 2.4 are generally accessible by foot from existing “open roads or by boat.” This sentence addresses public access to NFS land, not private access to private land. The access policy for private land is addressed on page 2-22 of the *Forest Plan*. Given that this road would be a private road, public access to NFS land would not change from the existing situation.

Therefore, this proposal is consistent with the *Forest Plan*. The *Forest Plan* was adopted to meet the requirements of the National Forest Management Act (NFMA) of 1976.

## Other Related Projects

The forest has experience with similar projects:

1. The forest recently analyzed and constructed 0.9 mile of road to the U-38 dam to repair the draw down structure and provide safe, all-season access to the dam (USDA FS 1998a).
2. The forest recently completed analysis of the Charles C. Deam Wilderness Trail Project that is in the Lake Monroe watershed and about 5 miles southeast of this project area (USDA FS 2001b).
3. The forest recently analyzed and constructed about 2 miles of road to Celina Lake dam. The purpose of this project was to construct a safe, all-season access road for the operation and maintenance of the dam (USDA FS 1999a).

These project environmental assessments are available on line on the Hoosier National Forest web site at [www.fs.fed.us/r9/hoosier](http://www.fs.fed.us/r9/hoosier).

## Other Projects in the Proposed Alternative Areas

Smithville Telephone Company has requested access across the Pate Hollow route to bury a fiber optic telephone line. They have placed flags in the ground to show the location of the proposed line for analysis. It follows the general location of the existing Pate Hollow road and the skid trail up to the ridge that continues west to the Breedlove property (personal observation Tom Krueger). The key difference is that the effects of a one-time entry to bury a phone line are considerably less than the construction and continuous use and maintenance of a road.

# Issues Related to the Proposed Action

Issues and management concerns related to the proposed action were identified by mailing a scoping letter on January 29, 2001, to approximately 650 individuals and organizations requesting their comments about the proposed action. Several of the adjacent landowners were also notified. These letters contained proposed route maps for access to the Breedlove property. The ID team also reviewed the area and expressed concerns about: soil and water resource protection during road construction and road design to resolve steep grade and safety issues on an access road between SR 446 and Lake Monroe.

Specific comments, issues, and concerns were identified from these sources. Responses were received as written letters, telephone calls, and personal contacts. A list of those groups or individuals that responded is in Appendix A. The interdisciplinary team evaluated each comment to determine how it should be addressed. The results of the evaluation are displayed in Appendix A.

Five issues were identified from public comments and internal comments. This input served as a basis for evaluating the alternatives, including the proposed action. These issues were also used to assess environmental consequences.

Impacts to Heritage Resources on Federal land must be evaluated for earth disturbing activities. The potentially affected Federal land was surveyed for heritage resources in 1993, 1994, and again in 2001 for this project. No sites were found (Krieger 2001). Heritage resources are protected by language in right-of-way authorizations. If they are discovered during construction, work must stop and the Forest Service and State Historic Preservation Officer (SHPO) must be notified to evaluate.

## Issue 1: Soil and Water Protection

Several people commented on the need to protect soil and water quality during road construction. Building roads in hilly terrain requires removing trees, ground cover, and making cuts and fills in the rolling hills to build a road that meets grade requirements. Research findings and our own experience have shown that most soil erosion potential occurs during the construction period (Swift 1988). Erosion potential is greatly reduced, as the road cuts and exposed soil are re-vegetated after the first year. Exposed soil should be revegetated quickly after construction and not exposed without mulch or vegetation over winter. Surfaced roads are best protected from soil erosion with a minimum of four inches of gravel. The stream crossing is the most critical part of the entire road and often involves fill material around and over culverts in the crossing. Filter strips of undisturbed forest leaf litter and vegetation prevent sediment from reaching streams (Swift 1988).

It is important to put the erosion concern of road construction into context with comparative sources of sediment. According to the Environmental Protection Agency, about a third of the nation's land is forested, only three percent of the nonpoint source of pollution that limits the usefulness of water is said to be of silvicultural origin (Patric 1996). Lake Monroe is fortunate to have a heavily forested watershed. The forest acts as a buffer to the watershed and is much more effective than range, agriculture, or recreation use of soils. "The nation produces about 4 billion tons of sediment annually, 55% of it is from farmlands, 30% from badlands, and 15% from urban, highway, range, and forested lands." Row crops and tilled soil are the greatest source of sediment as the erosion is from sheet and rill erosion. Farm soil loss is estimated to be about 30 times greater than produced on forested land. Tree cutting alone simply does not cause sheet and rill erosion" (Patric 1996).

Sediment load to the reservoir that may be directly related to road construction and long-term road maintenance is a concern. Fortunately, a watershed study determined the impacts of road construction and timber harvesting in Pate Hollow. Sediment load from road construction and timber sale activity was

monitored in the Pate Hollow drainage (Moss 1995). Soil erosion potential was controlled by diligent soil protection work as each step in the road construction process was completed. No sediment load was found in the collection basin. The recent road analysis conducted by the Hoosier National Forest (USDA FS 2001a) states, "Surface erosion is highly dependent on soils, the effectiveness and spacing and frequency of drainage structures, and the adequacy of buffer strips." The Pate Hollow Water Quality study and Swift's research findings listed above confirm the technical ability to control soil erosion and sediment load when mitigation measures are utilized.

After the road is constructed and stabilized, the second phase of soil erosion control is long-term road maintenance. Maintaining the road surface and keeping cross drainages clear of leaves and debris from blocking culverts and cross drains is critical. "Culverted road-stream crossing can cause large inputs of sediment to streams when culvert hydraulic capacity is exceeded or the culvert inlet is plugged" (USDA FS 2001a). Ridge roads have a buffer zone protecting the drainage and can filter out the contaminants and sediment before they enter the stream flow and lake (USDA FS 2001a).

Soil and water protection is the primary issue that drives this analysis. This issue is addressed in the effects section and mitigation measures are shown in Appendix B. These sections reflect the suggestions gained from research using extensive soil erosion protection measures developed over years of road construction in forested watersheds.

## **Issue 2: Healthy Watersheds and Floodplain**

Some people were concerned that the Lake Monroe watershed would be adversely affected by road construction. Lake Monroe is a municipal watershed for towns in Monroe, and the southwestern part of Brown Counties, with most customers in the cities of Bloomington and Nashville, Indiana. Watershed protection is a management concern of the USDA Forest Service. Pate Hollow and Baxter Branch are subwatersheds of the Salt Creek watershed. The primary subwatersheds potentially affected by this project are Baxter Branch and Pate Hollow.

Depending on the route selected, segments of the road could be in a floodplain. All-season permanent roads in a floodplain require fill to raise them above the seasonal flood level. A bottomland road parallel to the drainage requires cross drainage to maintain floodplain hydraulics. Maintaining floodplain hydraulics is the ability of surface water to flow unimpeded. The 4-foot raised road is estimated to be 20 feet wide with 1 to 3 slopes so a number of 36-foot long culverts are required. Culvert diameter would be specified in the road design to meet cross-flow needs to maintain floodplain hydraulics. Perennial stream crossings require fill for culverts or bridges and should allow for fish movement.

There are two measures to compare how alternatives affect healthy watersheds and floodplains: one is the type of floodplain crossing structure; its effectiveness in allowing fish passage; and ability to withstand storm flow; and second, is the presence or absence of raised road in the floodplain. A raised road is required when water threatens to flood the approach to the drainage crossing during a storm event. Any alternative would have mitigation measures built into the road design and would be evaluated by the authority with jurisdiction for the affected land. In Pate Hollow, the Hoosier National Forest engineer would evaluate the road design for approval by the Forest Supervisor. In Baxter Branch, the Monroe County Planning Department and the Highway Department (if over 5 lots are developed) would evaluate the road design for approval by the Monroe County Planning Commission.

## **Issue 3: Compliance with *Forest Plan* Riparian Management**

Some people were concerned the proposed action is not consistent with management objectives for Management Area 2.4. The *Forest Plan* discourages road construction in a riparian area, “Roads and trails will not be constructed in riparian areas unless no practical alternatives exist” (*Forest Plan*, pp. J-4 and J-5). Pate Hollow falls in a riparian filter strip, “Riparian filter strips will consist of the riparian area and a 50 to 100-foot zone adjacent to the riparian area” (*Forest Plan*, p J-4). Since both of these guidelines would be exceeded in crossing Pate Hollow, a site-specific *Forest Plan* amendment would be required. If this alternative were selected, the language in the *Forest Plan* would be changed from, “Roads and trails will not be constructed in riparian areas, unless no practical alternative exists.” to “With the exception of Pate Hollow (Forest Road 1552), roads and trails should not be constructed in riparian areas, unless no practical alternative exists.”

A natural spring flows across the existing Pate Hollow road about 300 feet east of the Pate Hollow crossing. *Forest Plan* guidance requires protection measures for springs, “The free flowing condition of springs will be protected, including karst springs, to maintain their functional and qualitative integrity” (*Forest Plan*, pp 2-8). This spring would need to be allowed to free flow across or under a new road.

## **Compliance with Monroe County Overlay Area Regulations**

The current Baxter Branch crossing location is not subject to *Forest Plan* guidance because it is on private land and regulated by Monroe County Overlay Area Regulations. The Breedlove property is zoned Forest Reserve with the Environmental Constraints Overlay (ECO) Area 1. These ECO Areas are in concentric zones surrounding Lake Monroe. The most restrictive is ECO Area 1. The proposed Baxter Branch crossing is at 570 feet and above the normal flood zone of 550 feet. Monroe County has jurisdiction on riparian buffers and requires a riparian buffer of 100 feet from each side of a perennial or intermittent stream. The Baxter Branch crossing is in the most restrictive ECO Area 1 adjacent to Lake Monroe (Monroe County 1997). Monroe County would either deny the request to build a road in ECO Area 1 or would need to issue a variance. Monroe County would likely require design plans with stringent mitigation controls for soil erosion.

## **Issue 4: Wildlife Habitat**

Some people were concerned that the wildlife habitat would be adversely affected by road construction. Impacts on threatened and endangered species, Regional Forester’s sensitive species, and Forest species of concern must be evaluated. Tree removal can cause loss of potential Indiana bat roosting trees from April 15 to September 15. There are special habitat concerns in riparian corridors such as Pate Hollow and Baxter Branch. There are concerns for the aquatic ecosystem if siltation is not controlled during road construction during the rainy season. The aquatic habitat issue is generally a concern when creeks are flowing. This is only a winter-spring or rainfall flow issue. Summer dry periods usually dry out these creek beds (Moss 1995).

The USDI Fish and Wildlife Service raised three issues: road construction and use may disrupt wildlife use in a little disturbed area; road construction in steep terrain can lead to increased loss of habitat; and the potential modification of wetland habitat in creek bottom areas. These issues are addressed in the effects section and mitigation sections. “Some of this bottomland area may qualify as regulated wetland” (Pruitt 2001a). If an alternative was carried out that affected wetlands regulated by the US Army Corps of Engineers, the applicant would be required to request a permit from the US Army Corps of Engineers

under 33 CFR Part 323, Permits for Discharges of Dredged or Fill Material Into Waters of the United States. The US Army Corps of Engineers may require further mitigation because the goal of "no net loss" is a guiding principle of the national wetlands regulatory program.

## **Issue 5: Road Design and Safety**

Some people were concerned with road design and safety. A neighbor commented on stopping sight distance safety at the Pate Hollow and SR 446 intersection.

Stopping sight distance is the cleared distance a driver can see another vehicle or pedestrian to safely stop or avoid collision. Indiana Department of Transportation (INDOT) has jurisdiction on SR 446. The INDOT Design Manual, Part V, Road Design Volume 1, requires a stopping sight distance of 570 feet for a vehicle going 55 miles per hour (mph); 350 feet for 40 mph; 273 feet for 35 mph and 225 feet for 30 mph. Hills and curves limit length of sight distance. The proposed road is a single lane road with turnouts. Single lane roads limit the ability to get out of the way of oncoming vehicle. Road turnouts allow oncoming vehicles to pull over so the other can safely pass. The road design would include provisions for sight distance on the interior roads in all alternatives and would not be a basis for comparison of alternatives. The measure for comparison is comparative sight distance of the proposed road to a collector road such as SR 446, Swartz Road, or Moores Creek Road.

The issues of steep grade, design vehicle, season of use, and signage are addressed in the road design package for any alternative and are not a basis for comparison.

The long-term safety concern is road maintenance. A well-maintained road has clean cross drainage, graded road surface, and a continuous road surface that is free of potholes and debris. A private road easement issued by the Hoosier National Forest requires that the holder inspect the road annually and maintenance needs are dealt with. The Forest Service also conducts an annual inspection to assure that road maintenance needs are met. A copy of the inspection report is sent to the holder and deficiencies are identified with a timeline to fix the problems.

# Alternatives

## Process Used to Develop Alternatives

This analysis was prepared in response to an application from Mr. Breedlove for access across NFS land to access to his property. The forest decided to analyze access routes to determine the preferred and least impact route across NFS land. In all alternatives, private or private and State parcels must be crossed before entering NFS land.

Following public input activities, the interdisciplinary team met and discussed issues and alternatives. Given the issues, the team developed alternatives that respond to several concerns.

Three general routes access the Breedlove property and are shown on Figure 2. One route is from SR 446 on the ridge called Knight Ridge. A second route is across Pate Hollow. A third route is across Baxter Branch. We reviewed the various routes for engineering design and environmental concerns. All routes cross multi-land ownerships. The Baxter Branch and Pate Hollow drainage crossings pose the most difficult challenges to engineering and environmental concerns related to soil and watershed protection. The Knight Ridge route poses the least challenge, as it would be a ridge road the entire route.

The applicant requested access from SR 446. There are four possible access points from SR 446.

We also analyzed the route timber was hauled out from the property in 1997 across Baxter Branch.

Estimated road access construction needs are listed in table form to facilitate comparison (Tables 1, 2, and 3). Each alternative assumes Indiana best management practices (IDNR 1998) would be used to mitigate impacts to soil and water resources and the watershed. Key factors in road construction are riparian crossings, proper cross drainage, acquiring rights-of-way, protecting disturbed soil during the construction phase (acres disturbed), and road length. Table 1 shows construction needs on NFS land, Table 2 shows construction needs on State and private land, and Table 3 shows the combined NFS, State and private lands construction needs. Cross drainage needs are based on road grade in slope percent and distance from table (USDA FS 2001a).

<b>Alternative</b>	<b>Riparian Crossing</b> (Drainage width and height or culvert size)	<b>Cross drains/construction</b> (Number of cross drains with 30-foot Culverts/Cut/fill (C/F) and Relocate segments (R))		<b>ROW No.</b> (Est.)	<b>Soil Disturbed</b> (Acres)	<b>Road length</b> (Approx. feet)
<b>A.</b>	20'x4' <sup>1</sup> Pate Hollow 96- and 76-inch culvert	10 ridge 24 sidehill 6 bottom	C/F, R Elevated road, 4'x20'x800'	1	4.40	7,730, 130 feet paved
<b>B.</b>	None	1 sidehill	C/F, R	1	0.04	75
<b>C.</b>	None	1 sidehill	C/F, R	1	0.04	75
<b>D.</b>	None	11 ridge 3 sidehill	Minor earth work	1	1.65	2,900
<b>E.</b>	None	11 ridge 3 sidehill	Minor earth work	1	1.65	2,900
<b>F.</b>	None	1 sidehill	C/F, R	1	0.04	75
<b>G.</b>	None					

Cross drainage needs are based on slope percent and distance from table (USDA FS 2001a).

<sup>1</sup> Width of stream cross-section by height of stream bank for bridge use.

<b>TABLE 2. ESTIMATED ROAD ACCESS CONSTRUCTION NEEDS ON PRIVATE OR STATE LAND</b>						
<b>Alternative</b>	<b>Riparian Crossing</b> (Drainage width and height or culvert size)	<b>Cross drains/construction</b> (Number of cross drains with 30-foot Culverts/Cut/fill (C/F) and Relocate segments (R))		<b>ROW No.</b> (Est.)	<b>Soil Disturbed</b> (Acres)	<b>Road length</b> (Approx. feet)
<b>A.</b>	None	2 ridge	C/F, R	2	0.3	530
<b>B.</b>	15'x8' Baxter Branch 96-inch culvert	3 ridge 22 sidehill 2 bottom	C/F, R Elevated road, 4'x20'x300'	2	2.27	4,000
<b>C.</b>	2-48" Un-named Creek 60", 96" Baxter Branch	5 ridge 29 sidehill 10 bottom	C/F, R 4 major riparian crossings	7	5.45	9,600
<b>D.</b>	None	9 ridge 13 sidehill	Minor earth work	4	2.27	4,000 of 6,000
<b>E.</b>	Upper Pate Hollow 65"	9 ridge 16 sidehill	C/F, R Riprap and fill	5	3.4	6,000
<b>F.</b>	15'x8' Baxter Branch or 96-inch culvert	19 sidehill 2 bottom	C/F, R Elevated road 4'x20'x200'	9	1.88	3,200
<b>G.</b>	Baxter Branch					

Cross drainage needs are based on slope percent and distance from table (USDA FS 2001a).

<b>TABLE 3. ESTIMATED TOTAL ROAD ACCESS CONSTRUCTION NEEDS ON PRIVATE, STATE, AND FEDERAL LAND</b>						
<b>Alternative</b>	<b>Riparian Crossing</b> (Drainage width and height or culvert size)	<b>Cross drains/construction</b> (Number of cross drains with 30-foot Culverts/Cut/fill (C/F) and Relocate segments (R))		<b>ROW No.</b> (Est.)	<b>Soil Disturbed</b> (Acres)	<b>Road length</b> (Approx. feet)
<b>A</b>	20'x4' Pate Hollow or 96", east branch 76"	12 ridge 24 sidehill 6 bottom	C/F, R Elevated road, 4'x20'x800'	3	4.7	8,260
<b>B.</b>	15'x8' Baxter Branch 96-inch	4 ridge 23 sidehill 2 bottom	C/F, R Elevated road, 4'x20'x300'	3	2.31	4,075
<b>C.</b>	10'x5' & 15'x8' Baxter Branch 48", 48", 60", 96"	5 ridge 30 sidehill 10 bottom	C/F, R 4 major riparian crossings	8	5.49	9,675
<b>D.</b>	None	20 ridge 16 sidehill	Minor earth work	5	3.92	8,900
<b>E.</b>	65-inch culvert upper Pate Hollow	20 ridge 19 sidehill	C/F, R	6	5.05	8,900
<b>F.</b>	15'x8' Baxter Branch 96"	20 sidehill 2 bottom	C/F, R Elevated road 4'x20'x200'	10	1.92	3,275
<b>G.</b>	Baxter Branch					

Cross drainage needs are based on slope percent and distance from table (USDA FS 2001a).

## **Alternative A (Pate Hollow Route)**

### **Background**

The road into Pate Hollow was built for a timber sale in the mid-1980's. The existing road, Forest Road (FR) 1552, is about 1 mile long from SR 446 to Pate Hollow crossing. A timber sale contractor

constructed it for logging trucks and high clearance vehicles with grades sometimes exceeding 22 percent. There are numerable grades that exceed eight percent. Eight percent is considered the maximum grade for all-weather driveways on NFS land. Mr. Breedlove proposed to use this route as shown on Figure 2.

USDA Forest Service would issue a private road easement for road segments across NFS land.

The *Forest Plan* discourages road construction in a riparian area, “Roads and trails will not be constructed in riparian areas unless no practical alternatives exist” (*Forest Plan*, pp. J-4 and J-5). Pate Hollow also falls in a riparian filter strip, “Riparian filter strips will consist of the riparian area and a 50 to 100-foot zone adjacent to the riparian area” (*Forest Plan*, p J-4). This alternative requires a site-specific *Forest Plan* amendment because the road would be built in a riparian corridor and there is a practical alternative (Knight Ridge) outside of a riparian zone (*Forest Plan*, page J-4 and J-5). Other alternatives would cross riparian areas on private land, which do not require a *Forest Plan* Amendment.

## **Description of Pate Hollow Route**

Alternative A begins at SR 446 and crosses about 30 feet of private land. The USDA Forest Service has an easement for this right-of-way across the Landry property. However, this easement is restricted to USDA Forest Service use. The first part of the road between the gate and the Indiana State Police Radio Tower is too steep, at about 22 percent grade, to meet passenger vehicle guidelines. The existing road intersects with another road (FR 1551) about a quarter of a mile from SR 446. Near this intersection, FR 1552 starts down the slope into Pate Hollow. On the descent to the Pate Hollow stream, FR 1552 crosses the un-named drain. Both drainages are steep sided subwatersheds of about 150 acres and 125 acres respectively.

The existing road has a major seep before crossing Pate Hollow. The area near the seep remains wet even in dry summers. The stream that runs parallel to the road shows evidence of flowing down the existing road in storm flow. The existing Pate Hollow road is located on a sidehill and currently needs several additional cross drain structures at the spacing indicated on the Recommended Maximum Spacing for Culverts and Drain Dips (USDA FS 2001a).

The private road easement would allow Mr. Breedlove to construct and maintain a 12-foot wide, single lane road with turnouts, minimum 22-foot clearing width, aggregate driving surface from near the intersection of FR 1552 and SR 446. This alternative would follow the general route of FR 1552, cross the Pate Hollow stream, ascend to Knight Ridge, and to his property as shown on Figure 2. The easement would require USDA Forest Service approval of the engineering design work before any construction could begin.

The route begins on SR 446 in a curve with very poor sight distance (200 feet north because of a curve and only 100 feet to the south because of a hill). It then crosses 30 feet of private land. The road is closed with a gate and then climbs 30 feet in elevation over 130 feet (a 23 percent grade) to the Indiana State Police radio tower. This grade may be too steep to negotiate in winter. It has wooden box culverts embedded in a gravel base. The recent heavy rains have washed out gravel and created a rut in the road (personal observation Tom Krueger March 20, 2002).

The road then follows the ridge for 1,900 feet at about two percent grade. Proper design requires one culvert every 300 feet or six culverts. It then drops down the sidehill to the bottom of the un-named drainage at 12 percent over 1,600 feet. At this grade, proper design requires one culvert every 133 feet or 12 culverts. The un-named drainage crossing needs a 76-inch culvert plus fill and riprap to protect the fill material around and over the culvert. The bottomland segment is about 1,700 feet between drainage crossings at two percent grade. Proper design requires one culvert every 300 feet or six culverts. Several smaller drainages cross this road segment. Larger culverts would be required according to engineer designs that estimate flow. A spring flowing year-round is located about 300 feet from the Pate Hollow

crossing and needs to flow freely across the road to the drainage. It may require more culverts. The existing road dead-ends at Pate Hollow. We estimate that the Pate Hollow crossing requires a 96-inch culvert and two feet of fill over the culvert and riprap to protect the fill material. The last 800-foot segment of the 1,700-foot bottomland road is at or below road drainage grade and requires three to four feet of fill and riprap to hold the soil against the erosion forces of the creek that runs parallel to the road.

After crossing Pate Hollow, a skid trail climbs the hill at 18 to 22 percent grade to Knight Ridge for 1,200 feet. At this grade, proper design requires a culvert every 129 feet or nine culverts. This grade exceeds the eight percent recommended grade for driveways. A new road would then cross the Pennington property for about 500 feet on the ridge at four percent grade. Proper design requires two culverts.

The next segment of road is on NFS land for 800 feet across a saddle at five percent grade. Proper design requires one culvert every 180 feet or four culverts. The final segment across NFS land to the Breedlove property is about 400 feet of sidehill road to build at 12 percent grade. Proper design of this segment requires one culvert every 133 feet or three culverts (Christensen 2001).

The first 160 feet of road is surfaced with gravel. We estimate that there would be 4.4 acres (0.2 acres of road are surfaced) of soil exposed by this road construction location, but the acreage figure does not include the fill material for the elevated road and culvert crossings, these require riprap as well as seed and mulch to hold the soil. Stabilizing the soil during construction is the primary mitigation measure to avoid sediment from leaving the construction site and entering the watershed. We estimate that this route would require 10 culverts on the ridge, 24 sidehill culverts, and six culverts in the bottom plus the two major culvert stream crossings of 96 and 76 inches.

All alternative routes require work to clear the right-of-way of trees and vegetation, construct cross drainage, fill low areas, cut hills, and stabilize the cuts and fills by seeding, mulching and fertilizing. Alternative A requires more cross drainage structures than any other alternative.

The road in the Pate Hollow crossing does not have a forested buffer between the road and the intermittent stream because the road is in the bottom of the drainage.

The final phase is long-term maintenance of the road right-of-way, holding the soil in place during the freeze-thaw cycle in the spring, and high velocity water coming off the adjacent steep slopes in large rainfall events. Most damage to roads and cross drainage can be attributed to the few heavy rainfall events. The road should be inspected for damage after each one of these storm events.

## **Connected Non-Federal Action**

It is likely the applicant would construct a single lane, gravel-surfaced road across private lands. We believe a right-of-way is required across the first 30 feet of the existing road as it crosses private land. A second right-of-way is required to cross about 500 feet on the Pennington property. In addition, about three or four lots may be large and flat enough for house sites to meet Monroe County Planning Department guidance of 1 contiguous acre of less than 12 percent slope. This means that 3 to 4 acres of land would be disturbed for house sites. The home sites would require utility rights-of-way for phone and electric service across the road access route or a cross-country route. A waterline would likely be cost prohibitive to service three to four homes. Deep wells or cisterns (storage tanks) may be feasible.

## **Mitigation Required for Alternative A**

This route would need considerable engineering design work to reduce grade, provide cross drainage, allow for a free-flowing spring, cross Pate Hollow, and build a new road at acceptable grade up the west side of Pate Hollow to the Pennington and Breedlove properties.

Stabilize exposed and disturbed soil by seeding and mulching the exposed soil as soon as it has been shaped at culvert inlets and outlets and in fill material around culverts and drainage crossings.

The right-of-way holder would be responsible for long-term road maintenance and must provide an operating plan for sustained year-round use.

## **Alternative B (Swartz Road Route)**

This route primarily affects private land. It was used to haul timber from the Breedlove property in 1997. The forest issued a temporary road use permit to Mr. Breedlove to access his property for timber harvest. He completed the work in 1998 and the permit terminated. The forest would issue a private road easement for the 75-foot long piece of road used in 1997. The route crosses about 75 feet of Federal land (0.04 acre) at a 15 percent grade and requires placement of one sidehill culvert.

## **Connected Non-Federal Action**

The majority of road access is on private land. We speculate the applicant would construct a single lane, gravel-surfaced road across private lands. We believe a right-of-way is required across the first private tract owned by Bret Davis for about 700 feet of the existing road as it crosses private land and is on a ridge. A second right-of-way is required to cross the Pennington property along a sidehill, then across Baxter Branch and up the opposite sidehill for about 3,300 feet to the Breedlove property. We estimate the road would affect about 4,000 feet or about 2.27 acres of private land.

The road begins at the intersection with Swartz Road on the Bret Davis property and has good sight distance for access to Swartz Road. The road leaves Swartz Road as a driveway past a house and enters on old road cut at about 10 percent grade for about 200 feet. Proper design requires a culvert every 133 feet or two culverts. The road follows about 800 feet of ridge at three percent slope. At this average grade, proper design requires a culvert every 233 feet or three culverts.

The road continues in an open field across the Pennington property and along the sidehill for about 1,500 feet to the bottom in Baxter Branch at about 11 percent grade. Proper design requires a culvert every 136 feet or 11 culverts.

The road continues across an open field in the bottom for about 300 feet to the Baxter Branch crossing. This segment of road is in the floodplain of Baxter Branch. For all-season use, an elevated, all-season road across the riparian zone of Baxter Branch is needed. This elevated road would require two 36-foot long culverts to allow cross-flow or it would act as a dam. Normal stream flow of the Baxter Branch crossing is contained within a channel about eight feet deep. Storm flow exceeds the height of the banks and spills over into the field to the north of the drainage. The subwatershed of Baxter Branch is about 600 acres (over twice the watershed acreage as Pate Hollow, 275 acres above the crossing). It would take a bridge or very large culvert to contain the seasonal water flow.

The road south of Baxter Branch climbs in elevation for about 1,200 feet at about 12 percent (average) grade, but is severely eroded from lack of maintenance. The grade and sidehill on this segment would require nine culverts. There are steeper segments across the three side drains that exceed 18 percent grade. They would need larger culverts to allow for storm flow and considerable fill material to bring the road up to grade. With proper design, it may be possible to reduce this grade below 12 percent to meet Monroe County zoning ordinance for private land access roads.

## **Mitigation Required for Alternative B**

This route would need considerable engineering design work to reduce grade. It would require reconstruction to meet grade by placing culverts in the cross drainages and relocating segments. This would require placing fill material to meet grade in several cross drainages. Monroe County also has building code guidance for lands in ECO Area 1 around Lake Monroe. These include specific restrictions for sensitive lands (Monroe County 1997). About 1 acre of relatively flat ground is needed for home site and septic system. A mound system requires undisturbed soil 50 feet by 80 feet on less than six percent slope with a 25-foot buffer to 12 percent slope (Heneger 2000). Septic systems require Monroe County Health Department permits.

The right-of-way holder would be responsible for long-term road maintenance and must provide an operating plan for sustained year-round use.

## **Alternative C (Pine Grove Church Route)**

This route crosses about 75 feet of Federal land (0.04 acre) and requires one sidehill culvert. About 9,600 feet of this route crosses private and State lands, affecting a total of 5.49 acres.

## **Connected Non-Federal Action**

Under this alternative, the road would begin on SR 446 at Pine Grove Church. This intersection has poor sight distance on SR 446. The route is an old county road that runs down the “nose” of the ridge to the upper reaches of Baxter Branch. The road can be seen on old maps and the U.S. Geological Survey (USGS) quad map for Allens Creek as a dashed line (in Section 20). A dashed line indicates a trail or narrow woods road. The existing road/trail begins on private land at Pine Grove Church and crosses several private properties before entering State land and continues down Baxter Branch. The road is primarily in the Baxter Branch riparian zone. This old road meanders down the un-named drainage east of Baxter Branch and crosses the creek three times in the 3,000 feet before entering the Baxter Branch drainage. Once in the Baxter Branch drainage, the old road crosses Baxter Branch once and the crossing is about 800 feet upstream from the Baxter Branch crossing proposed for Alternatives B and F.

The 1,100-foot ridge segment near Pine Grove Church is about three percent grade. Proper design requires a culvert every 233 feet or five culverts. The next segment is on a sidehill and is 1,600 feet at 12 percent slope. Proper design requires a culvert every 133 feet or 12 culverts. The road continues alongside the un-named drainage that feeds Baxter Branch for 3,500 feet at one percent grade. Proper design on this segment requires a culvert every 500 feet or seven culverts. The road crosses the existing channel three times and would require three larger culverts to permit storm flow. A portion of this road segment is in the drainage for 500 feet. Indiana best management practices do not recommend building a road in the creek or even in the riparian zone (IDNR 1998). The road would need to be relocated out of the creek centerline. The next segment is 1,000 feet long at two percent grade. Proper design requires a culvert every 300 feet or three culverts along Baxter Branch. The road crosses the un-named creek just before it enters Baxter Branch about 1,500 feet upstream from the main Baxter Branch crossing. At this location, the road could be relocated upslope to avoid crossing Baxter Branch. The road then climbs out of Baxter Branch across the Pennington property on a sidehill for 2,400 feet at 10 percent grade. Proper design requires a culvert every 140 feet or 17 culverts. Four of these culverts cross side drains and would require larger culverts and considerable fill to maintain grade. The fill would have to be protected with riprap to stabilize the soil.

## **Mitigation Required for Alternative C**

This route requires the same mitigation measures as Alternatives B and F across 75 feet of Federal land. The road is primarily on private and State lands in the Baxter Branch riparian zone. The road was built in the drainage and cannot meet the Monroe County riparian buffer of 100 feet from the edge of the stream. This alternative would require a variance from Monroe County to build a road in the “100 foot set back zone” and require road design approval by Monroe County. Alternative C would also require a State right-of-way permit. Monroe County has Overlay Area Regulations, which apply to home development and land subdivision in the Overlay Areas surrounding Lake Monroe (Monroe County 1997).

The right-of-way holder would be responsible for long-term road maintenance and must provide an operating plan for sustained year-round use.

## **Alternative D (Proposed Action – Knight Ridge Route)**

Alternative D is explained in detail in the purpose and need section of this EA.

## **Alternative E (Crossroads Route)**

The route begins at SR 446 with good sight distance at a four-way intersection (Richardson Road and SR 446). This route crosses Pate Hollow higher in the drainage about half a mile up-drainage from the Pate Hollow crossing in Alternative A. The route crosses about 2,900 feet (1.65 acres) of Federal land and about 6,000 feet (3.4 acres) of private land. This alternative runs southwest along the ridge across the Grubb property and descends to upper Pate Hollow. The route crosses Pate Hollow and climbs up to Knight Ridge. Once on Knight Ridge, this route follows the same route to the Breedlove property as the proposed alternative (Alternative D). This route was analyzed as an alternative to improve the poor sight distance of Alternative A at the intersection with SR 446, avoid many of the cross drainage problems in Alternative A, and avoid the Knight Ridge Campground. This alternative is primarily on private and State lands and crosses upper Pate Hollow at a 90-degree angle, thus minimizing roadway in the intermittent drainage.

The road enters Federal land on the ridge for 1,700 feet at five percent grade. Proper design requires a culvert every 180 feet or nine culverts. There is a 500-foot segment across the Pennington property at five percent grade. The road then crosses an 800-foot flat segment of Federal land requiring two culverts. A 400-foot, 12 percent, downhill segment takes the road to the Breedlove property. Proper design requires three culverts for this segment.

## **Connected Non-Federal Action**

Based on map analysis, the route begins at SR 446 and follows the ridge southwest across the Grubb property for about 1,900 feet at about one percent grade. Proper design requires a culvert every 500 feet or two culverts. The next segment is on a sidehill to the upper Pate Hollow crossing and is 1,000 feet at 12 percent slope. Proper design requires a culvert every 133 feet or eight culverts.

The road crosses Pate Hollow for 200 feet and requires a large culvert since it has a watershed the same size as the un-named drain in Alternative A (about 115 acres). This was estimated to require a 65-inch culvert. The two feet of fill required over the culvert for this drainage crossing would reduce grade in and out of the crossing. After the road crosses Pate Hollow, the road climbs up to Knight Ridge at about 13 percent grade for 1,000 feet. Proper design requires a culvert every 131 feet or eight culverts. The

ensuing segment is 1,400 feet long at two percent grade. Proper design requires a culvert every 300 feet or five culverts along Knight Ridge on State land. The road enters Federal land on the ridge for 1,700 feet at five percent grade. There is a 500-foot segment across the Pennington property at five percent grade. Proper design requires a culvert every 180 feet or two culverts. The road then crosses an 800-foot flat segment of Federal land. The ensuing segment turns and proceeds 400 feet, at 12 percent grade, downhill to arrive at the Breedlove property.

## **Mitigation Required for Alternative E**

This route requires approximately eight private rights-of-way, an easement across Federal land, and a right-of-way across State land. It requires the same road design approval and building permits required by Monroe County on private lands in the Overlay Areas surrounding Lake Monroe. Monroe County has overlay area regulations, which apply to home development and land subdivision around Lake Monroe.

The right-of-way holder would be responsible for long-term road maintenance and must provide an operating plan for sustained year-round use.

## **Alternative F (Baxter Branch Higher Route)**

The route crosses about 75 feet (0.04 acres) of NFS land and would require the placement of one sidehill culvert. This alternative crosses about 3,300 feet (1.88 acres) of private lands. This route differs from others because it utilizes the Moores Creek Road to the Swartz Road. This alternative closely resembles the existing access route that is limited to Mr. Breedlove's use and is not transferable.

The Baxter Branch route is parallel and above the old county road that crosses COE administered land. The existing road location appears as a single dashed line on the Allens Creek USGS quad map in Section 30. A dashed line indicates a trail or narrow woods road. A new road would need to be constructed above and parallel to the dashed line on the map and would use the same Baxter Branch crossing as described in Alternative B. We believe a right-of-way is required across the first private tract owned by Ronald and Kay St.Martin.

After crossing Baxter Branch, the road would be relocated on a new location that would follow the contours across the Pennington property to climb to the top of the ridge at a 12 percent grade (the road used for logging this area in 1997 is too steep and eroded on its present location).

## **Connected Non-Federal Action**

A new road is required that would be above the COE property line and would parallel the existing two-track road in the Baxter Branch floodplain. This road would be about 1,800 feet and would be built on the sidehill at about five percent grade. Proper design requires a culvert every 180 feet or 10 culverts. There are four cross drains with steep sidehills before the Baxter Branch crossing. Therefore, four of the ten culverts would need to be large enough to handle storm flow. The Baxter Branch crossing would require a bridge or large culvert and a raised road segment for the width of the crossing (approximately 200 feet by 20 feet). The raised segment would require about two 36-foot long culverts or the elevated road would act as a dam. The road then climbs up the other sidehill at 12 percent grade for about 1,200 feet. Proper design requires a culvert every 133 feet or nine culverts.

## **Mitigation Required for Alternative F**

This alternative would require approximately eight private land rights-of-way, an easement over about 75 feet of Federal land, and the same mitigation measures as Alternative B. A ninth right-of-way is required to cross the Pennington property along the sidehill, then across Baxter Branch. Monroe County also has building code guidance for lands in ECO Area 1 around Lake Monroe. These include specific restrictions for sensitive lands (Monroe County 1997). About 1 acre of relatively flat ground is needed for home site and septic system. A mound system requires undisturbed soil 50 feet by 80 feet on less than six percent slope with a 25-foot buffer to 12 percent slope (Heneger 2000). Septic systems require Monroe County Health Department permits.

The right-of-way holder would be responsible for long-term road maintenance and must provide an operating plan for sustained year-round use.

## **Alternative G (No Action or Existing Condition)**

This alternative does not implement the proposal. This alternative allows the current owners to access their properties on foot. Mr. Breedlove, Sr. sold access rights to the COE in 1967. There are no access rights to transfer. This alternative would not meet the objectives of Mr. Breedlove to acquire legal access that is transferable, allowing him to sell the property with legal access. He has the option to sell the property with no legal access.

## **Alternatives Not Considered in Detail**

We considered an alternative that would cross the COE administered property. This route, lower on the hillside than the Baxter Branch higher route, crosses COE land, several private parcels, Baxter Branch, and a small portion of NFS land. The COE has tacitly allowed the Breedloves to use its land for access and would grant formal access to the Breedloves. The access right is not transferable to their successors in interest. The Breedloves would like to sell this land for development. Transferable access would be a prerequisite to future development (Almario 2001).

Several people suggested that the USDA Forest Service buy the land. William Burton and Mr. Grubb mentioned this as their preferred solution rather than affect their land (Burton 2001 and Grubb 2001). The Breedloves rejected an offer to purchase their land.

# Environmental Effects

This section presents the environmental effects of implementing each alternative. The effects are presented in response to the issues and concerns identified earlier. Knowing the expected environmental consequences of proposed activities gives the decision maker a basis for selecting which actions to implement. The need for an environmental impact statement is based on what environmental effects are expected from the proposed actions. The following effects are discussed because they are related to road construction, reconstruction, and maintenance.

The effects on plant and animal habitat, including the effects to threatened and endangered species, Regional Forester sensitive species, forest species of concern, and management indicator species, are shown to document compliance with the Endangered Species Act and the *Forest Plan*.

The effects on public safety require responsibility for safe road design before granting a road easement.

The effects on heritage resources are shown to document compliance with the National Historic Preservation Act and other acts that protect heritage resources.

The potential effects on soil and water resources drove the analysis because they are the resources most affected by road construction. Usually, use of Indiana's best management practices adequately protect soil and water resources (IDNR 1998). Standard mitigation measures are required in the design for any road construction and are described in Appendix K of the *Forest Plan* (USDA FS 1991b). The rest of the issues are minor in comparison as they can be mitigated with required design criteria, whether the road is built on Federal land, State, or private land. Each land ownership requires approved plans either by the USDA Forest Service on Federal land, Monroe County on private lands, or the State of Indiana on State land and appropriate construction permits.

## Issue 1: Soil and Water Protection

Several people commented on the need for protecting the soil and water quality during road construction.

### Affected Environment

#### Environmental Factors

The proposed action would occur in the Lake Monroe watershed. Lake Monroe was constructed by the COE in the late-1960's for flood control, watershed protection, water use, and recreation development. The watershed typically has hardwood-covered slopes. Some slopes are steep, with some slopes exceeding 40 percent.

The analysis area is limited to the two subwatersheds of Baxter Branch and Pate Hollow. These watersheds have a total area of about 1,807 acres and about 164 non-forested acres. The percentage of forested land cover is about 91 percent. It is generally believed that forested land contributes less sediment to watercourses and provides other beneficial watershed functions, such as watershed stability, wildlife habitat, and filtering of pollutants. In theory, effects to watershed health from land management activities decrease as the percentage of forested land increases. We found 18 non-forested sites containing from 1 to 30 acres per site, with the average non-forested site about 9 acres. There are 7.51 miles of road and 6.20 miles of stream in these watersheds.

Above the Baxter Branch drainage crossing by the proposed routes, there are about 600 acres in the Baxter Branch watershed. Baxter Branch collects water from an area south of the Swartz Road, west of SR 446, north of Knight Ridge, and west to the proposed crossing. This is a perennial stream. Almost the entire subwatershed is on State and private lands above the Baxter Branch crossing (Albright 2002).

Above the Pate Hollow drainage crossing of the proposed routes, there are about 150 acres in the Pate Hollow watershed. This is an intermittent stream. Pate Hollow collects water from the area west of SR 446 and south of Knight Ridge. The majority of the watershed is on Federal land. The upper reaches of the Pate Hollow watershed are in State and private ownership. The un-named watershed east of Pate Hollow is about 125 acres and affects the first crossing on the Pate Hollow Route.

## **Jurisdiction Factors**

Monroe County, USDA Forest Service, or Indiana Department of Natural Resources (IDNR) have jurisdiction over lands included in one or more of the alternatives evaluated. They have similar mitigation requirements and must review and approve construction plans before issuing permits or easements. All road construction and development plans on private lands must be reviewed and approved by Monroe County. If State of Indiana land is crossed, a State permit is required for access road construction and use. The USDA Forest Service requires an engineer's review of road construction plans and plan approval by the Forest Supervisor.

The Breedlove property and Baxter Branch crossing are in ECO Area 1. Monroe County also has building code guidance for lands in ECO Area 1 around Lake Monroe. These include specific restrictions for sensitive lands (Monroe County 1997). About 1 acre of relatively flat ground is needed for home site and septic system. A mound system requires undisturbed soil 50 feet by 80 feet on less than six percent slope with a 25-foot buffer to 12 percent slope (Heneger 2000). Septic systems require Monroe County Health Department permits.

Monroe County ordinances apply to road construction and development on private land. Proposals and permit applications are required to contain erosion and a drainage control plan is required. Subwatersheds on private land have watershed development restrictions that are most stringent close to the reservoir and Monroe County requires a, "Setback Distance from Tributaries and Streams: riparian buffer zones, measured from the stream/vegetation interface line, shall be established to a distance of 100 feet from each side of all intermittent and perennial streams as shown on USGS 7 ½ minute topographic maps" (Monroe County 1997). This setback would apply to all routes in the Baxter Branch watershed.

## **Soils**

Soils in the analysis area consist of Wellston-Gilpin silt loams, 6 to 20 percent slopes on the ridges, Berks-Weikert complex, 25 to 75 percent slopes on the side slopes, and Burnside silt loams on the narrow floodplains in the drainages.

The Soil Survey of Monroe County (USDA SCS 1981) rates the degree and kind of soil limitations as they affect local roads and streets. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength, shrink-swell potential, frost action potential, and depth to high water table affect the traffic supporting capacity. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties and site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult overcome that

special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where soil limitations are severe.

The Wellston-Gilpin soil dominantly is severely limited for roads because of potential frost action and slope. Replacing or strengthening the upper layer of soil with a more suitable base material, aggregate, can overcome this limitation. Designing roads to complement the slope helps offset the slope limitation. The Berks-Weikert soil is severely limited for local roads because of slope steepness. Placing the roads on the contour can help offset this limitation. Cutting and filling may be necessary, which can be limited by depth to bedrock. The Burnside soil is severely limited for local roads because it is subject to occasional flooding.

Soil erosion is a concern during road construction.

The Soil Survey of Monroe County includes road construction as a forest management activity. Ratings of erosion hazard indicate the risk of loss of soil during road construction. A slight erosion hazard rating indicates expected soil loss would be small. A moderate erosion hazard rating indicates mitigation measures are needed to control erosion during road construction. A severe erosion hazard rating indicates intensive management or special equipment and methods are needed to prevent excessive loss of soil (USDA SCS 1981).

The Wellston-Gilpin soils and Burnside soils have a slight erosion hazard for road construction. The Berks-Weikert soils have a moderate erosion hazard for road construction.

## **Water**

The primary water concern is stream sedimentation, which results when eroded soil makes its way to the stream. Sediment in streams reduces water quality and affects the aquatic ecosystem. By muddying the water and covering streambeds with silt, stream sedimentation can degrade the habitat for fish, fresh water mussels, and other aquatic life forms.

## **Soil and Water Impacts with Mitigation Measures**

Appendix K of the *Forest Plan* lists guidelines and lists reference materials that discuss methods to mitigate soil erosion during and after road construction.

Road construction on steep side-slopes requires full bench cuts and sufficient cross drainage to move water off the road surface to avoid soil erosion. By comparison, ridge road locations require minimal cross drainage to move water off the roadway because they have minimal acreage to collect water (USDA FS 2001a).

Road construction has potential for moving large amounts of soil and removing vegetation necessary for holding soil in place on slopes. A study was conducted for soil erosion in Pate Hollow (Moss 1995). The study was conducted over five years (1984 to 1988) to determine and monitor the effects of clearcutting on the water quality of local streams. The Pate Hollow logging road and a ridge road were reconstructed for a timber sale in July and August 1985. Road reconstruction projects were shown to have the same impact as new road construction. The greatest soil loss occurred during road construction between road cutting and soil stabilization with cross drain construction, gravel surfacing, and mulching. Past effects of road construction and maintenance may have contributed some soil or sediment load to the riparian area in Pate Hollow and Lake Monroe. The results show an increase in nutrient and sediment load in Pate Hollow during road construction, but no increase from the ridge road reconstruction. The study demonstrated that sediment outflow was minimal from the two watersheds. The roads were stabilized with cross drainage and erosion control measures within 1 year of construction.

Growing recognition of soil loss from forest roads led to the development of mitigating measures. Continued refinement of erosion control techniques has resulted in mitigation measures that usually do minimize soil loss from roads, which ensures inconsequential increases of sediment in forest streams (Patric 1996).

About 3 acres of soil would be exposed for every mile of road constructed or reconstructed (USDA FS 2001a). Studies have shown that newly constructed roads lose the most soil, primarily during the short period before grass becomes well established and the roadbed is graveled or compacted (Swift 1988).

The road would need to be cleared about 22 feet wide with turn-outs that are an additional 10 feet wide. This is approximately 3 acres of soil disturbance per mile or 4.7 total acres of soil disturbance. Drainage dips and culverts should be installed according to the forest road guidelines, and surfacing or paving should be done to hold the soil for all-weather traffic (USDA FS 2001a).

Drain dips and culverts should be built at recommended spacing based on road grade (USDA FS 2001a). Erosion control blankets, sod, or mulch should be used to stabilize the soil until seed catches (IDNR 1992).

Maintaining the road surface and keeping cross drainages clear of leaves and keeping debris from blocking culverts and cross drains is critical. "Culverted road-stream crossing can cause large inputs of sediment to streams when culvert hydraulic capacity is exceeded or the culvert inlet is plugged" (USDA FS 2001a).

The final phase is long-term maintenance of the road right-of-way, holding the soil in place during the freeze-thaw cycle in the spring, and high velocity water coming off the adjacent steep slopes.

Long-term road maintenance provides relatively small erosion potential, but it can occur over many years. It requires annual inspection of the road for problems. Mitigation measures for soil loss during the road maintenance phase include cleaning culverts and cross drains after heavy rains and keeping the road surface maintained and graded. Without mitigation maintenance, the road would deteriorate in time.

The soil scientist has observed the effectiveness of these mitigation measures during and following the construction of an access road to the U-38 Lake dam and Celina Lake dam on similar soils and landscapes on the Tell City Ranger District. The purpose of these projects was to construct a safe, all-season access road for the operation and maintenance of the dam. The monitoring report for the U-38 Lake dam access states that impacts to soil and water resources were minimal because of the successful implementation and mitigation measures and design guidelines. This road was approximately 1 mile long and followed a ridge. It had 10 culverts for cross drainage and one drainage dip. Five of the culverts had some soil erosion at the inlets but it settled out within 5 to 21 feet of the culvert (Merchant 2002).

The monitoring report for Celina Lake dam states that some soil erosion had occurred as the seed and mulch was placed during a dry spell. The seed germinated and then died. The soil slumped at the cut bank. He recommended that the slump area be reshaped and protected with an erosion control blanket embedded with seed. In addition, several of the culverts had erosion at their inlets. He recommended that erosion control blankets be placed at the inlets of these culverts (Merchant 2001).

## **Determination of Impacts from Connected Non-Federal Actions**

Impacts to Federal and private land were reviewed for soil and water protection needs when the proposed routes for Pate Hollow and Baxter Branch were field reviewed. The upland portions of the Crossroads, Pine Grove, and the Swartz Road routes were not field reviewed. These old roads were evaluated using

topographic maps to determine estimated cross drainage needs and slope. Any route selected would need to be constructed using Indiana's best management practices (IDNR 1998).

Monroe County has building code guidance for lands in ECO Area 1 around Lake Monroe. These include specific restrictions for sensitive lands (Monroe County 1997). About 1 acre of relatively flat ground is needed for home site and septic system. A mound system requires undisturbed soil 50 feet by 80 feet on less than six percent slope with a 25-foot buffer to 12 percent slope (Heneger 2000). Septic systems require Monroe County Health Department permits.

Monroe County planning department has with varying construction limits based on distance from Lake Monroe shoreline. The most limiting is ECO Area 1 regulations with 12 percent slope limits on road grade. It applies to private lands for driveway and improvement construction in the Baxter Branch area below the proposed crossing of Alternatives B, C, and F. This includes all of Alternative F.

ECO Area 2 regulations have a 15 percent slope limit on road grade. It applies to private lands for driveway and improvement construction in the Baxter Branch area above the proposed crossing of Alternatives B, C, and F. This includes the rest of Alternative B.

ECO Area 3 has an 18 percent slope limit and applies to the portion of alternatives outside of Baxter Branch on the sidehills and ridges. The proposed action (Alternative D) is located in ECO Areas 1, 2, and 3, but on a ridge the entire way.

Monroe County requires site plans, subdivision plats, planned unit developments, and plans for more than one single family dwelling unit be designed by a professional engineer registered in the State of Indiana (Monroe County 1997).

## **Effects of Alternative A**

The Pate Hollow Route has about 7,730 feet of road to construct or reconstruct on Federal land. Approximately 2,700 feet of the Pate Hollow route occurs on the ridge locations, 3,330 feet occurs on the side slope locations, and 1,700 feet occur in the drainage floodplain.

## **Direct and Indirect Effects on Soil and Water**

Based on historical evidence and past experience in working on soils, which occur in this analysis area, constructing and reconstructing roads without mitigation would cause loss of soil and stream sedimentation.

The effects of a new road on the soil and water resource include potential soil erosion during the construction phase, where exposed soil is subject to heavy rainfall events and erosion potential during the soil stabilization phase.

Soil particles carried off-site could be deposited in streambeds. Off-site sediment entering the stream course can increase turbidity, reduce water transparency, alter nutrient status of the stream, and change streambed composition. These soil particles can be carried in suspension for long distances and impact flowing waters that can adversely affect aquatic life.

Pate Hollow has many cross drainages that would wash gravel and soil off the roadway if they are not properly installed or maintained. An example of erosion impacts without mitigation is the existing road in the Baxter Branch watershed on the Pennington property. The road is not surfaced and most of the waterbars have breached. Gully erosion has begun in the roadbed. The road is impassable by 2-wheel drive vehicles.

The Pate Hollow crossing would require a bridge or large (96 inch) culvert with riprap to protect the walls of the bridge abutments or to protect the fill around the culvert. If a 96-inch culvert is installed, both sides of the Pate Hollow crossing would need to be built up to at least 120 inches (or 10 feet) to provide a two-foot covering over the culvert. If it were not maintained properly, it would wash out in time. If a bridge is constructed, the road could have a flatter profile, as the opening would be wider. A bridge would need supports and riprap armor on the abutments to protect them from erosion. Similarly, the un-named drainage crossing that handles about 125-acre watershed requires about a 76-inch culvert with two feet of fill over the top or about 100 inches (8.3 feet) on the approach.

## **Cumulative Effects on Soil and Water**

The area of consideration for cumulative effects includes the two subwatersheds of Baxter Branch and Pate Hollow. These watersheds have a total area of about 1,807 acres. The percentage of forested land cover is about 91 percent. The landscape is mostly forested land with single-family residence development along the roads and a few fields in Baxter Branch. There is commercial development along State Highway 446. There are two campgrounds within the two subwatersheds. Knight Ridge Campground is adjacent to SR 446 along the Knight Ridge route. The other campground is east of the intersection of Baxter Branch Higher route and Baxter Branch on Moores Creek Road east. There are larger blocks of forested land within the national forest boundary.

Activities that have occurred in the past on private lands in this area include conversion of woodlands to agricultural land, crop production, livestock grazing, timber harvesting, and abandonment of farming which left fields in various stages of open condition. Lots and acreages were sold for development. Access roads were built with little design or concern for effects to the soil and water resource.

Activities that have occurred in the past on Federal lands in this area include timber harvesting, site preparation, planting of new forest stands, and construction of roads, trails, camp sites, recreation areas, and boat launch areas. The United States has purchased farms to establish the Hoosier National Forest. Some of the land had excessive erosion due to past agricultural practices. On these lands, subsequent forestry practices have been conducted using Indiana's best management practices (IDNR 1998) and mitigation measures to curb soil erosion and prevent stream sedimentation.

Past effects of road construction and maintenance may have contributed some soil or sediment load to the riparian area in Pate Hollow, Baxter Branch, and Lake Monroe. A soil erosion study was conducted in Pate Hollow (Moss 1995). The results show that road construction impacts soil more in a bottom road than a ridge road. Neither road location contributed to sediment load after the roads were stabilized with cross drainage and erosion control measures within one year of construction.

In the next five years, the Forest Service may construct a hiking trail in the Pate Hollow area. There would be no appreciable effects to the soil and water resources from such future Forest Service activities because mitigation measures would be employed to minimize the impacts.

## **Cumulative Effects of Connected Non-Federal Actions on Soil and Water**

In the reasonably foreseeable future, it is speculated that approximately four lots would be developed on the Breedlove property. This is based on the four relatively flat knobs on the Breedlove property that could be cleared and made level for a home site. If house lots are developed, about a half-acre to an acre would need to be cleared for home, septic system and parking for each lot. Each home would require electric, phone, and water utilities. There is a Smithville Telephone Company phone line, Rural Electric Authority electric line, and waterline within a quarter of a mile of the property across Baxter Branch. It is probable that the utility lines would be buried in the road access or possibly run cross-country from the

north side of Baxter Branch. If utilities are buried, a trench would be excavated, the utilities would be buried, and if the trench is filled within a few days of the work, minimal soil loss is anticipated.

## **Summary Cumulative Effects of Alternative A**

Cumulative impact is the impact on the environment that results from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7).

The addition of the Federal road (1.46 miles) and the private right-of-way (530 feet) would add 1.56 miles to the existing 7.51 miles in the subwatersheds for a total of 9.07 miles. This is a 17 percent increase in road miles.

These watersheds total about 1,807 acres with about 164 non-forested acres. The percentage of forested land cover is about 91 percent. The road clearing of 20 to 30 feet would likely fill in the canopy within five years of clearing for the road. In the short term, road clearing would disturb 4.7 acres of soil. If house lots are developed, about a half-acre to an acre would need to be cleared for home, septic system, and parking for about 3 to 4 acres of non-forestland from house lots. These activities would add about 4 acres to the non-forest component of the watersheds. This is about one half of one percent change in forestland. The acreage of disturbed soil and non-forest would be the same in every alternative with house lot development.

We estimate that the effect on soil and water resources is minor mainly because of the following two items:

- These roads would be constructed with mitigation measures to protect the environment such as engineering design work under USDA Forest Service permits on NFS roads or under Monroe County zoning ordinance requirements on private land.
- The soil scientist has observed the effectiveness of these mitigation measures following the construction of an access road to the U-38 Lake dam and Celina Lake dam on similar soils.

In addition, cumulatively when we view these two subwatersheds of Baxter Branch and Pate Hollow as a whole, it appears this project has a minor effect on the landscape. The ID team considered the total effect of this alternative for Federal land and the connected non-Federal actions of road construction and house lots on private land. It is generally believed that forested land contributes less sediment to watercourses and provides other benefits to the watershed. This subwatershed is one of the most forested areas near the national forest (Ewing and Merchant 2000). Research has shown effects to watershed health from land management activities decrease as the percentage of forested land increases (Swift 1988). The cumulative effect of the Pate Hollow Route is very small when you look at the past, present, and reasonably foreseeable future actions as well as the context of these actions in these forested subwatersheds.

## **Effects of Alternative B**

The Swartz Road Route was used to haul timber in 1997 from the Breedlove property. The Swartz Road route has about 4,075 feet of road to construct or reconstruct to meet the recommended 12 percent grade for roads on private land in Monroe County. Baxter Branch is a watershed of about 600 acres. The crossing of Baxter Branch is on private land, but requires a large culvert or bridge to allow all-weather crossing to protect the soil in the drainage. The grade ascending from Baxter Branch to Knight Ridge is too steep to meet the 12 percent grade. The existing road has deep gully erosion because cross drainage

was inadequate after use in 1997. Once on Knight Ridge, the road would follow the ridge to the Breedlove property.

## **Direct and Indirect Effects of Alternative B**

The effects of the Swartz Road Route would be much less than Alternative A on Federal land since this alternative affects only 75 feet of Federal land. This is about one percent of Federal land affected in Alternative A (75 feet in Alternative B vs. 7,730 feet in Alternative A). This alternative has the same type of soil (Berks-Weikert complex) as Alternative A, but much less road construction on Federal land. This alternative requires one cross drain on Federal land as opposed to 40 cross drains in Alternative A (Table 1). Therefore, the potential for erosion on Federal land is less, as is the resultant silt entering streams and shallow ground water.

## **Cumulative Effects of Alternative B**

The cumulative effects of Alternative B on soil and water on Federal land would be similar to Alternatives C and F as there is only 75 feet across Federal land. The total cumulative effect is minimal as it is limited to 75 feet of sidehill road.

## **Cumulative Effects of Connected Non-Federal Actions on Soil and Water**

For the Swartz Road Route, the reasonable foreseeable future development speculations are similar to Alternative A for the Breedlove property and utilities.

A right-of-way would need to be acquired and developed across the St. Martin property. A right-of-way would also be required to cross approximately 500 feet of the Pennington property.

The affected 2.3 acres (Table 3) is a small portion of the Baxter Branch watershed. Previously, three major cross drains, located in the sidehill portion of the road, have completely washed off the road. The road would require culverts and fill material to make the road passable. The Baxter Branch crossing would require a large culvert or bridge to be considered an all-weather road. An elevated road with culverts would be required to cross the bottomland before the Baxter Branch crossing.

The existing road in the Baxter Branch watershed across the Pennington property is an example of soil and water impacts without mitigation. There are several exposed portions of bedrock along this section of road. There is no evidence of gravel surfacing on this road section to reduce rainfall impact and soil particle separation.

Since Monroe County ordinances apply to road construction on private land, it is likely soil and water effects (direct and indirect) on private land would be similar to road construction on Federal land as described in Alternative A. Therefore, soil and water resources would be protected on the private land in this alternative by Monroe County.

## **Summary Cumulative Effects of Alternative B**

The private road (4,000 feet) would add 0.75 miles to the existing 7.51 miles in the subwatersheds for a total of 8.26 miles. This is a nine percent increase in road miles.

Because of road construction, 2.27 acres of forestland would have a cleared understory but the tree canopy would close within 5 years. If house lots are developed, about a half-acre to an acre would need to be cleared for home, septic system and parking for about 3 or 4 acres. Therefore, about 4 acres would

be added to the non-forest component of the watershed. This is about one-half of one percent change in forestland.

The total effects are 0.75 miles of road construction, 5 acres of soil disturbance, one half of one percent less non-forestland, and five additional non-forest sites. As in Alternative A, the cumulative effects of the Swartz Road Route are very small for similar reasons.

## **Effects of Alternative C**

The Pine Grove Church Route was not field reviewed, but was depicted on road maps as an old county road leading down to the upper reaches of Baxter Branch. It includes about 9,675 feet (Table 3) of road to construct or reconstruct to meet the recommended 12 percent grade for roads on private land in Monroe County. The map shows numerous grades that exceed 12 percent on these moderate erosion hazard soils. The existing road appears to be in an old eroded roadbed leading to Baxter Branch. The road would follow the old trace that shows on the Allen Creek USGS quadrangle map as a dashed line in Sections 19 and 20. A dashed line indicates a trail or narrow woods road. The road would not have to cross Baxter Branch. Proper design would indicate the road should be built on the sidehill before the Baxter Branch crossing. The ascent out of Baxter Branch to Knight Ridge is steep and no switchbacks are possible. The effects of the rest of the route are the same as Alternative B.

## **Direct and Indirect Effects on Soil and Water**

The effects of Alternative C on Federal land would be identical to Alternative B. The effects would be much less than Alternative A on Federal land. As indicated in Table 1, this alternative affects 75 feet of Federal land rather than 7,730 feet in Alternative A. This alternative has the same type of soil (Berks-Weikert complex) as Alternative A, but much less road construction on Federal land. This alternative requires one cross drain on Federal land. Alternative A requires 40 cross drains on Federal land (Table 1). Therefore, the potential for erosion on Federal land is less, as is the resultant silt entering streams and shallow ground water.

## **Cumulative Effects of Federal Actions on Soil and Water**

The cumulative effects of Alternative C on soil and water are the same as Alternatives B and F.

## **Cumulative Effects of Connected Non-Federal Actions on Soil and Water**

For Alternative C (Pine Grove Church Route), the reasonably foreseeable future development speculations for the Breedlove property and utilities are similar to Alternative A.

Approximately seven rights-of-way would be needed to cross private property and State land.

The Pine Grove Church route directly affects approximately 9,600 feet (5.45 acres at 3 acres/mile) of non-Federal roadway through hardwood forest covered soils. Alternative C is the longest route, includes the most soil disturbance, and is located in a riparian zone for most of the route.

As Table 2 shows, much of this road is in the bottomlands and includes the greatest number of bottomland culverts. A few road segments require relocation since they are in the creek. Several of the creek crossings require major earthwork. There is no forested buffer strip because the road is located in the riparian buffer. Since the road is in the riparian buffer, it would be exposed to the full impact of storm flow. Two steep grades on this route need road relocation. The Pine Grove Church access point (from SR 446 descending to the drainage bottom) is an old entrenched road. Entrenched roads make it difficult to build cross drains, as the roadside berms are higher than the roads traveled surface. Side ditching

would be necessary, which exposes more soil. The road from Baxter Branch to the Breedlove property is located on a sidehill, which requires soil disturbance for culvert installation. This alternative would be the most difficult to construct and maintain. Extensive construction is needed to hold the roadway in place during seasonal flooding of Baxter Branch and tributaries. Extensive maintenance of an all-season road is needed because of all the cross drain structures.

## **Summary Cumulative Effects of Alternative C**

The private road (9,600 feet) would add 1.82 miles to the existing 7.51 miles of road in the subwatersheds, for a total of 9.33 miles of road. This is a 24 percent increase in road miles.

Road construction would expose 5.49 acres of soil (Table 3). If house lots were developed, about a half acre to an acre would need to be cleared for each lot developed. This would include the home, septic system, and parking for about 3 additional acres of non-forestland. This is a change of one-half of one percent in forestland in the watershed.

The total effects are 1.82 miles of road construction, 8.5 acres of soil disturbance, one-half of one percent less non-forestland, and five additional non-forest sites. For similar reasons as Alternative A, the cumulative effect of the Pine Grove Church Route is very small.

## **Effects of Alternative D - Proposed Action**

The Knight Ridge Route is on a ridge the entire way to the Breedlove property. It has about 2,900 feet of road to construct or reconstruct to meet the recommended eight percent grade for roads on Federal land. The ridge has gentle grades with a few pitches that exceed 12 percent running to the top of high knobs. Sidehilling around the knobs on these moderate erosion hazard soils can reduce the 12 percent pitches to 8 percent. An existing surfaced road runs through the Knight Ridge Campground, with cross drain structures in place. The existing road then continues across State property and the Grubb property. Approximately 6,000 feet of road is on private land.

## **Direct and Indirect Effects on Soil and Water**

The effects would be much less than Alternative A on Federal land because of the gentle road grade and lack of watersheds above the road (this alternative is on a ridge top). Erosion potential would be limited to precipitation that falls directly on the road. There is no cross flow from above the road, as is the case in side-hill and bottomland routes. This alternative affects 2,900 feet (1.6 acres) of Federal land rather than 7,730 feet (4.4 acres) in Alternative A (about 38 percent of Alternative A), (Table 1). This alternative has one of the soil types (Wellston-Gilpin silt loams) of Alternative A. This alternative requires less road construction than Alternative A. This alternative requires 14 cross drain structures on Federal land as opposed to 40 cross drain structures on Federal land in Alternative A (Table 1). The result should be less overall potential for erosion on Federal land and less potential for silt to enter the streams and shallow ground water.

## **Cumulative Effects on Soil and Water**

The cumulative effects of Alternative D on soil and water would be similar to Alternative A. However, the total cumulative effect is less. Alternative D has a longer road length (8,900 feet in Alternative D vs. 8,260 feet in Alternative A) and fewer cross drains (36 in Alternative D vs. 42 in Alternative A, Table 3). Alternative D has no riparian crossings and only minor earthwork. This alternative should have the least soil erosion potential of all alternatives because it has a gentle road grade, is located on top of a ridge, has a forested buffer between the road and riparian zones, and has the least riparian crossings (Table 3).

## **Cumulative Effects of Connected Non-Federal Actions on Soil and Water**

The reasonably foreseeable future development speculations for the Breedlove property and utilities in Alternative D are similar to Alternative A.

Four rights-of-way would need to be acquired to cross private property and State land.

The Knight Ridge route directly affects approximately 6,000 feet of non-Federal roadway through hardwood covered soils. This would be roughly 3.4 acres to protect from soil erosion. Alternative D is the second longest route, but is located on a ridge for the entire length.

Monroe County ordinances apply to road construction on private land. We estimate the soil and water direct and indirect effects on private land would be similar to road construction on Federal land, as described in Alternative A. Soil and water resources on private land would be protected under this alternative.

### **Summary Cumulative Effects of Alternative D**

The private road (6,900 feet, not including the 2,000 feet of existing surfaced road) would add 1.30 miles to the existing 7.51 miles in the subwatersheds for a total of 8.81 miles. This is a 17 percent increase in road miles.

Road construction would disturb 3.90 acres of soil. If house lots were developed, about a half acre to an acre would need to be cleared for each lot developed. This would include the home, septic system, and parking for a total of about 4 additional acres of non-forestland. A total of about 4 acres would be added to the non-forest component of the watershed. This is a change of one-half of one percent in forestland.

The total effects are 1.30 miles of road construction, 3.90 acres of soil disturbance, one-half of one percent less non-forestland, and five additional non-forest sites. For similar reasons as Alternative A, the cumulative effect of the Knight Ridge Route is very small.

### **Effects of Alternative E**

The Crossroads Route begins at SR 446 and follows a ridge for about 1,900 feet. The route then descends to the upper reaches of Pate Hollow on an old road for about 1,000 feet at about 14 percent grade. The route crosses upper Pate Hollow with a 200-foot wide ford with a rock base. The sidehill road into and out of the Pate Hollow crossing is eroded. This crossing is about one-half mile above the Pate Hollow crossing in Alternative A. Then the route ascends the sidehill for 1,000 feet to Knight Ridge. The remainder of this alternative follows the same route as Alternative D, following the ridge for 1,400 feet on State land, crosses 1,700 feet of Federal land, then across 500 feet of the Pennington property, and 1,200 feet across Federal land to the Breedlove property.

### **Direct and Indirect Effects on Soil and Water**

The effects on Federal land would be identical to Alternative D. The effects would be much less than Alternative A on Federal land. This alternative affects 2,900 feet (1.65 acres) of Federal land rather than 7,730 feet (4.4 acres) in Alternative A (about 38 percent of Alternative A) (Table 3). This alternative has one of the same types of soil (Wellston-Gilpin silt loams) as Alternative A. This alternative requires less road construction than Alternative A. This alternative requires 14 cross drain structures on Federal land as opposed to 40 cross drain structures on Federal land in Alternative A (Table 1). The result should be less overall potential for erosion on Federal land and less potential for silt to enter the streams and shallow ground water.

## **Cumulative Effects on Soil and Water on Federal Land**

The cumulative effects of Alternative E on soil and water would be the same as Alternative D and less than Alternative A. Alternative E has a shorter road length (2,900 feet in Alternative E vs. 7,730 feet in Alternative A) and fewer cross drains (14 in Alternative E vs. 40 in Alternative A, Table 1).

## **Cumulative Effects of Connected Non-Federal Actions on Soil and Water**

The reasonably foreseeable future development speculations for the Breedlove property and utilities in Alternative E are similar to Alternative A.

Five rights-of-way would need to be acquired to cross private property and State land in Alternative E.

The Crossroads route directly affects approximately 6,000 feet of non-Federal roadway through hardwood-covered soils. This would be roughly 3.4 acres to protect from soil erosion. Alternative E is the second longest route, and the same length as Alternative D. This alternative is primarily located on a ridge, but includes one riparian crossing in the upper reaches of Pate Hollow.

The ridge has gentle grades with a few areas on the high knobs exceeding 12 percent. Sidehilling around the knobs containing moderate erosion hazard soils can reduce the 12 percent grades to an acceptable level. An old road runs 2,900 feet along a ridge and across private land from SR 446 to the riparian crossing in the upper reaches of Pate Hollow. The last 1,000 feet of this segment is a 14 percent descent to the cross drain. The cross drain would consist of a large 65-inch (estimate) culvert, fill, and riprap. The gentle road grade (on the ridge tops before and after the upper Pate Hollow crossing) and lack of watershed above the road (4,000 feet is located on the top of or near the top of a ridge) limit erosion potential to precipitation falling directly on the road. The upper crossing of Pate Hollow has the potential to discharge silt and sediment into the drainage during the construction phase. Proper maintenance would reduce long-term risks of silt discharges into the watershed.

Because Monroe County ordinances apply to road construction on private land, we estimate the soil and water direct and indirect effects on private land would be similar to road construction on Federal land, as described in Alternative A. Therefore, soil and water resources on private land would be protected under this alternative by Monroe County.

## **Summary Cumulative Effects of Alternative E**

The private road (8,900 feet) would add 1.69 miles to the existing 7.51 miles in the subwatersheds for a total of 9.2 miles. This is a 23 percent increase in road miles.

Road construction would expose 5.07 acres of forest soil. If house lots were developed, about a half acre to an acre would need to be cleared for each lot developed. This would include the home, septic system, and parking for a total of about four additional acres of non-forestland. A total of about 8.07 acres would be added to the non-forest component of the watershed. This is a change of one-half of one percent in forestland.

The total effects are 1.69 miles of road construction, 5.05 acres of soil disturbance, one-half of one percent less non-forestland, and five additional non-forest sites. For similar reasons as Alternative A, the cumulative effect of the Crossroads Route is very small.

## Effects of Alternative F

The Baxter Branch Higher Route would cut into the sidehill above the U. S. Army Corps of Engineers administered property boundary on the northwest side of Baxter Branch to avoid the floodplain of Baxter Branch. This route would cross Baxter Branch, which would require a large culvert (96-inch) and an elevated road (4 feet high by 20 feet wide by 300 feet long, Table 4). Then this alternative ascends on a sidehill to the ridge on the southeast side of Baxter Branch. It would include 3,075 feet of sidehill road construction. This requires establishing cross drainage for the entire length of the road. The southeast side of Baxter Branch is quite steep. It would require large fills to get the grade less than 12 percent and require placement of large culverts with riprap to stabilize the fill material around the drainage structures. Baxter Branch is a 600-acre watershed in a steep basin.

Alternative	Riparian crossing (Drainage width and height or culvert size)	Cross drains/construction (Number of cross drains/ C/F = cut/fill)		Elevate road (Square feet)	Creek crossing (Square feet in crossing)	Total (Square feet)
A.	20'x4' Pate Hollow or 96-inch, east branch 76-inch	Two	Elevated road 4'x20'x800'	16,000	8x20=160 6.5x20=130	16,290
B.	15'x8' Baxter Branch 96-inch	One	Elevated road 4'x20'x300'	6,000	8x20=160	6,160
C.	10'x5' and 15'x8' Baxter Branch 48", 48", 60", 96"	Four	4 major riparian crossings		5x20=100 8x20=160 4x20=80 4x20=80	420
D.	None	None				
E.	65-inch culvert upper Pate Hollow	One	2-foot fill cover culvert		4x10=40	40
F.	15'x8' Baxter Branch 96-inch	One	Elevated road 4'x20'x200'	4,000		4,000
G.	Baxter Branch					

## Direct and Indirect Effects on Soil and Water

The effects of the Baxter Branch Higher Route on Federal land would be identical to Alternative B. The effects would be much less than Alternative A on Federal land, since this alternative affects 75 feet of Federal land rather than 7,730 feet in Alternative A. This alternative has the same type of soil (Berks-Weikert complex) as Alternative A, but much less road construction on Federal land. This alternative requires one cross drain on Federal land. Alternative A requires 40 cross drains on Federal land (Table 3). Therefore, the potential for erosion on Federal land is less, as is the resultant silt entering streams and shallow ground water.

## Cumulative Effects on Federal Land

None.

## Cumulative Effects of Connected Non-Federal Actions on Soil and Water

The reasonably foreseeable future development speculations for the Breedlove property and utilities in Alternative F are similar to Alternative A.

Nine rights-of-way would need to be acquired to cross private property.

The Baxter Branch Higher route directly affects approximately 3,200 feet of non-Federal ownership. This would be roughly 1.81 acres to protect from soil erosion. Alternative F is the shortest route of any action alternatives. This alternative is located primarily on a sidehill, but includes a major riparian crossing in Baxter Branch.

This alternative begins at the end of an existing county road. This route is located on a sidehill, includes the second most sidehill culverts on private land (21 in Alternative F vs. 26 in Alternative B, Table 2). The first sidehill segment requires road relocation and crosses major cross drains and would require sufficient cross drainage to allow storm flow to cross the road without washing gravel off the road or soil from around the culvert inlets and outlets. These cross drains have the potential to wash the road completely out. The riparian crossing of Baxter Branch is a major undertaking requiring a large culvert (96-inch) and about 300 feet of elevated road. This crossing would be exposed to the full impact of flow from the 600 acre Baxter Branch watershed. The riparian crossing of Baxter Branch has the potential to discharge silt and sedimentation into the drainage during the construction phase. Proper maintenance would reduce long-term risks of silt discharges into the watershed.

The road from Baxter Branch to the Breedlove property is located on a sidehill, which requires soil disturbance for culvert installation. This route would be difficult to construct and maintain. Extensive construction is needed to hold soil in place during seasonal flooding of Baxter Branch and tributaries. Extensive maintenance would be needed to allow this route to be considered seasonal because of all the cross drain structures.

Because Monroe County ordinances apply to road construction on private land, we estimate the soil and water direct and indirect effects on private land would be similar to road construction on Federal land, as described in Alternative A. Therefore, soil and water resources on private land would be protected under this alternative.

## **Summary Cumulative Effects of Alternative F**

The proposed road (3,275 feet) would add 0.62 miles to the existing 7.51 miles in the subwatersheds for a total of 8.13 miles. This is an eight percent increase in road miles.

Road construction would expose 1.86 acres of forest soil. If house lots were developed, about a half acre to an acre would need to be cleared for each lot developed. This would include the home, septic system, and parking for a total of about 4 additional acres of non-forestland. A total of about 4 acres would be added to the non-forest component of the watershed. This is a change of one-half of one percent in forestland.

The total effects are 0.62 miles of road construction, 4.86 acres of soil disturbance, one-half of one percent less non-forestland, and five additional non-forest sites. For similar reasons as Alternative A, the cumulative effect of the Baxter Branch Higher Route is very small.

## **Effects of Alternative G - No Action**

There are still active erosion areas on the road used to haul timber in 1997 across the Pennington property. They are indicative of long term and cumulative effects of soil erosion on soil and water resources when the roads are not properly maintained or “put to bed” after use. Therefore, the impact to soil and water would persist until erosion control measures are initiated and maintained.

## **Direct and Indirect Effects on Soil and Water**

The direct effect of the no action alternative is that no soil would erode from road construction and maintenance or lack of road maintenance because a road would not be constructed. If nothing were done to stabilize the soil, erosion would continue until the road stabilizes through natural processes. The indirect effect is that the soil and water resource would continue to improve over time as vegetation fills in the exposed soil on the road.

## **Cumulative Effects of Alternative G - No Action**

The cumulative effects of no action in this case is that no road would be built so none of the cumulative effects listed in the other road construction alternatives would occur. Soil and water quality would improve over time. This process can be sped up by taking action to stabilize the old roadbed by replacing waterbars and cross drainage and closing the road to vehicular traffic. Open roads and unrestricted motorized vehicle use is a cause of destruction of the waterbars and cross drain structures.

## **Issue 2: Healthy Watersheds and Floodplains**

### **Affected Environment**

This proposal implements the USDA Forest Service Natural Resource Agenda. The publication, "Charting Our Future...A Nation's Natural Resource Legacy," is the latest and most detailed presentation of the Forest Service Natural Resource Agenda (USDA FS 1998). Damming Salt Creek about 7 miles downstream from this project area created Lake Monroe. The lake is a municipal watershed for towns in Monroe and the southwest part of Brown Counties. Watershed protection is a management concern of the Forest Service, the State of Indiana, and Monroe County. The two primary drainages potentially affected are Baxter Branch and Pate Hollow. Depending on the route selected, segments of the road could be in a floodplain.

Two primary issues affect the Pate Hollow and Baxter Branch subwatersheds. They are floodplain hydraulics and fish passage when water is flowing in the two drainages. Floodplain hydraulics is the ability of water to flow naturally over the soil in the floodplain. Floodplain hydraulics is maintained by restricting construction from the riparian zone. Fish passage in high water is provided by having bridges or culverts large enough to allow for unimpeded fish passage through the culvert or under a bridge in either the Pate Hollow or Baxter Branch drainage.

Watershed quality can be affected by soil erosion and sediment load. The buffer capacity of hardwood forest over tilled ground and pastures is also documented. Most of the affected watershed is hardwood forest. These aspects of watershed health are addressed in Issue 1. Research has also shown that roads have less impact on riparian values if built across a riparian zone rather than parallel to it or in it.

The riparian qualities of the watershed and floodplain are discussed in guidance for riparian corridor management, Management Area 2.4 discussion, and in Appendix J of the *Forest Plan*.

### **Jurisdiction Factors**

Monroe County, the USDA Forest Service, or Indiana Department of Natural Resources have jurisdiction over lands included in one or more of the alternatives evaluated. They have similar mitigation requirements and must review and approve construction plans before issuing permits or easements.

Lake Monroe is a municipal watershed protected by the zoning regulations for private land development in the ECO Areas of the watershed and administered by Monroe County. The healthy watershed issue would analyze the effects of alternatives on maintaining floodplain hydraulics and allowing for fish movement in perennial streams. It would also compare relative impacts to the riparian values by length of road in the riparian corridor.

Baxter Branch is a watershed with a perennial stream at the proposed crossing location. According to Dave Cable of the US Army Corps of Engineers, Baxter Branch flows year-around at the crossing with two to three inches of water in the summer (Cable 2002). Pate Hollow is higher in the watershed and mapped as a perennial stream. The Pate Hollow alternative crossing has been dry in 1985, 1993, and 1999, except in the wet season.

“Some of this bottomland area may qualify as regulated wetland” (Pruitt 2001a). If an alternative was carried out that affected wetlands regulated by the US Army Corps of Engineers, the applicant would be required to request a permit from the US Army Corps of Engineers under 33 CFR Part 323, Permits for Discharges of Dredged or Fill Material Into Waters of the United States. The US Army Corps of Engineers may require further mitigation because the goal of "no net loss" is a guiding principle of the national wetlands regulatory program.

Based on length alone, the Pine Grove Church route would have 4,600 feet of road in the riparian area, followed by Pate Hollow with 1,700 feet, Swartz Road route with 300 feet, Baxter Branch Higher and Crossroads each with 200 feet, and Knight Ridge would have none.

## **Healthy Watershed and Floodplains with Mitigation Measures**

As stated under the issues related to the proposed action, this issue is measured in two ways: one is the type of floodplain crossing structure; its effectiveness in allowing fish passage; and ability to withstand storm flow; and second, is the presence or absence of raised road in the floodplain. Table 4 compares alternatives by number and size of structures needed for floodplain crossings. These structures of either culverts or bridges are recommended mitigation measures to allow for fish passage and to maintain floodplain hydraulics. The design engineer would make a more definitive determination of structures needed to meet these concerns in the road design. Culvert size estimates for a 20-foot-wide road surface would be a minimum of 18-inch diameter and 30 feet long. The raised road segments would need 36-foot long and larger diameter culverts. The agency with jurisdictional authority would approve the design plans for the lands crossed by the selected alternative.

## **Determination of Impacts from Connected Non-Federal Actions**

Impacts to watershed and floodplains were reviewed on private land by map review and comparison to stream crossings of similar size in watershed acres and cross-section on Federal land. The results allow for relative comparison of size and number of crossings between private and Federal land and are shown in Table 4.

## **Effects of Alternative A**

The Pate Hollow Route includes construction of 1,700 feet of road down a tributary drainage to Pate Hollow. Rainfall from spring storms floods the Pate Hollow drainage and the existing forest road. There is evidence of water flow down the road for about 800 feet. This section of road would need to be built up about four feet to allow year-around use and still may occasionally be flooded (Christensen 2001). There is a seep and a spring flowing year round in this road segment. The spring should be allowed to flow in a free-flowing nature. Enough cross drainage is required to avoid flow obstruction. Pate Hollow

flowed only intermittently during very dry years in 1985, 1993, and 1999. The Pate Hollow cross drainage structure should be designed to allow unimpeded fish passage when water is in the stream.

## **Direct and Indirect Effects on Healthy Watersheds and Floodplains**

Fish passage may be blocked when constructing and reconstructing roads within a floodplain without proper mitigation and result in a road unable to withstand storm flow. Culvert failure could result in loss of soil, which would cause stream sedimentation.

The direct effect of building a road in the Pate Hollow floodplain is the need to build the road high enough adjacent to the stream that flows parallel to the road and the crossing of Pate Hollow to prevent water from inundating the road. This would require a raised roadbed, four feet high by 20 feet wide by 800 feet long, and a large diameter culvert crossing for Pate Hollow. There is no material to use on site. Riprap and crushed gravel would need to be hauled in by large trucks to build the road. The first part of the road to the radio tower would need to be relocated or reconstructed to allow trucks to the turn and proceed up the hill and down to Pate Hollow. Large trucks would need to haul the many 30 to 36 foot long culverts for cross drainage. The indirect effect of building and maintaining the road may be debris-plugged culverts. Plugged cross drains could damage the structures designed to allow flow of the water through the floodplain.

If the road segment in the floodplain is built up to a level above run-off flood stage, as described in the alternative mitigation measures, it should permit all-season use (Christensen 2001). Water would not pond if cross drainage for the spring is allowed to free flow. These mitigation measures must be designed by an engineer and approved by the Forest Supervisor before an easement would be issued.

## **Cumulative Effects on Healthy Watersheds and Floodplains on Federal Land**

For this issue, cumulative effects are bound in space by the area of the floodplain. Any cumulative effects would last as long as the cross drain and elevated road exists. The bridge or culvert would likely have a useful life of 30 to 50 years before being replaced. The road construction design plan should provide for unobstructed flow of water across or under the road which would provide fish passage. Long-term effects on the watershed and floodplain require vigilance to maintain cross drains.

## **Cumulative Effects on Healthy Watersheds and Floodplains from Connected Non-Federal actions**

None of the connected non-Federal actions identified for this alternative would have an effect on the floodplains.

## **Summary Cumulative Effects of Alternative A**

The existing road in the Pate Hollow floodplain was built for seasonal use. The lower Pate Hollow floodplain is permanently flooded by Lake Monroe. Smithville Telephone Company has requested to use this route for a new buried fiber optic line. If the line were buried, trenching and burying in one pass during the dry season would likely have minimal impact to the floodplain. The remainder of the proposed road prism and four house sites are out of the floodplain and have sufficient hardwood forest buffer to minimize any effect to the watershed if built to Monroe County approved plans. No other present or reasonably foreseeable actions are known that would affect the Pate Hollow floodplain. The Pate Hollow Water Quality Study suggests when a road is built according to design, with stringent mitigation measures, impacts are negligible after the construction and the road has stabilized (Moss 1995). Based on the assumption that the required mitigation measures are carried out and maintained, the cumulative effects are estimated to be minimal from the Pate Hollow Route.

## **Effects of Alternative B**

The effects of the Swartz Road Route would be much less than Alternative A on Federal land since this alternative affects only 75 feet of Federal land. There are no floodplains on Federal land so there are no direct effects to floodplains. This alternative requires one cross drain on Federal land. However, it is not in a floodplain.

### **Cumulative Effects of Alternative B on Federal land**

There are no floodplains on the 75 feet of Federal land needed for a private road easement.

### **Cumulative Effects of Alternative B from Connected Non-Federal Actions**

Under this alternative, a road would be built across Baxter Branch. Rainfall, from spring storms, has the potential to flood the Baxter Branch drainage and the existing low water crossing. There is evidence of water flow out of the banks of Baxter Branch. It is speculated a road would be flooded seasonally in this floodplain. This section of road would need to be built up about four feet to allow year-around use and still may occasionally be flooded. This watershed is about 600 acres above the crossing. To provide an all weather road to the private tracts southeast of Baxter Branch a bridge or culvert should be of sufficient size to allow for seasonal flooding.

The Baxter Branch crossing would require an approved construction plan and road maintenance plan for continued use as required by Monroe County. For this analysis, cumulative effects are bound in space by the area of the floodplain. Any cumulative effects would last as long as the cross drain and elevated road exists. The bridge or culvert would likely have a useful life of 30 to 50 years before needing replacement. The road construction design plan should provide for unobstructed flow of water across or under the road which would provide fish passage. Long-term effects on the watershed and floodplain require vigilance to maintain cross drains.

### **Summary Cumulative Effects of Alternative B**

The lower Baxter Branch floodplain is permanently flooded by Lake Monroe. Smithville Telephone Company has requested to use part of this route for a new buried fiber optic line. If the line was buried, trenching and burying in one pass during the dry season would likely bury it. The rest of the proposed road prism and four house sites are out of the floodplain and have sufficient hardwood forest buffer to minimize any effect to the watershed if built to Monroe County approved plans. No other present or reasonably foreseeable actions are known that would affect the Baxter Branch floodplain. The Pate Hollow Water Quality Study suggests when a road is built according to design, with stringent mitigation measures, impacts are negligible after the construction and the road has stabilized (Moss 1995). Based on the assumption that the required mitigation measures are carried out and maintained, the cumulative effects are estimated to be minimal from the Swartz Road Route.

## **Effects of Alternative C**

The Pine Grove Church Route begins on SR 446 and meanders down the riparian zone of a tributary almost the same size as Baxter Branch. The road is estimated to be in the floodplain for 4,500 feet of its 9,675-foot total length.

## **Direct and Indirect Effects of Alternative C**

The effects on Federal land are the same as alternative B.

## **Cumulative Effects of Alternative C on Federal Land**

There are no floodplains on the 75 feet of Federal land needed for a private road easement. Therefore, there are no cumulative effects on Federal land.

## **Cumulative Effects of Alternative C from Connected Non-Federal Actions**

The old roadbed is healing as it was abandoned long ago for inability to maintain the road in this location. The effects are most critical on the Baxter Branch riparian zone. It is anticipated this road would be almost entirely in the Baxter Branch riparian zone after it descends the ridge from Pine Grove Church. This alternative has the greatest impact to the Baxter Branch floodplain because of distance in the floodplain. This road would violate the Monroe County zoning ordinance for the offset of 100 feet in the riparian buffer zone. A potential impact would be more homes and subdivisions could be built along this route. Since the route is in a floodplain, development would need to provide approved design and construction plans by Monroe County.

Cumulative effects are similar to those of the Swartz Road Route (Alternative B). However, there would be four major cross drains across Baxter Branch instead of just one. The Baxter Branch crossings would require an approved construction plan and road maintenance plan for continued use as required by Monroe County. The Pate Hollow Water Quality Study suggests that the impacts are negligible after the road is built and stabilized with diligent use of mitigation measures (Moss 1995).

## **Summary Cumulative Effects of Alternative C**

The cumulative effects are very similar to the Swartz Road Route, except there are four major cross drains across Baxter Branch instead of just one. The road is estimated to be in the floodplain for 4,500 feet of its 9,675 feet total length. However, based on the assumption that the required mitigation measures are carried out and maintained, the cumulative effects are estimated to be small from the Pine Grove Church Route.

## **Effects of Alternative D - Proposed Action**

The Knight Ridge Route would have minimal effect on the watershed or floodplain as it does not enter the floodplain and is on the ridge between these two watersheds.

## **Direct and Indirect Effects of Alternative D**

There would be no direct or indirect effects on the watershed or floodplain. The road would be built on the ridge between the watersheds and the effects of water flowing over the sides off the road would not be accelerated by the road structure. The hardwood forest buffer between the road and the subwatershed drainages adequately protects the drainages from changes in water flow.

## **Cumulative Effects of Alternative D**

The road may bring more traffic into the area to and from the Breedlove property. If the area were further developed with homes or subdivisions along the ridge road, the additional impact would be minimal to the watershed because of the existing hardwood forest buffer.

## **Summary Cumulative Effects of Alternative D**

Smithville Telephone Company has requested to use part of this route for a new buried fiber optic line. They propose to trench and bury the line in one pass during the dry season. There would be minimal exposure to the floodplain. The rest of the proposed road prism and four house sites are out of the floodplain and have sufficient hardwood forest buffer to minimize any effect to the watershed if built to Monroe County approved plans.

“Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7). Since there would be no incremental direct or indirect effects on the watershed or floodplain, there are no cumulative effects from the Knight Ridge Route.

## **Effects of Alternative E**

The Crossroads Route is on a ridge or sidehill for all but 200 feet of its length. It has no effect on floodplain soils as it crosses Pate Hollow within one-half mile of its origin and about one-half mile above the typical floodplain soils.

## **Direct and Indirect Effects of Alternative E on Federal Land**

There would be no direct affect on floodplains and only an indirect effect on the watershed as the road is on ridge and sidehill segments of Federal land. As exposed soil is seeded and mulched, use of weed free seed and straw would minimize the potential for noxious weeds from entering the watershed.

## **Cumulative Effects of Alternative E from Connected Non-Federal Actions**

The road would be built according to approved plans by Monroe County. It is projected that one crossing is necessary about one-half mile above the typical floodplain soils. The upper Pate Hollow crossing is not in a floodplain. Impacts to the watershed should be minimal and sediment load potential would be as described in the soil and water discussion of this alternative. The road construction design plan should provide for unobstructed flow of water across or under the road which would provide fish passage. Long-term effects on the watershed and floodplain require vigilance to maintain cross drains.

## **Summary of Cumulative Effects of Alternative E**

Smithville Telephone Company has requested to use part of this route for a new buried fiber optic line. If the line were buried, trenching and burying in one pass during the dry season would likely have minimal impact to the floodplain. The rest of the proposed road prism and four house sites are out of the floodplain and have sufficient hardwood forest buffer to minimize any effect to the watershed if built to Monroe County approved plans. No other present or reasonably foreseeable actions are known that would affect the Pate Hollow floodplain. The Pate Hollow Water Quality Study suggests when a road is built according to design, with stringent mitigation measures, impacts are negligible after the construction and the road has stabilized (Moss 1995). Based on the assumption that the required mitigation measures are carried out and maintained, the cumulative effects are estimated to be minimal from the Crossroads Route.

## **Effects of Alternative F**

Under the Baxter Branch Higher Route, a road would be constructed across Baxter Branch. Rainfall from spring storms floods the Baxter Branch drainage and the existing low water crossing. There is evidence of water flow out of the banks of Baxter Branch. A road has the potential to be seasonally flooded. This section of road would need to be built up about four feet to allow year-around use and still may occasionally be flooded. This watershed is about 600 acres above the crossing. To provide an all weather road to the private tracts southeast of Baxter Branch a bridge or culvert, should be of sufficient size to allow for seasonal flooding.

### **Direct and Indirect Effects of Alternative F on Federal Land**

There are no direct effects to the floodplain as only 75 feet of Federal land located on a sidehill are affected. There should be minimal indirect effects to the watershed or floodplain. As exposed soil is seeded and mulched, use of weed free seed and straw would minimize the potential for noxious weeds from entering the watershed.

### **Cumulative Effects of Alternative F from Connected Non-Federal Actions**

The road would be built according to approved plans by Monroe County. The Baxter Branch crossing is in a floodplain. Alternative F directly affects about 300 feet of floodplain,. This alternative would indirectly affect 1,800 feet of floodplain, as it would be built parallel to the Baxter Branch drainage. The road construction design plan should provide for unobstructed flow of water across or under the road which would provide fish passage. Long-term effects on the watershed and floodplain require vigilance to maintain cross drains for the Baxter Branch Higher Route.

### **Summary Cumulative Effects of Alternative F**

The cumulative effects are very similar to the Swartz Road Route (Alternative B) except this route directly affects about 300 feet of floodplain. This alternative would indirectly affect 1,800 feet of floodplain. However, based on the assumption that the required mitigation measures are carried out and maintained, the cumulative effects are estimated to be small from the Baxter Branch Higher Route.

## **Effects of Alternative G - No Action**

Under the no action alternative, a road would not be built and Mr. Breedlove would continue to have limited access to the property.

### **Direct and Indirect Effects of Alternative G**

Mr. Breedlove has no access rights so this alternative would eliminate the need to build a road anywhere. Therefore, there would be no impact on the watershed or floodplain except the continued soil erosion on the road used in 1997 until it is stabilized.

### **Cumulative Effects of Alternative G**

Since there are no effects to floodplains, there are no cumulative effects.

## **Issue 3: Compliance with *Forest Plan* Riparian Management or Monroe County Zoning Ordinances**

The *Forest Plan* discourages road construction in a riparian area, “Roads and trails will not be constructed in riparian areas unless no practical alternatives exist” (*Forest Plan*, pp. J-4 and J-5). Pate Hollow also falls in a riparian filter strip, “Riparian filter strips will consist of the riparian area and a 50 to 100-foot zone adjacent to the riparian area” (*Forest Plan*, p. J-4).

Monroe County has jurisdiction on riparian buffer zones on private land and lists specific restrictions for sensitive lands in Chapter 825-3 of the Zoning Ordinance (Monroe County 1997). Monroe County requires a setback distance or riparian buffer zone of 100 feet from each side of a perennial or intermittent stream. “No earth disturbance, removal of vegetation, logging operation, and agriculture and livestock feeding activities are permitted except for the following: installation or construction of infrastructure crossing.” “Where infrastructure crossings are necessary, erosion and sediment control plans will be submitted to the reviewing bodies. Such plans shall include: (a) Specifications for practices to be used in minimizing disturbance; (b) Methods for revegetation; (c) Documentation of any sensitive area which may be disturbed” (Monroe County 1997). The reviewing body is the Monroe County Planning Department.

### **Affected Environment**

The Pate Hollow crossing is in both a riparian area and a riparian filter strip. The free flowing perennial spring east of Pate Hollow crossing must be protected. Protection measures include no vegetation disturbance except for the road clearing width of 22-32 feet.

The Baxter Branch crossing routes are regulated by Monroe County zoning ordinance (Monroe County 1997). Monroe County has riparian guidance for “set back” or riparian buffer zone similar to the Hoosier National Forest guidance to protect riparian zones.

### **Effects of Alternative A**

The Pate Hollow Route proposed crossing is in the riparian zone on Federal land and conflicts with *Forest Plan* standards and guidelines.

### **Direct and Indirect Effects of Alternative A**

The direct affect of this alternative is a *Forest Plan* Amendment would be required. The road would need to be built to a higher standard to protect the free flowing spring and riparian values of Pate Hollow. The indirect effect is special mitigation and monitoring would be required to assure protection of riparian values in the Pate Hollow riparian zone during road construction and over long-term maintenance. The mitigation cost has the potential to be very high. The construction phase would have the impacts listed above in Soil and Water and Healthy Watersheds and Floodplains. Maintenance of the roads to protect these resources is critical to riparian health.

### **Cumulative Effects of Alternative A**

For this issue, cumulative effects are bound by *Forest Plan* compliance in the Baxter Branch and Pate Hollow watersheds. The estimated time needed to carry out this project is 2 to 3 years.

## **Summary Cumulative Effects of Alternative A**

The *Forest Plan* Amendment would be site specific and would not set a precedent for other riparian management issues. There are no other known actions (Federal or non-Federal) that would affect compliance with *Forest Plan* riparian management or Monroe County zoning ordinances. Therefore, cumulative effects of the Pate Hollow Route are minimal.

## **Effects of Alternatives B and F**

The Baxter Branch crossing alternatives, Swartz Road Route (Alternative B) and Baxter Branch Higher Route (Alternative F), are not subject to *Forest Plan* guidance because the riparian crossing is on private land. It is regulated by Monroe County zoning ordinance.

## **Direct and Indirect Effects of Alternatives B and F**

There is no affect to *Forest Plan* riparian management guidance since these routes are on private land.

Monroe County Planning Department must review and approve the riparian crossing erosion and sediment control plans for infrastructure crossing.

## **Cumulative Effects of Alternatives B and F**

It does not affect *Forest Plan* compliance.

The Baxter Branch crossing would comply with the riparian crossing protection measures set by Monroe County. It should improve the cumulative effect, as the current Baxter Branch crossing predates the 1997-zoning ordinance and is a low water crossing.

## **Summary Cumulative Effects of Alternatives B and F**

The Monroe County Planning Department would review and approve the riparian crossing erosion and sediment control plans for infrastructure crossing. They would be site specific and would not set a precedent for other riparian management issues. There are no other known actions (Federal or non-Federal) that would affect compliance with *Forest Plan* riparian management or Monroe County zoning ordinance within the Baxter Branch and Pate Hollow watersheds. Therefore, cumulative effects of the Swartz Road Route and Baxter Branch Higher Route are minimal.

## **Effects of Alternative C**

The Pine Grove Church Route is not subject to *Forest Plan* guidance because the riparian areas are located on private land.

## **Direct and Indirect Effects of Alternative C**

There is no affect to *Forest Plan* riparian management guidance because the riparian areas are on private land.

The Pine Grove Church Route in Baxter Branch would not comply with Monroe County zoning ordinance for development in a riparian area because it would have difficulty meeting the 100-foot set back distance from the drainage center line. The old county road meanders down the drainage within the 100-foot riparian buffer zone and has four crossings. A riparian set back variance from Monroe County

would be needed to pursue this alternative. The variance would require stringent protection measures developed by an approved engineer and approved by Monroe County Planning Department.

### **Cumulative Effects of Alternative C**

It does not affect *Forest Plan* Compliance.

Monroe County would consider this application for a variance and review for cumulative effects. It is unknown if Monroe County would issue a variance, since this route would have the largest impact to the riparian buffer zone.

### **Summary Cumulative Effects of Alternative C**

The Monroe County Planning Department would review plans for construction of a road and improvements submitted by a professional engineer registered in the State of Indiana. It is speculated the plans would be site specific and would not set a precedent for other riparian management issues. The *Forest Plan* Amendment would be site specific and would not set a precedent for other riparian management issues. There are no other known actions (Federal or non-Federal) that would affect compliance with the *Forest Plan* riparian management or Monroe County zoning ordinance within the Baxter Branch and Pate Hollow watersheds. Therefore, cumulative effects of the Pine Grove Church Route are minimal.

### **Effects of Alternative D – Proposed Action**

The Knight Ridge Route is on a ridge and would not affect riparian values.

### **Direct and Indirect Effects of Alternative D**

The direct and indirect effect is the route would not affect riparian values.

### **Cumulative Effects of Alternative D**

There is no cumulative effect.

### **Effects of Alternative E**

The Crossroads Route would cross Pate Hollow on private land at a 90-degree angle and is about one-half mile up drainage from the Pate Hollow route crossing. It would comply with the Monroe County zoning ordinance by not building a road in the riparian set back zone of 100 feet.

### **Direct and Indirect Effects of Alternative E**

There are no effects since the crossing is on private land.

### **Cumulative Effects of Alternative E**

The Crossroads Route has no effects. Therefore, there are no cumulative effects on *Forest Plan* riparian management.

Monroe County would consider this application for a development permit and review for cumulative effects. There are no known other actions (Federal or non-Federal) that would affect Monroe County zoning ordinance within the Baxter Branch and Pate Hollow watersheds. Therefore, cumulative effects are minimal of the Crossroads Route.

## **Effects of Alternative G - No Action**

The no-action alternative would not affect riparian values because a road would not be built in the riparian corridors.

## **Direct and Indirect Effects of Alternative G**

There is no direct or indirect effect on *Forest Plan* riparian management.

## **Cumulative Effects of Alternative G**

There is no cumulative effect on *Forest Plan* riparian management.

## **Summary Cumulative Effects of Alternative G**

No road would be built with this alternative so there are no cumulative effects. The existing road predates the 1997 Monroe County zoning ordinance and is not subject to it.

## **Issue 4: Wildlife Habitat**

An environmental assessment must consider the impacts on threatened and endangered species, Regional Forester sensitive species (RFSS), and forest species of concern (FSOC). There are special habitat concerns in riparian corridors such as Pate Hollow and Baxter Branch.

The project area is the road access route. There would be vegetation and soil disturbance of roughly 3 acres per mile of road constructed.

## **Threatened and Endangered Species**

All National Forest projects are reviewed for possible effects on endangered, threatened, proposed, or sensitive species (FSM 2672.4). The HNF entered into formal consultation with the USDI Fish and Wildlife Service under section 7 of the Endangered Species Act for continued *Forest Plan* implementation on April 5, 2000. The forest received a Biological Opinion on July 31, 2001 (Pruitt 2001b and USDI FWS 2001). The USDI Fish and Wildlife Service identified four Federally listed species as having part of their range on the HNF. These species are the threatened bald eagle (*Haliaeetus leucocephalus*), the endangered fanshell mussel (*Cyprogenia stegaria*), the endangered gray bat (*Myotis grisescens*), and the endangered Indiana bat (*Myotis sodalis*). There is no critical habitat (50 CFR 402.02) for these species in the project area.

Each alternative consists of the same type of effects to Indiana bat to varying degrees. The acreage involved varies from 0.04 to 4.4 acres on Federal land and 0.3 to 5.45 acres on private land depending on the alternative. "The project will not eliminate enough habitat to affect this species, but to avoid incidental take from removal of an occupied roost tree we recommend that tree-clearing be avoided during the period April 15 – September 15. If this measure is implemented the proposed project is not likely to adversely affect these listed species" (Pruitt 2001a).

There are three known bald eagle nests on Lake Monroe. The USDI Fish and Wildlife Service believes the nests are far enough away from the project area that they would not be disturbed by the proposed project (USDI FWS 2001a).

Neither fanshell mussel nor gray bat would be affected by this project because there are no records of these species in the vicinity (USDI FWS 2001a).

## Regional Forester Sensitive Species

The February 29, 2000 update of the Regional Forester sensitive species list shows that 78 sensitive species have been documented to occur on the HNF. Sensitive species are plant and animal species for which population viability is recognized as a concern, as evidenced by a downward trend in population or habitat capability. A review of forest records and the IDNR heritage database revealed no sightings of RFSS listed species within or immediately adjacent to the proposed project area (Larson 2002a).

Dry forest, mesic forest, and wetland habitats are found within or in the immediate vicinity of the proposed project area. There are 18 RFSS species that may utilize these habitat types in the proposed project area if landscape characteristics, plant community composition, or community structure are suitable.

Each alternative consists of the same type of effects to habitat to varying degrees: some tree removal and road construction. All alternatives, except Knight Ridge, also have one or more stream crossings. The acreage involved varies from 0.04 to 4.4 acres on Federal land and 0.3 to 5.45 acres on private land depending on the alternative. The project would not eliminate enough habitat to affect continued viability of RFSS species within the forest planning area.

Dry forests are dominated by trees, which create a canopy closure of greater than 80 percent. Bachman's sparrow (*Aimophila aestivalis*), evening bat (*Nycticeius humeralis*), Illinois bramble (*Rubus centralis*), timber rattlesnake (*Crotalus horridus*), and trailing arbutus (*Epigaea repens*) could potentially find suitable habitat in or near the proposed project area.

Mesic forests are dominated by large trees, which create a canopy closure of greater than 80 percent. Forest composition may vary with the type and depth of bedrock. These forests often grade imperceptibly into dry forests. American ginseng (*Panax quinquefolius*), butternut (*Juglans cinerea*), cerulean warbler (*Dendroica cerulea*), Illinois wood-sorrel (*Oxalis illinoensis*), large yellow lady's-slipper (*Cypripedium pubescens*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), southeastern myotis (*Myotis austroriparius*), valerian (*Valeriana pauciflora*), and West Virginia white (*Pieris virginensis*) could potentially find suitable habitat in or near the proposed project area.

Wetlands are those areas that are flooded or have hydric soils and have a cover of vegetation whether woody (swamp) or herbaceous (marsh). The vegetation can be quite variable depending on frequency and duration of flooding. This type of habitat is found in the stream crossings of Pate Hollow and Baxter Branch. It is not found on the Knight Ridge route. Clingman's hedge-nettle (*Stachys clingmanii*), Kirtland's snake (*Clonophis kirtlandi*), river otter (*Lutra canadensis*), and rose turtlehead (*Chelone obliqua* var. *speciosa*) could potentially find suitable habitat in or near the proposed project area.

Wide-ranging species use a diversity of habitat. Bobcat (*Lynx rufus*) is a wide-ranging predator that needs secluded areas and requires dense brush or rocky outcrops for cover. It is a low-density species and is very secretive, leading to few well-documented occurrences. Observations of bobcats have not occurred within the proposed project area or in the immediate vicinity. The nearest documented sighting is about 4.5 miles south of the proposed project area.

Although bobcat does not have documented occurrences with the proposed project area, it is active primarily at night, so sightings are few. Bobcats most likely inhabit the area, based on the presence of habitat and nearby sightings. Temporary disturbance to bobcat may occur if the project is implemented, but a sufficient amount of undisturbed habitat exists nearby.

## Forest Species of Concern

The revision of the Regional Forester sensitive species list includes most of the FSOC list found in Appendix C of the *Forest Plan*. However, those species, which did not become “sensitive,” remain as forest species of concern. A review of forest records and the IDNR heritage database revealed no FSOC sightings within or immediately adjacent to the proposed project area (Hedge *et al.* 2002 and IDNR 2002).

Dry forest, mesic forest, and wetland habitats are found within or in the immediate vicinity of the proposed project area. There are 16 FSOC species that may utilize these habitat types in the proposed project area if landscape characteristics, plant community composition, or community structure are suitable.

Each alternative consists of the same type of effects to habitat to varying degrees: some tree removal and road construction. All alternatives, except Knight Ridge, also have one or more stream crossings. The acreage involved varies from 0.04 to 4.4 acres on Federal land and 0.3 to 5.45 acres on private land depending on the alternative. The project would not eliminate enough habitat to affect continued viability of FSOC species within the forest planning area.

Dry forests are dominated by trees, which create a canopy closure of greater than 80 percent. FSOC inhabiting dry forests, which occur in the Brown County Hills section, include: Bewick’s wren (*Thryomanes bewickii*), black-and-white warbler (*Mniotilta varia*), Illinois pinweed (*Lechea racemulosa*), Nuttall’s bush-clover (*Lespedeza x nuttallii*), rough green snake (*Opheodrys aestivalis*), southern dewberry (*Rubus enslenii*), and worm-eating warbler (*Helmintheros vermivorus*).

Mesic forests are dominated by large trees, which create a canopy closure of greater than 80 percent. FSOC inhabiting mesic forests, which occur in the Brown County Hills, include: broad-winged hawk (*Buteo platypterus*), hooded warbler (*Wilsonia citrina*), red-shouldered hawk (*Buteo lineatus*), sharp-shinned hawk (*Accipiter striatus*), treelike clubmoss (*Lycopodium dendroidium*), and yellowwood (*Cladrastis lutea*).

Wetlands are flooded areas or have hydric soils and have a cover of vegetation whether woody (swamp) or herbaceous (marsh). The vegetation can be quite variable depending on frequency and duration of flooding. FSOC found in wetlands that occur in the Brown County Hills include: Appalachian quillwort (*Isoetes engelmannii*), meadow spike-moss (*Selaginella apoda*), and osprey (*Pandion haliaetus*).

## Management Indicator Species (MIS)

Species believed to be vulnerable to population decline and species most likely to provide an indication of effects of management actions through population change make up the MIS list in the *Forest Plan*, p. C-13. Monitoring of these species would provide data on population trends under a variety of habitat conditions found on the forest (*Forest Plan*, C-13). Recently under the Forest-wide Openings Maintenance EA, we documented the trends of all MIS species forestwide and we discovered no trends that caused concern (USDA FS 1999b). There are no documented occurrences of any MIS species within or in the immediate vicinity of the project area (Larson 2002b).

Each alternative consists of the same type of effects to habitat to varying degrees: some tree removal and road construction. All alternatives, except Knight Ridge, also have one or more stream crossings. The acreage involved varies from 0.04 to 4.4 acres on Federal land and 0.3 to 5.45 acres on private land depending on the alternative. The project would not eliminate enough habitat to affect continued viability of MIS species within the forest planning area.

The terrestrial MIS species that may have appropriate habitat within or adjacent to the project area include: Acadian flycatcher (*Empidonax vireescens*), American woodcock (*Scolopax minor*), grass pickerel (*Esox americanus*), gray squirrel (*Sciurus carolinensis*), Louisiana waterthrush (*Seriurus motacilla*) pileated woodpecker (*Dryocopus pileatus*), pine warbler (*Dendroica pinus*), raccoon (*Procyon lotor*), rock bass (*Ambloplites rupestris*), ruffed grouse (*Bonasa umbellus*), scarlet tanager (*Piranga olivacea*), wild turkey (*Meleagris gallopavo*), wood duck (*Aix sponsa*), and wood thrush (*Hilocichla mustelina*), as well as stream invertebrates and wetlands (Larson 2002b).

The two fish species occur in Lake Monroe. Both commonly inhabit small to moderate size streams (Robison and Buchanan 1984) and have potential habitat within the streams intersecting the proposed road. It is likely these two species exist in the proposed project area. Siltation and turbidity would increase in the two intersected streams due to road construction (USDA FS 2000a). Rock bass and several stream invertebrates are intolerant of siltation and high turbidity (Robison and Buchanan 1984 and Brigham *et al.* 1981).

Gray squirrel, wild turkey, and pileated woodpecker are relatively widespread on the forest, so we consider them present in the project area in spite of no documented sightings. All of the action alternatives may remove some potential habitat for the terrestrial species. However, the project would not eliminate enough available habitat to affect the continued viability of these species within the Hoosier National Forest or the proposed project area. Temporary disturbance to wildlife may occur during construction activities, if they do inhabit these areas, but sufficient amounts of undisturbed habitat exists nearby. In addition, the proposed project would not affect the overall habitat quality since the overstory composition, density, and structure would remain essentially unchanged (Larson 2002b).

Typical or “true” wetlands do not exist in the proposed project area, but similar habitat elements may be present in the small, isolated areas along Pate Hollow Creek and Baxter Branch Creek. This marginal potential habitat exists primarily at the lower reaches of these streams below the proposed stream crossings. Considering the specific microsite habitat requirements of either plant or animal species typically occurring in wetlands, the anticipated effects on this habitat would be minimal or none by the action alternatives (Larson 2002b).

## Cumulative Effects

Past activities on private land that have affected the area include conversion of land to agricultural or residential uses, timber harvest, and the construction of Lake Monroe. Past activities on Federal land that have probably affected this area include timber harvest in both riparian and upland habitats.

Present or reasonably foreseeable future activities on private land that may have an impact on this area include construction or use of roads, timber harvest, and activities associated with nearby residences. Private lands near the proposed project area would continue to be a mix of forest and residential development.

Present or reasonably foreseeable future activities on Federal land include the conversion of non-native pines in the area to native hardwoods either naturally or through vegetation management such as timber harvest. “Vegetation management in riparian areas will emphasize enhancement and/or maintenance of riparian dependent resources” (*Forest Plan Appendix J*).

There is evidence of recent development in this area on private land, with most available sites presently occupied. Relatively little additional development is likely because of the topography of the area and Monroe County has placed limits on road construction to residences in this area.

These past, present, and reasonably foreseeable effects on Federal land and private land are the same for all alternatives for wildlife habitat, including threatened and endangered, RFSS, FSO, and MIS species.

## **Effects of Alternative A**

The Pate Hollow Route crosses about 7,730 feet of NFS land and about 530 feet of private land. About 4.7 acres would be disturbed in this alternative. Most of this route is through white oak (*Quercus alba*) stands with other dry to mesic forest trees in the canopy as well. About 56 percent of this route is in the dry slope ecological land type (ELT), 27 percent is in the mesic slope ELT, and 15 percent in the bottomland ELT. Hardwoods, such as sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), and silver maple (*Acer saccharinum*) are common in the floodplain. This route crosses two drainages above the pool level and could negatively affect aquatic species with sedimentation during road construction. A small portion is in a pine plantation near the radio tower site. This is the two percent of the route in the dry ridge ELT.

## **Direct and Indirect Effects of Alternative A**

There is an old narrow roadway beginning west the radio tower site and terminating at the Pate Hollow bottom. The direct effect is a considerable number of trees would need to be cut for the road to follow the point of the ridge, cross the Pate Hollow bottoms, and ascend the slope on the north side of the hollow. This affects about 4.4 acres on Federal land. Road construction and use could disrupt wildlife use in this relatively little used area. To keep the grade of the road within limitations for its intended use, extensive cut and fill construction would be needed. The cut and fill would result in additional forest habitat being removed and would increase the potential for erosion which could further disrupt wildlife use of the area. Another potential loss of habitat or habitat modification comes from the fill material. The road would be raised a minimum of four feet to keep the part of the road on the Pate Hollow bottoms from flooding.

Alternative A requires the construction of two stream crossings. Infiltration of contaminants is highest at stream crossings (USDA FS 2000a) and stream crossings have been shown to negatively effect invertebrate populations (McCammom and Rector 1998). Road crossings are also common migration barriers for fish (USDA FS 2000b). Alternative A has the greatest potential to negatively affect grass pickerel, rock bass, and stream invertebrates (b 2002).

An indirect effect would be establishing a permanent access route for noxious weeds into relatively little disturbed forests. Invasive non-native plants tend to simplify community structure, making areas less diverse and less suitable for native plants and animals in the habitat.

## **Cumulative Effects of Alternative A**

In addition to the 4.4 acres of Federal land, the road clearing and construction would affect about 0.3 acres of private land. The addition of the road and four house sites would add four non-forest sites to the already 18 non-forested sites within the subwatersheds for 22 non-forested sites. This is a 28 percent increase in non-forest areas. This additional fragmentation of the largely forested landscape would likely increase the edge habitat relative to interior habitat in the area for the Pate Hollow Route.

The cumulative effects of Alternative A on aquatic species, taking into account the past, present, and future actions in the project area vicinities, could potentially be negative. Physical changes (such as increased turbidity) can have ripple effects throughout aquatic environments (Cole and Landres 1995). Physical

changes within the streams could result in the loss of potential habitat for stream invertebrate and two MIS fish, the grass pickerel and rock bass.

## **Effects of Alternative B**

The Swartz Road Route crosses about 75 feet (0.04 acre) of dry slopes on Federal land and about 4,000 feet on private land. The Federal land is dominated by white oak and sugar maple (*Acer saccharum*) and beech (*Fagus grandifolia*) are in the understory, with a few of these reaching the canopy. This area is in the dry slope ELT.

## **Direct and Indirect Effects of Alternative B**

About 0.04 acre of Federal land (75 feet) would be affected by the road clearing and construction. No additional trees would likely be cut and only a small amount of encroaching brush would need to be removed. Maintenance of the road would probably cause the vegetation along the edge of the road to be low and brushy. This low, brushy vegetation may provide cover for a variety of birds and mammals.

An indirect effect would be establishing a permanent access route for the possible introduction of noxious weeds into relatively little disturbed forests. Invasive non-native plants tend to simplify community structure, making areas less diverse and less suitable for native plants and animals in the habitat.

## **Cumulative Effects Alternative B**

In addition to the 0.04-acres of Federal land, about 2.27 acres of private land would be affected by the road clearing and construction (a connected non-Federal action). Effects on the private land would be the same as on the Federal land described above.

There is evidence of recent development in this area on private land, with most available sites presently occupied. Relatively little additional development is likely because of the topography of the area and Monroe County has placed limits on road construction to residences in these hills. Timber harvests, agricultural crop production, and livestock grazing continue to occur on private land. Most private forestland is harvested every 10 to 20 years (Unversaw 2002).

There would be few additional effects to the area because the permitted road from the 1997 Breedlove access is still present. The 1997 permit had a 10-foot tread width and a 20-foot clearing width. The tread width of the road in this alternative would be 12 feet with a 20-foot clearing width.

The addition of the road and four house sites would add four non-forest sites to the already 18 non-forested sites within the subwatersheds for 22 non-forested sites. This is a 28 percent increase in non-forest areas. This additional fragmentation of the largely forested landscape would likely increase the edge habitat relative to interior habitat in the area.

From an aquatic standpoint, Alternatives B and F differ from Alternative A by the need for the construction of one stream crossing. Therefore, Alternatives B and F would have the same indirect, direct, and cumulative effects as Alternative A, but to a lesser degree. See Alternative A for direct, indirect, and cumulative effects.

The effects of the 75-foot segment of a road would provide very little additional effect on plant and animal habitat in the area. There would be considerably greater effects from the remaining length of this alternative as it crosses private lands. The overall effects of a gravel surface road would be the same in forested areas on private land as on Federal land for the Swartz Road Route.

## **Effects of Alternative C**

The Pine Grove Church Route would cross Baxter Branch farther up drainage about a quarter of a mile. About 25 percent of this alternative route is in the dry slope ELT, 25 percent is in the mesic slope ELT, and 50 percent in bottomland ELT. Hardwoods, such as sycamore, American elm, and silver maple are common in the bottomland ELT. The route crosses about 75 feet of dry slopes on Federal land.

### **Direct and Indirect Effects of Alternative C**

The effects to Federal land in this alternative would be similar to Alternative B.

### **Cumulative Effects of Alternative C**

In addition to the 0.04 acres of Federal land; about 5.45 acres of private land would be affected by the road clearing and construction (a connected non-Federal action). Road construction would affect the greatest amount of riparian habitat of any alternative, as the road meanders back and forth across the creek four times. The road would be located in the riparian corridor about 4,500 feet with four major riparian crossings. Infiltration of contaminants is highest at stream crossings (USDA FS 2000a), and stream crossings have been shown to negatively effect invertebrate populations (McCammom and Rector 1998). Road crossings are also common migration barriers for fish (USDA FS 2000b). This area currently receives little disturbance and there are some nest structures. It appears wildlife habitat improvement work has occurred in the past based on the number of wood duck boxes installed on posts and grains planted.

The addition of the road and four house sites would add four non-forest sites to the already 18 non-forested sites within the subwatersheds for 22 non-forested sites. This is a 28 percent increase in non-forest areas. This additional fragmentation of the largely forested landscape would likely increase the edge habitat relative to interior habitat in the area for the Pine Grove Church Route.

## **Effects of Alternative D - Proposed Action**

The Knight Ridge Route is on a ridge the entire way to the Breedlove property. The first 2,000 feet of road is paved and passes through Knight Ridge Campground. The rest of the route would require 6,900 feet of road construction or reconstruction. The route crosses about 2,900 feet of Federal land. This alternative would affect about 3.92 acres due to new vegetation disturbance. The Federal land is dominated by white oak and sugar maple and beech is in the understory, with a few of these reaching the canopy. About 58 percent of this alternative route is in the mesic slopes ELT and 42 percent is in the dry slope ELT.

### **Direct and Indirect Effects of Alternative D**

This route directly affects 1.65 acres of Federal land. Road construction and use could disrupt wildlife use in this relatively little used area. The road follows a ridge minimizing the amount of sidehill cuts. This would result in less forest habitat being removed and less wildlife impact than road alternatives on the sidehill.

An indirect effect would be establishing a permanent access route for noxious weeds into relatively little disturbed forests. Invasive non-native plants tend to simplify community structure, making areas less diverse and less suitable for native plants and animals in the habitat.

## **Cumulative Effects of Alternative D**

In addition to the 1.65 -acres of Federal land, about 2.27 acres of private land would be affected by the road clearing and construction (a connected non-Federal action). Effects on the private land would be the same as on the Federal land as described above.

There is evidence of recent development in this area on private land, with most available sites presently occupied. Relatively little additional development is likely because of the topography of the area and Monroe County has placed limits on road construction to residences in these hills. Timber harvests, agricultural crop production, and livestock grazing continue to occur on private land. Most private forestland is harvested every 10 to 20 years (Unversaw 2002).

The addition of the road and four house sites would add four non-forest sites to the already 18 non-forested sites within the subwatersheds for 22 non-forested sites. This is a 28 percent increase in non-forest areas. This additional fragmentation of the largely forested landscape would likely increase the edge habitat relative to interior habitat in the area for the Knight Ridge Route.

## **Effects of Alternative E**

The Crossroads Route requires crossing upper Pate Hollow. The route crosses about 2,900 feet of Federal land and about 6,000 feet of private land. This alternative would affect about 5.05 acres. The Federal land is dominated by white oak; sugar maple and beech are in the understory, with a few of these reaching the canopy. About 58 percent of this alternative route is in the dry slope ELT and 42 percent is on the mesic slope ELT.

## **Direct and Indirect Effects of Alternative E**

Road construction and use could disrupt wildlife use in this relatively little used area. This directly affects the same 1.65 acres of Federal land as in Alternative D.

An indirect effect would be establishing a permanent access route for noxious weeds into relatively little disturbed forests. Invasive non-native plants tend to simplify community structure, making areas less diverse and less suitable for native plants and animals in the habitat.

## **Cumulative Effects of Alternative E**

In addition to the 1.65 -acres of Federal land, about 3.4 acres of private land would be affected by reconstruction (a connected non-Federal action). No trees would be cut on the Grubb property as the road crosses pasture. There is evidence of recent development in this area on private land, with most available sites presently occupied. Relatively little additional development is likely because of the topography of the area and Monroe County has placed limits on road construction to residences in these hills. Timber harvests, agricultural crop production, and livestock grazing continue to occur on private land. Most private forestland is harvested every 10 to 20 years (Unversaw 2002).

The addition of the road and four house sites would add four non-forest sites to the already 18 non-forested sites within the subwatersheds for 22 non-forested sites. This is a 28 percent increase in non-forest areas. This additional fragmentation of the largely forested landscape would likely increase the edge habitat relative to interior habitat in the area for the Crossroads Route.

## **Effects of Alternative F**

The Baxter Branch Higher Route crosses about 75 feet (0.04 acre) of Federal land and about 3,200 feet of private land.

### Direct and Indirect Effects of Alternative F

The effects to Federal land in this alternative would be the same as those described in Alternative B.

### Cumulative Effects of Alternative F

In addition to the 0.04 acres of Federal land, about 1.88 acres of private land would be affected by the road clearing and construction (a connected non-Federal action). Otherwise, the cumulative effects of Alternative F are the same as Alternative B.

### Effects of Alternative G - No Action

This alternative does not implement the proposal.

### Direct and Indirect Effects of Alternative G

Implementing the no action alternative would not affect any habitat in the area. The land in the alternative corridors would continue to act as habitat for the plants and animals in the vicinity.

### Cumulative Effects of Alternative G

Because there would be no effects on plants, animals, or their habitats in the project area, there would likewise be no cumulative effects of the no-action alternative.

## Issue 5: Road Design and Safety

There are three concerns regarding road design and safety. One is sight distance. Sight distance is the cleared distance a driver can see another vehicle or pedestrian to safely stop or avoid collision. INDOT has jurisdiction on SR 446. The INDOT Design Manual requires a stopping sight distance of 570 feet for a passenger car and 720 feet for a truck going 55 mph (INDOT 1994). Hills and curves limit length of sight distance. Single lane roads limit the ability to get out of the way of oncoming vehicles. The proposed road is a single lane road with turnouts. Road turnouts allow oncoming vehicles to pull over so the other can safely pass. The alternatives would be evaluated against the sight distance criteria. Table 5 provides a summary of road design safety criteria.

<b>Alternatives</b>	<b>Sight Distance (feet)</b>	<b>Visual Concerns</b>	<b>Collector Road Access</b>	<b>Average Traffic Speed</b>	<b>Sight Distance Minimum per INDOT</b>
<b>A.</b>	<200 north, 100 south	Middle curve Hill to south	SR 446 paved two lane	30 advisory 40 mph max	350' at 40 mph wet pavement level
<b>B.</b>	300' NE, 200' SW	On ridge Hill to SW	Swartz Road 18' wide, paved	35 mph	275' at 35 mph wet pavement level

<b>Alternatives</b>	<b>Sight Distance (feet)</b>	<b>Visual Concerns</b>	<b>Collector Road Access</b>	<b>Average Traffic Speed</b>	<b>Sight Distance Minimum per INDOT</b>
<b>C.</b>	300' north, 350' south	On ridge hill to N Curve to south	SR 446 paved two lane	30 advisory 40 mph max	350' at 40 mph wet pavement level
<b>D.</b>	400' north, 350' south	On ridge in curve	SR 446 paved two lane	30 advisory 40 mph max	350' at 40 mph wet pavement level
<b>E.</b>	350' north, 350' south	On ridge next to Grubb home.	SR 446 paved two lane	30 advisory 40 mph max	350' at 40 mph wet pavement level
<b>F.</b>	200' Moores Rd 3-way stop Swartz	Hill 100' south of turn to Swartz Road 3-way stop.	Moores Creek Rd 15-18' wide, paved	30 mph	225' at 30 mph wet pavement level
<b>G.</b>					

The second design and safety concern is road grades. Steep grades increase stopping distance and increase the potential of sliding off the roadway due to increased speed on downhill grades. This concern would be addressed in each alternative in the proposed road design and would be the same for any selected alternative. Therefore, it would not be a criterion for alternative comparison.

The third design and safety concern is road design factors such as the design vehicle used, whether the road is for seasonal or year-round use, and signage. The applicant requested a year-round access. The design vehicle is a passenger car and may include towing a trailer. Larger vehicles (such as large concrete trucks) would need access during any activities associated with the development of residential lots. Monroe County zoning policy is for grades not to exceed 12 percent, and USDA Forest Service policy is for grades not to exceed eight percent. The applicant has stated he is interested in developing an access to serve year-round use by one to five developed lots. Hoosier National Forest Road Design Guidelines for access easements serving these developments should be a minimum of twelve-foot wide, aggregate surface with a maximum of eight percent road grade, and a traffic service level B. Traffic Service Level B describes many operational constraints to improve safety (USDA FS 2001a). Year-round use may require snow plowing in winter. This concern would be addressed in each alternative in the road design and would be the same for any selected alternative. Therefore, it would not be a criterion for alternative comparison.

The long-term safety concern is road maintenance. It is required for any selected alternative and is part of the monitoring phase. The easement holder and landowner would share responsibility for monitoring road maintenance. The easement holder would be responsible for the cost of road maintenance.

## **Affected Environment**

The sight distance issue is at the intersection of the anticipated private road easement with Moores Creek Road, with SR 446, or Swartz Road depending on the alternative. On SR 446, the posted speed limit is 40 mph adjacent to the Pate Hollow road entrance. The recommended stopping sight distance, at 40 mph, is 350 feet (INDOT 1994). Table 5 displays sight distance minimum per INDOT.

## **Effects of Alternative A**

The Pate Hollow entrance road to SR 446 has a sight distance less than 200 feet north because of a curve and 100 feet south because of a hill. The sight distance to the south is because of a hill with about a 15

percent grade. A vehicle traveling down grade at 40 mph could not stop traveling in less than 350 feet (Table 5). This access to SR 446 does not meet the required stopping distance of 350 feet. Most vehicles travel near 50 mph in this road section.

## **Direct and Indirect Effects of Alternative A**

Granting an easement across Federal lands on this route does not directly affect the sight distance at SR 446. There is an anticipated effect from the likely non-Federal connected action. Those effects are discussed below in cumulative effects.

## **Cumulative Effects of Alternative A**

Road travel safety could be considered a broad issue. In this analysis road travel safety is limited to the critical sight distance at the intersection of the anticipated private road easement with the public paved road. For this analysis, cumulative effects are bounded in space to the actual intersection because that is the limit of any affects of the associated actions. Cumulative effects are bounded to the next two to three years because that is when possible road construction may occur.

Under this alternative, it is anticipated that Mr. Breedlove would obtain an easement across about 30 feet of the Landry property to the intersection with SR 446. If an easement is obtained, there is an effect on sight distance and grade at the entry from SR 446 to Pate Hollow. This intersection does not meet the recommended sight distance (Table 5). The intersection in this alternative is located on a curve on a hill. The area to the north is in a curve with 200 feet sight distance, but does not meet the 350 feet recommended sight distance. The indirect effect is an increase in traffic if used as access and greater potential for vehicle accidents. An adjacent landowner said they avoid the northbound short sight distance by exiting south from the driveway on to SR 446. If they want to go north on SR 446, they would drive south until they can safely turn around. If traveling north on SR 446, they would pass their driveway, continue north until they get to the store across from Pine Grove Church, turn around at the store, and proceed south on SR 446, which allows them to safely turn right into their driveway.

This is the least favorable alternative for sight distance. If this alternative were the access, more traffic would use this location and potentially increase vehicle accidents.

## **Cumulative Effects of Connected Non-Federal Actions**

Christensen looked at a possible new access about 400 feet south of the existing access. The new access would require considerable fill material to construct a new intersection for an access road and allow a vehicle to turn off SR 446. This new intersection would improve the sight distance by 100 feet (200 feet total). The intersection would still not meet the 350-foot minimum recommended sight distance (Christensen 2001).

## **Summary Cumulative Effects of Alternative A**

The intersection of the Landry driveway and SR 446 has existed for some time. Around 1985, USDA Forest Service contractors used this intersection (during the course of a timber sale) to haul timber. Pate Hollow has the worst sight distance and the least potential to improve it. A tractor-trailer truck should not be used to haul material into the Pate Hollow Route. The turn off to the access road from SR 446 is a sharp and narrow turn, which immediately ascends the hill to the radio tower electronic site. The USDA Forest Service participants have no knowledge of other present or reasonably foreseeable future actions (Federal or non-Federal) that would add additional impacts to the site distance concern. This intersection does not meet the 350-foot recommended stopping sight distance. If this alternative were carried out,

there would be potential for an increase in traffic resulting in more vehicle accidents. The cumulative impact of this alternative is greater than all the others.

## **Effects of Alternative B**

The Swartz Road entrance from the private road has a sight distance of 400 feet north and 300 feet south and is located at the top of a ridge.

## **Direct and Indirect Effects of Alternative B**

Under this alternative, an easement would be granted across Federal lands on the Swartz Road Route to Mr. Breedlove. This Federal action does not directly affect the sight distance at Swartz Road. There are anticipated effects from the likely non-Federal connected action. Those effects are discussed below in cumulative effects.

## **Cumulative Effects of Alternative B**

Cumulative effects are bounded at Swartz Road as discussed above for Pate Hollow. Under this alternative, it is anticipated that Mr. Breedlove would obtain an easement across several private tracts. He would likely need an easement from Bret Davis to develop a road intersection with Swartz Road. Once an easement is obtained, there would be an effect on sight distance and grade at the entry from Swartz Road to the private road easement.

The effect on the safety issue of sight distance is the road entry to the Swartz Road has good sight distance. There are several possible access points to the Swartz Road but they cross private land. The applicant would have to negotiate these routes with each landowner. The entrance of one route (as mapped) is on the east side of a hill and on a ridge. It has good sight distance in both directions and meets the 275-foot minimum recommended stopping sight distance at 35 mph. Some vegetation may need to be trimmed to clear the view.

The indirect effect is less potential impact on other resources from safety mitigation.

This entrance would be regulated by Indiana traffic code and probably would require a stop sign at the intersection with Swartz Road.

## **Summary Cumulative Effects of Alternative B**

Table 5 provides a summary of the sight distance safety factor. Swartz Road has better sight distance and could be improved by removing some of the berms adjacent to the county road. The USDA Forest Service participants have no knowledge of other present or reasonably foreseeable future actions (Federal or non-Federal) that would add additional impacts to the site distance concern at this intersection. This intersection has good site distance. However, if this alternative is carried out, there would be an increase in local traffic and may result in a slightly higher vehicle accident potential. Nevertheless, the cumulative impact of this alternative is minimal.

## **Effects of Alternative C**

The intersection of the Pine Grove Church entrance road and SR 446 has a sight distance of 300 feet to a hill in the north and 350 feet to a curve in the south. The posted speed limit is 40 mph in this road section. According to Table 5, the minimum site distance is 350 feet at 40 mph under wet pavement

conditions; the sight distance to the north is too short. There are about a half dozen homes with access from this road.

## **Direct and Indirect Effects of Alternative C**

Under this alternative, an easement would be granted across Federal lands on the Pine Grove Church Route to Mr. Breedlove. This Federal action does not directly affect the sight distance at Pine Grove Road. There is an anticipated effect from the likely non-Federal connected action. Those effects are discussed below in cumulative effects.

## **Cumulative Effects of Alternative C**

Cumulative effects are bounded at Pine Grove Church as discussed above for Pate Hollow. Under this alternative, it is anticipated that Mr. Breedlove would use the old county road to access SR 446 near Pine Grove Church. Under this alternative, there is an effect on the issue of sight distance and grade at the entry from the Pine Grove Church road to SR 446.

The effect on the sight distance is the entry to the Pine Grove Church does not meet the minimum recommended stopping sight distance of 350 feet (Table 5). The indirect effect is there may need to be more caution signs at this intersection. Some vegetation may need to be trimmed to clear the intersection of vegetation blocking the view.

This entrance would be regulated by Indiana traffic code and probably would require a stop sign at the intersection with SR 446. The long-term solution would be to redesign the intersection with turn lanes.

## **Summary Cumulative Effects of Alternative C**

Table 5 presents a summary of the sight distance safety factor. Pine Grove Church entrance road has several homes and the addition of an access road to a few more homes should not increase the use significantly. The USDA Forest Service participants have no knowledge of other present or reasonably foreseeable future actions (Federal or non-Federal) that would add additional impacts to the site distance concern at this intersection. This intersection has poor site distance to the north and several homes use this intersection to access SR 446. If this alternative is carried out, there would be an increase in local traffic and may result in a slightly higher vehicle accident potential. Nevertheless, the cumulative impact of this alternative is minimal.

## **Effects of Alternative D – Proposed Action**

The Knight Ridge entrance road to SR 446 has a sight distance of 400 feet north and 350 feet south to the top of a hill and meets the recommended 350-foot stopping sight distance.

## **Direct and Indirect Effects of Alternative D**

This alternative would grant an easement across Federal lands on a route called Knight Ridge to Mr. Breedlove. This Federal action does not directly affect the sight distance at the Knight Ridge intersection with SR 446. There is an anticipated effect from the likely non-Federal connected action. Those effects are discussed below in cumulative effects.

## **Cumulative Effects of Alternative D**

Cumulative effects are bounded at Knight Ridge as discussed above for Pate Hollow. Under this alternative, it is anticipated that Mr. Breedlove would obtain a right-of-way across the first property called Knight Ridge Campground and use the existing intersection to obtain access to SR 446. Under this alternative, there is an effect on sight distance and grade at the entry from the Knight Ridge Campground to SR 446.

The effect on sight distance is the entry to Knight Ridge meets the recommended stopping site distance. It is at the top of a hill and is access for a busy campground. Traffic tends to slow down in anticipation of this intersection.

The indirect effect is the applicant would have to negotiate this route with each landowner and agree to road signage and closure devices, such as a gate to control access.

The Knight Ridge road has minimal road travel safety issues beyond the entrance, as the road is relatively flat. The single lane road would still require turnouts, but the turnouts would be easier to construct with minimal sidehill cutting. The applicant would have to negotiate traffic management with the Knight Ridge Campground.

## **Summary Cumulative Effects of Alternative E**

Table 5 displays a summary of the sight distance safety factor. Knight Ridge has about 100 trailer campsites. The owner of the campground is concerned about increased traffic and the speed additional vehicles may go through the campground to access possible building sites. The intersection is generally busy and traffic to a few more lots would not appreciably increase traffic except in the winter, when there are few visitors to the trailer park. This alternative has the best sight distance. The USDA Forest Service participants have no knowledge of other present or reasonably foreseeable future actions (Federal or non-Federal) that would add additional impacts to the site distance concern at this intersection. This intersection has good site distance. If this alternative were carried out, there would be a minor increase in local traffic, which may result in a slightly higher vehicle accident potential. Nevertheless, the cumulative impact of this alternative is minimal.

## **Effects of Alternative E**

The Crossroads Route entrance is next to the Grubb property where it intersects with SR 446. The intersection has a sight distance of 350 feet to the south and 350 feet to the north. This meets the recommended sight distance at 40 mph of 350 feet in Table 5.

## **Direct and Indirect Effects of Alternative E**

Under this alternative, an easement would be granted across Federal lands on the Crossroads Route to Mr. Breedlove. This Federal action does not directly affect the sight distance at the four-way intersection (Richardson Road and SR 446). There is an anticipated effect from the likely non-Federal connected action. Those effects are discussed below in cumulative effects.

## **Cumulative Effects of Alternative E**

Cumulative effects are bounded at Crossroads Route as discussed above for Pate Hollow. Under this alternative, it is anticipated that Mr. Breedlove would use the existing intersection at Richardson Road to obtain access to SR 446. There is an effect on sight distance and grade at the entry at Richardson Road to SR 446.

The effect on the sight distance is the entry from SR 446 to the Crossroads route has good sight distance. The indirect effect is less potential impact on other resources from safety mitigation. This entrance would be regulated by Indiana traffic code and probably would require a stop sign at the intersection with SR 446. The long-term solution to fix this SR 446 road segment is to redesign the State highway to widen the road with turnout lanes. This may not be practical for an access road that would potentially serve only a few additional houses.

## **Summary Cumulative Effects of Alternative E**

Table 5 displays a summary of the sight distance safety factor. The access is adjacent to the Grubb residence and has the second best sight distance compared to Knight Ridge. The USDA Forest Service participants have no knowledge of other present or reasonably foreseeable future actions (Federal or non-Federal) that would add additional impacts to the site distance concern at this intersection. This intersection has good site distance. If this alternative were carried out, there would be a minor increase in local traffic, which may result in a slightly higher potential for vehicle accidents. Nevertheless, the cumulative impact of this alternative is minimal.

## **Effects of Alternative F**

The Baxter Branch Road is gated and appears to be a private road. It has a “T” intersection with a right turn on to Moores Creek Road. It is about one-half mile to the Swartz Road intersection, which has a three-way stop sign. The limited sight distance is on Moores Creek Road because there is a hill about 100 feet south of its intersection with the Swartz Road.

## **Direct and Indirect Effects of Alternative F**

This alternative would grant an easement across Federal lands on a route called Baxter Branch Higher to Mr. Breedlove. This Federal action does not directly affect the sight distance at the intersection of the Baxter Branch Road and Moores Creek Road. However, there is an anticipated effect from the likely non-Federal connected action. Those effects are discussed below in cumulative effects.

## **Cumulative Effects of Alternative F**

For this analysis, cumulative effects are bounded in space to the two intersections: Baxter Branch Higher with Moores Creek Road, and Moores Creek Road with Swartz Road because that is the limit of any affects of the associated actions. Cumulative effects are bounded to the next two to three years because that is when possible road construction may occur. Under this alternative, it is anticipated that Mr. Breedlove would obtain a right-of-way to use the existing intersection of Baxter Branch Road and Moores Creek Road. Under this alternative, there is an effect on sight distance and grade at the entry from the Baxter Branch Road to the Moores Creek Road.

Sight distance is not very good at the intersection with Moores Creek Road. In addition, sight distance at the turn from Moores Creek Road to Swartz Road does not meet the recommended stopping sight distance of 225 feet at 30 mph. The three-way stop intersection at Swartz Road and Moores Creek Road may reduce this short sight distance, since all vehicles must stop at the intersection.

There are many trailer lots on the Baxter Branch road. It is doubtful that an additional access road for a few lots would add much traffic to the current level of use in the summer.

## **Summary Cumulative Effects of Alternative F**

Table 5 displays a summary of the sight distance safety factor. This is a gated road with trailers adjacent to the road. Traffic has the potential to be busy in the summer. Sight distance is not very good at the intersection with Moores Creek Road or at the turn to Swartz Road. This alternative is better than the Pate Hollow access route. The USDA Forest Service participants have no knowledge of other present or reasonably foreseeable future actions (Federal or non-Federal) that would add additional impacts to the site distance concern at this intersection. The affected intersections have poor site distance. If this alternative were carried out, there would be a minor increase in local traffic, which may result in a slightly higher potential for vehicle accidents. Nevertheless, the cumulative impact of this alternative is minimal.

## **Effects of Alternative G - No Action**

The only access permitted is to the current landowner and is limited to foot traffic. This alternative has the same concerns as Baxter Branch Higher (Alternative F).

## **Direct and Indirect Effects of Alternative G**

Potential effects are the same as Baxter Branch Higher (Alternative F).

## **Cumulative Effects of Alternative G**

Potential effects are the same as Baxter Branch Higher (Alternative F).

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U.S. Department of Agriculture, Soil Conservation Service (USDA SCS). 1981. Soil Survey of Monroe County. 184 p.

U.S. Department of the Interior, Fish and Wildlife Service (USDI FWS). 2001. Letter dated July 31 to Kenneth G. Day transmitting biological opinion. [On file with Forest Supervisor, Hoosier National Forest, 811 Constitution Ave., Bedford, IN 47421.] 1 p.

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# Appendix A

## Public Comments from Initial Scoping

The ID team categorized each response received during the scoping process to identify specific comments, issues, and concerns. These comments were identified and sorted. Following each comment is a summary of how the comment was addressed in the analysis.

In the following pages, we group comments by issues. There is also a “general comments, opportunities and alternatives for consideration” heading which lists non-specific issue comments. “C” indicates a comment. “R” indicates the USDA Forest Service response. Direct quotes are within quotation marks. Paraphrased comments are without quotation marks. In parentheses we list the comment source code (response number - comment number). When we list several comment source codes the quote is from the first comment source code, however, the ID team believes the quote represents the additional comments.

Approximately 218 groups, individuals, and neighbors were contacted regarding the proposed project (Day 2001). Table 6 lists those who responded during the public scoping process. A complete list of the individuals contacted can be found in the project file.

<b>Name</b>	<b>Organization</b>	<b>Response #</b>
Barnes, Lou		1
Breedlove Jr., Michael		2
Buehler, Jeff	Monroe County Planning Department	8
Burton, William	Knightridge Campground	3
Cable, David R.	Department of the Army, Corps of Engineers	4
Dillon Jr., Robert E.	Lawrence County Engineering Project Coordinator	5
Duke, Harvey	Land owner	6
Johnson, Vova		12
Landry, Ralph	Adjacent landowner	10
Mathes, George B.	Attorney at Law	11
O’Neill, Brian	Monroe County Board of Commissioners	7
Pruitt, Scott E.	USDI Fish and Wildlife Service	9

### General Comments, Breedlove Road Access

#### G-1 Concern about the right of access to private land

**C.** Five respondents were concerned about private access rights of Mr. Breedlove – They support providing access to Mr. Breedlove. (01, 02, 04, 06, 10, 11, and 12)

**R.** The USDA Forest Service provided temporary access as requested by Mr. Breedlove in 1997. In January 2001, we received a request for permanent access into the property. This analysis is intended to identify the “best” year-round access route into the Breedlove property.

C. More people would use the land if an easement were granted. The government property doesn't get much use because it is isolated. (02)

R. More people would use the land if an easement were granted for private use. Even more people could use the land if the road were open to public use. One of the objectives of Management Area 2.4 is to protect watershed and riparian values. *Forest Plan* Guidance on page 2-30 states, "National Forest lands in Management Area 2.4 are generally accessible by foot from existing open roads or by boat."

C. Lawrence County has no comment on the proposed project since the property lies entirely in Monroe County. (05)

R. Thank you for your response.

## **Resource Concerns, Breedlove Access**

### **R-1 Concern for healthy watersheds**

C. We are concerned about wildlife impacts, soil erosion, and impact to bottomland and streams in the Pate Hollow and Baxter Branch Drainages and the municipal watershed. (09)

R. The USDA Forest Service addresses these concerns in effects and mitigation in the environmental assessment. Potential wildlife impacts are discussed under Issue 4 Wildlife Habitat; potential soil erosion impacts are discussed under Issue 1 Soil and Water Protection; and, potential impacts to bottomland and streams in the watershed are addressed under Issue 2 Healthy Watersheds and Floodplain.

C. Isn't this a watershed area? It's a shame to destroy the woods and waterways to build a driveway far back into the woods. Nobody needs a 4-mile driveway. (03)

R. The proposed access road is in the Monroe Lake watershed. The analysis is intended to display the impacts and offer mitigation measures to reduce those impacts to the watershed.

### **R-2 Concern for building road in floodplain.**

C. "There would be 3600 feet of roadway on COE property all within the floodplain of Lake Monroe. The Baxter Branch crossing requires a stream crossing or bridge." (04)

R. The COE bought these rights and a road located in the floodplain would not be considered, because the COE has jurisdiction. Some routes considered do not cross COE administered land but would cross Baxter Branch above the 538 to 560 foot elevation flowage easement. If the Responsible Official selects an alternative crossing Baxter Branch, then an easement would only be granted across segments of Federal land after proper design approval by the controlling jurisdiction (Monroe County) can be shown to properly cross Baxter Branch for all-season use.

C. We are concerned about bottomland and stream impacts. "Due to the flood hazard of Pate Hollow, a permanent road would require extensive fill, along with bridges or culverts for the two stream channel crossings. Culverts and fill disrupt stream and floodplain hydraulics and create barriers for fish movement. Some of this bottomland area may qualify as regulated wetland." (09)

R. The USDA Forest Service addresses these concerns in effects and mitigation in the environmental assessment under soil and water effects.

### **R-3 Concern for building a road in steep sidehills prone to soil erosion.**

C. “The steep slopes required to reach Mr. Breedlove’s property will make it difficult to construct a road and more likely to erode.” (04))

R. The USDA Forest Service would address concerns for steep slopes and soil erosion concerns on NFS land. Development on private land is regulated by Monroe County. Development on State land requires a permit from the Indiana Department of Natural Resources. The forest supervisor would not grant an easement until these issues are approved in the form of easements or permits from the private or State landowner and the Monroe County zoning authority as ordinances apply to private land.

C. We are concerned about erosion. “Wherever excavation is required, tree removal and road construction on the steep slopes would create a high potential for erosion, with associated adverse impacts on water quality in streams. Special erosion control methods would have to be used in this area. Some areas, such as both sides of Pate Hollow bottoms, are too steep to support a permanent road. This would necessitate either extensive cut and fill or a series of switchbacks, either of which would greatly increase tree removal, erosion potential and wildlife habitat destruction.” (09)

R. The USDA Forest Service shares the concern of soil erosion, especially in the riparian zones of Pate Hollow and Baxter Branch. We analyzed these impacts in the effects section. Other agencies also have jurisdiction and require mitigation measures as part of the permit process. The proponent must provide plans that mitigate the impacts. All landownership situations require similar construction plans before permits, easements, or variances are granted.

### **R-4 Concern for wildlife disturbance and habitat impacts.**

C. We are concerned about wildlife impacts. “Construction of a road and subsequent frequent traffic would disrupt wildlife use in this otherwise undisturbed area.” (09)

R. The USDA Forest Service shares the concern of wildlife disturbance in a remote forested area. We analyzed these impacts in the effects section.

C. “The proposed project area is within the range of the Federally endangered Indiana bat (*Myotis sodalis*) and Federally threatened bald eagle (*Haliaeetus leucocephalus*). There are at least three eagle nests on Monroe Lake, however they are all far enough away from the project site that they would not be disturbed by the proposed project. Indiana bats hibernate in caves during fall and winter, then disperse to reproduce and forage in relatively undisturbed forest areas associated with water resources during spring and summer. Young are raised in nursery colony roosts in trees, typically near drainage ways in undeveloped areas. There is suitable summer habitat for this species present throughout the area surrounding the project site. The project will not eliminate enough habitat to affect this species, but to avoid incidental take from removal of an occupied root tree, we recommend that tree clearing be avoided during the period April 15 to September 15.” (09)

R. The USDA Forest Service shares the concern of threatened and endangered wildlife species in this remote forested watershed. We analyzed these impacts in the effects section and protect potential roost trees with a mitigation measure to allow tree removal outside of the roost season (September 15 to April 15).

## **Social Concerns, Breedlove Access**

### **S-1 Concern for private property rights to deny access across their land**

C. "I oppose any easement to cross my property." (03, 10)

R. Various laws (Federal and State) guarantee access to landlocked properties. This analysis attempts to determine the "best" access route. All access routes cross a portion of private land. If a landowner objects, a court hearing would determine the route and compensation to the affected landowner.

C. The private campground is successful because it is away from any "through roads." Solitude draws campers to the area. Children are safe riding bikes in the area with minimal traffic. Life savings is invested in the property to supplement retirement. Lost solitude and increased traffic would cause some campers to leave and income would be lost. The new road through the campground would require moving buried utilities including waterlines, sewer lines, electric lines, a lift station and several holding tanks. (03)

R. All of these "business related" issues are beyond the scope of this analysis but would have to be considered in compensation for use of the land if this route is selected. These issues would need to be resolved so a road easement could be acquired from the private landowners before a Federal easement could be granted.

### **S-2 Concern of Monroe County zoning regulations and rights purchased by the Corps of Engineers.**

C. The proposed routes across Baxter Branch and Pate Hollow exceed the grade limits set by Monroe County for development. (08)

C. "The logging road you suggest does not meet county standards which is not appropriate, and it can not be used." (07)

R. The zoning regulations and access rights issues apply to private land only. The Forest Supervisor would not grant an easement across Federal road segments until the proponent provides road design plans for review by the proper authority with jurisdiction. Monroe County would need to review and approve the road design across private land in these Eco Areas, before the Forest Supervisor would grant an easement across Federal road segments.

C. The Corps of Engineers compensated the landowners along Monroe Reservoir for access rights. Therefore, these rights of access are not transferable. (04)

R. Since the Breedloves were compensated for their access rights by the COE, the USDA Forest Service is not bound by ANILCA, but has discretionary authority to issue an easement contingent upon all other property owners granting access.

C. "Many people have had their property values go down to nearly nothing simply because of lake Monroe and certainly Mr. Breedlove and his family is one of the families hurt most by everyone else's gain. He should be granted the private road easement through the national forest as soon as possible."(06)

R. Property values are based on comparative rate sales. Land values in the Monroe lake area are relatively high because some people prefer remote lake properties.

# Appendix B

## Mitigation Measures

Mitigation measures created in response to issues and concerns associated with the proposed action and alternatives are contained in this appendix.

*Forest Plan* guidance for mitigating potential adverse effects of management activities applies to all alternatives. Management Area 2.4 guidance is noted in the *Forest Plan* on pages 2-28 through 2-30. Forestwide guidance applicable to all NFS lands are found in *Forest Plan* Appendix K.

**Mitigation A** – To avoid potential take of Indiana bat, trees can be removed during the winter (September 15 to April 15) without bat surveys being conducted (Pruitt 2001b).

**Mitigation B** – No archaeological artifacts were found in our records on the affected Federal land (Krieger 2001). If a route across Federal land were selected, the road easement would include a clause that protects cultural resources. If resources are discovered during road construction, construction work must stop and immediately contact the Forest Service and State Historic Preservation Officer.

**Mitigation C** – Standard mitigation measures to protect soil and water resources applicable to road reconstruction, *Forest Plan* Appendix K, would be used to protect the soil and water resources. Natural drainage and drainage dips would be used during layout and construction. Culverts, diversion ditches and other water diverting structures would be installed where required to divert runoff onto undisturbed forest floor away from stream channels. HNF Road Design Guidelines (USDA FS 2001a) should be used when setting design standards in road contracts or special use permits on Federal lands in Indiana. The USDA Forest Service requires an engineer's review of road construction plans and plan approval by the Forest Supervisor.

**Mitigation D** – Management of streamside management zones would occur in accordance with direction in the *Forest Plan*, Appendix J.

**Mitigation E** – Indiana's best management practices would be used as a guide for soil and water protection on State and private land (IDNR 1998).

**Mitigation F** – On private lands in the project area, Monroe County zoning ordinance requires an approved plan for development and limits construction on slopes in Monroe Reservoir watershed with environmental constraints in the overlay zones (Monroe County 1997).

**Mitigation G** - If an alternative was carried out that affected wetlands regulated by the US Army Corps of Engineers, the applicant would be required to request a permit from the US Army Corps of Engineers under 33 CFR Part 323, Permits for Discharges of Dredged or Fill Material Into Waters of the United States. The US Army Corps of Engineers may require further mitigation because the goal of "no net loss" is a guiding principle of the national wetlands regulatory program.

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# Appendix C

## Public Comments on the June 14, 2002 Pre-decisional EA

The ID team categorized each response received during the 30-day comment period to identify specific comments, issues, and concerns. These comments were sorted and grouped by issue. There is also a "general comments" heading which lists non-specific issue comments. Following each comment is a summary of how the comment was addressed in the analysis. "C" indicates a comment. "R" indicates the USDA Forest Service response. Direct quotes are within quotation marks. Paraphrased comments are without quotation marks. In parentheses, we list the comment source code (response number - comment number).

Approximately 218 groups, individuals, and neighbors were contacted regarding the proposed project. The following table lists those who responded during the comment period. A complete listing of the individuals contacted can be found in the project file.

<b>Name</b>	<b>Organization</b>	<b>Response #</b>
Bensman, Jim	Forest Watch Coordinator, Heartwood	4
Bunger, Thomas	Attorney, Bunger & Robertson	6
Burton, William	Landowner	5
Cowell, Jr. Robert S.	Planning Director, Monroe County Planning Department	3
Form Letter #1		8
Form Letter #2		10
Fischman, Robert L.		1
Jacquart, Ellen		7
Johnson, Vova		9
Maloney, Tim	Executive Director, Hoosier Environmental Council	12
Martin, Joshua	Indiana Forest Alliance	2
McConnell, Mary	State Director, The Nature Conservancy	11
Mittenthal, Suzanne	Hoosier Hikers Council	13

### Social Concerns, Breedlove Access

**S-1** C. Several respondents were against granting access to someone who had sold /gave up / was compensated for / signed away their access rights or has a "deed restriction" for access. (1, 4, 6, 7, 8, 11, and 12)

C. There is no legal obligation to provide access. (4, 7, 8, and 12)

C. One respondent commented "they (the Breedloves) clearly were aware of the situation when the property was sold and they were paid for lack of access." (6)

C. Mr. Breedlove knowingly signed away his access rights. (4, 7, 8, and 12)

C. It is clearly unacceptable public policy. (13)

R. Roscoe and Mildred Breedlove (Mr. Breedlove's parents) sold a tract of land to the COE in 1963 for the impoundment of Lake Monroe. The senior Mr. Breedlove agreed, at that time, that he would waive access to the remainder of his estate **across the tract he sold to the COE**. He did not waive access rights across any of his other property. His estate included the two tracts analyzed in this EA.

The two tracts are landlocked as they are surrounded by Federal land, either COE or NFS land. Mr. Breedlove, Jr. requested a special use permit to access the two tracts owned by him and his family without crossing the COE land sold by his father in 1963. There are no deed restrictions on these two tracts regarding access.

This is discussed in Need for Proposed Action, Breedlove Property section of the analysis. The only known deed access restriction is across the land the COE bought in 1963. This is not a restriction for access across all land owned by the United States (USDA Forest Service) and the applicant has a right to apply for access.

**S-2** C. Several respondents were against granting an access easement across National Forest System land to the Breedlove property along Alternative D or any route. "The Forest Service has no obligation to grant a road easement in this instance" (1, 4, 5, 6, 11, and 12)

R. Granting of access is a discretionary decision authorized under the Federal Land Management and Policy Act of 1976 (FLPMA). Issuing a permit for an access road is consistent with direction in the *Forest Plan*. This was discussed in the Purpose for Proposed Action section of the analysis. In addition "Changes to the existing road system may be made to meet short-term or long term administrative needs, public access needs, or resource management needs only after area-specific project planning and appropriate consideration of public input" (*Forest Plan* p. 2-20). Please refer to the response in S-1 and the Purpose and Need section of this EA.

**S-3** C. The Forest Plan does not require that a permit be issued. We disagree with the legal opinion. You do not have the right to give away a deed restriction. We think ANILCA does apply and requires the FS to deny the request. (4, 8, and 13)

R. We acknowledge your disagreement with the OGC legal opinion, but will continue to rely on the advice from the attorneys. We respectfully disagree with your interpretation of the Forest Plan and your opinion about ANILCA. We have the authority to consider the request under FLPMA and consideration of the request is in line with the Forest Plan. Please refer to the response in S-1 and the Need for Proposed Action, Breedlove Property section of this EA.

**S-4** C. The FS is proposing to give away property rights and cause massive developments. The COE purchased the rights. Why the change in policy on development? (4, 8, 12, and 13)

R. The Forest Service is not proposing to give away property rights. We do not know why COE had waivers for access in deeds for Lake Monroe. We speculate it was to limit access to the lake itself. The COE issued a Shoreline Management Plan in 1997 that does limit access to the lake. We are unaware of a change in FS policy. There is not likely to be much development in the area due to the public ownership, the topography, and Monroe County's zoning which restricts activities in Eco Area 1 around Lake Monroe.

**S-5** C. FS giving away access rights likely worth millions. How much would this special use permit increase the value of the Breedlove property? (4, 8, and 13)

R. The special use permit itself would not increase the property value. There would be an annual fee for the access. In addition, we would not issue a permit until all other conditions had been

met, such as easements across other ownerships and complying with Monroe County ordinances on the private land easements. We would require road design plans that we would have to approve before issuing a permit. We believe the cost of complying with all requirements and building the access road offset the potential increase in the property value.

**S-6** C. One respondent was against an access road through a campground. (10)

R. Various laws (Federal and State) guarantee access to landlocked properties. This analysis attempts to determine the best access route. All access alternatives cross a portion of private land. The analysis shows Alternative D (Knight Ridge) as the route with the least environmental impact to National Forest System land. This is discussed under Proposed Action and Mitigations Included in the Proposed Action in the analysis. The applicant would need to acquire access across the private and state parcels before an access permit is issued.

**S-7** C. One respondent commented, "Approximately 20 years ago Mr. Breedlove gave up the right to access this property through Knightridge Campground." (10)

R. This EA does not analyze the access right Mr. Breedlove may have across private property. This is discussed under Proposed Action and Mitigations Included in the Proposed Action in the analysis. The applicant would need to acquire access across the private and state parcels before an access permit is issued.

**S-8** C. Several respondents were concerned about the effects (change of character of the road through the campground, change of character to the campground, safety along the campground road, and economic impact to the campground owner) of Alternative D on Knight Ridge Campground. (5, 6, 8, 10, and 13)

R. This analysis is used to consider issuing a permit across National Forest System land (NFS) only. The expected effects across private land are considered in our analysis. Mr. Breedlove is required to secure a right of access from the private landowners along the route before he will be allowed to cross NFS land. If Mr. Breedlove cannot acquire an easement across the private lands from their respective owners, the Hoosier National Forest will not issue a permit.

## **Resource Concerns, Breedlove Access**

**R-1** C. Respondent was concerned the road and development would "fragment forest wildlife habitat, including habitat for the endangered Indiana bat." (12)

C. One respondent commented, "the proposed access would contribute to the cumulative degradation of this forest system by allowing inappropriate development inside a core, intact forested system and it would increase fragmentation due to roads in the forest." (11)

R. The Wildlife Habitat and the Mitigations Included in the Proposed Action sections of the EA discuss the effects on wildlife and mitigation measures to prevent the incidental take of an Indiana bat.

**R-2** C. One respondent commented, "we also expect that the road would contribute to future invasive species problems in this portion of the forest." (11)

R. Comment noted. Invasive species are a concern on the Hoosier National Forest.

## General Comments

**G-1** C. One respondent is in favor of granting the access. (9)

R. The USDA Forest Service initiated the analysis to identify the best access route. Granting of access is a discretionary decision authorized under the Federal Land Management and Policy Act of 1976 (FLPMA).

**G-2** C. One respondent “concurrs with the EA in that the Alternative D appears to provide the best access with the least amount of potential harm to state and federally owned lands.” (3)

R. The forest agrees with this statement.

**G-3** C. A respondent asked why the Hoosier National Forest did not purchase the Breedlove property and protect the Lake Monroe watershed. (2)

R. The Hoosier National Forest has attempted to purchase the Breedlove property in the past. The most recent attempt to purchase the property was by The Trust for Public Land in 2000, their offer of an appraised value was not sufficient to purchase the property.

**G-4** C. “We also believe this access proposal is not consistent with the Forest Plan. This proposal goes beyond this guidance by providing additional access to a 2.4 area by a new road.” All routes appear to involve new road construction in M.A. 2.4. It may be allowed, but seems incompatible with the intent of 2.4. (7 and 12)

R. This was discussed in the *Forest Plan* Background section of the analysis. The Forest believes this action is consistent with the Forest Plan and the National Forest Management Act of 1976.

**G-5** C. One respondent “was concerned about the poor precedent set if the forest lowers its standards for issuing road easements.” (1)

R. The forest applies the same standard for evaluating access requests. Granting of access is a discretionary decision authorized under the Federal Land Management and Policy Act of 1976 (FLPMA). Issuing a permit for an access road is consistent with direction in the *Forest Plan*. This was discussed in the Purpose for Proposed Action section of the analysis. Each request for access is evaluated on a case-by-case basis.

**G-6** C. One respondent commented, “The Lake Monroe watershed is already too concentrated with roads and development.” (1)

R. The Monroe County Planning Department has zoning ordinances in place to protect the Lake Monroe watershed. The applicant will have to meet Monroe County standards on activities on private lands. This is discussed in the Compliance with Monroe County Overlay Area Regulations in the analysis.

**G-7** C. A former Forest Supervisor had copies of deed and maps of severed lands. The information about Breedlove access should have been in that file. The scoping letter should not have referred to ANILCA and the temporary permit should not have been issued in the past. (4, 8, and 13)

R. The forest has no “severed land” file archived at our office. The forest has US Army Corps of Engineers (COE) segment maps of Lake Monroe on file at the Bedford office. We searched for

old files and did not find anything that was conclusive about the Breedlove property. We submitted the questions to the OGC attorneys for a legal opinion, which we included in the EA.

**G-8** C. The scoping letter said ANILCA applied and it does not. The scoping letter should have been re-issued. (4, 8, and 13)

R. The project proposal did not change, just the authority under which it may be granted. This is different from the example cited where resource information caused a scoping letter to be re-issued on a different FS unit.

**G-9** C. One respondent commented “It will require the applicant to obtain additional rights of way across other nonfederal land, including that of private landowners who have indicated they do not wish to grant any access rights.” (12)

R. This is a true statement. This is discussed under Proposed Action and Mitigations Included in the Proposed Action in the analysis. The applicant would need to acquire access across the private and state parcels before an access permit is issued.

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## Appendix D

### Public Comments on the October 03, 2002 Pre-decisional EA

The interdisciplinary (ID) team categorized each response received during the 30-day comment period to identify specific comments, issues, and concerns. These comments were sorted and grouped by issue. There is also a "general comments" heading. Following each comment is a summary of how the comment was addressed in the analysis. "C" indicates a comment. "R" indicates the USDA Forest Service response. Direct quotes are within quotation marks. Paraphrased comments are without quotation marks. In parentheses, we list the response number.

Approximately 218 groups, individuals, and neighbors were initially contacted regarding the proposed project. Those groups and individuals, plus additional neighbors and others in October, were either sent the EA in October or advised of its availability and asked for comments. The following table lists those who responded during the October-November comment period. A complete listing of the individuals contacted can be found in the project file.

Several comments received from this second mailing were addressed in either Appendix A, Public Comments from Initial Scoping, or Appendix C, Public Comments on the June 14, 2002 Pre-decisional EA.

<b>TABLE 7. COMMENTS RECEIVED ON SECOND PRE-DECISIONAL EA</b>		
Name	Organization	Response #
Breedlove, Roscoe Jr.	Applicant	9
Breedlove, Valerie		14
Brinkman, Cynthia and Bret Davis	Landowner	4
Brinkman, Mayan		22
Burton, William	Landowner	5
Caves, Mary M.		24
Caves, Tina M.		25
Form letter #1		1
Form letter #2		3
Fulkerson, Tom	Adjacent Landowner	11
Gwinn, Jess A.		2
Haberman, David L.	Indiana Forest Alliance	13
Mathes, George B.		16
Moore, Cathy	Landowner	21
Lykins, Rick	Landowner	18
Nelson, Bob		12
Osborn, Mike		15
Pennington, Alta	Adjacent Landowner	10
Pennington, William L.	Landowner	17
Rinker, Addison	Landowner	19
Shultz, David	Landowner	7
Spalding, Errin and William	Landowner	20
Stillions, Sue	Landowner	23
Swartz Ridge Concerned Neigh	Landowners	4
Tuttle, Paul	Landowner	8
White, Genevieve	Landowner	6

## Social Concerns, Breedlove Access

**S-1** C. A neighbor feels the Crossroads route would be the best alternative to avoid impact to Knightridge Kampground and believes the Pine Grove Church route would result in an appreciable riparian impact (6).

R. The Crossroads route has the least impact after Knight Ridge, because it crosses the Pate Hollow Drainage upstream on the Grubb property (recently sold). The Hoosier National Forest (HNF) would issue a road easement only after receiving proof of required private and state right-of-way easements and road plans designed by a state-licensed engineer and approved by Monroe County.

**S-2** C. Several respondents interpreted the deed recorded for the portion of Breedlove property bought by the U.S. Army Corps of Engineers (COE), which reads “their right to any way of necessity they may have over herein described land”, to mean the right of access from any direction and not just from the COE-acquired land (2, 11, 13).

R. Roscoe and Mildred Breedlove (Mr. Breedlove’s parents) sold a tract of land to the COE in 1963 for the impoundment of Lake Monroe. The senior Mr. Breedlove agreed, at that time, that he would waive access to the remainder of his estate across the tract he sold to the COE. He did not waive access rights across any of his other property. His estate included the two tracts analyzed in this EA.

The two tracts are landlocked as they are surrounded by Federal land, either COE or NFS land. Mr. Breedlove, Jr. requested a special use permit to access the two tracts owned by him and his family without crossing the COE land sold by his father in 1963. There are no deed restrictions on these two tracts regarding access.

This is discussed in Need for Proposed Action, Breedlove Property section of the analysis. The only known deed access restriction is across the land the COE bought in 1963. This is not a restriction for access across all land owned by the United States (USDA Forest Service) and the applicant has a right to apply for access.

The EA merely examines the environmental effects and suggests the route with the least impact. The rest is a legal question beyond HNF authority.

**S-3** C. Alta Pennington has requested access across NFS land as an add-on to Mr. Breedlove’s request (10).

R. The Pennington property is on much the same route. The HNF would require the Penningtons to provide the same application, legal access, road design, and State and Monroe County approval as would be required of Mr. Breedlove.

**S-4** C. The FS is proposing to give away property rights and cause massive developments. The COE purchased the rights (13, 3, 21).

R. The USDA Forest Service provided temporary access as requested by Mr. Breedlove in 1997. In January 2001, we received a request for permanent access into the property. This analysis is intended to identify the “best” year-round access route into the Breedlove property.

The Forest Service is not proposing to give away property rights. We do not know why COE had waivers for access in deeds for Lake Monroe. The COE issued a Shoreline Management Plan in 1997 that does limit access to the lake. There is not likely to be much development in the area due to the public ownership, the topography, and Monroe County's zoning which restricts activities in Eco Area 1 around Lake Monroe.

Also please see the response to S-2 above.

**S-5** C. Some respondents oppose an access road through a campground (1).

R. Various laws (Federal and State) guarantee access to landlocked properties. This analysis attempts to determine the best access route. All access alternatives cross a portion of private land. The analysis shows Alternative D (Knight Ridge) as the route with the least environmental impact to National Forest System land. This is discussed under Proposed Action and Mitigations Included in the Proposed Action in the analysis. The applicant would need to acquire access across the private and State parcels before an access permit could be issued.

**S-6** C. Several respondents were concerned about the effects (change of character of the road through the campground, change of character to the campground, safety along the campground road, and economic impact to the campground owner) of Alternative D on Knight Ridge Campground (1, 12).

R. The purpose of this analysis has been to examine the effects of a proposal to issue a permit across National Forest System land (NFS) only. The expected effects across private land are considered in our analysis. Mr. Breedlove is required to secure a right of access from the private landowners along the route before he will be allowed to cross NFS land. If Mr. Breedlove cannot acquire an easement across the private lands from their respective owners, the Hoosier National Forest will not issue a permit.

**S-7** C. Several respondents have indicated opposition to granting an access easement across National Forest System land to the Breedlove property along Alternative D or any route (2, 4, 13, 18, 19, 20, 21, 22).

R. Granting of access is a discretionary decision authorized under the Federal Land Management and Policy Act of 1976 (FLPMA). Issuing a permit for an access road is consistent with direction in the *Forest Plan*. This was discussed in the Purpose for Proposed Action section of the EA. In addition, changes to the "existing road system may be made to meet short-term or long term administrative needs, public access needs, or resource management needs only after area-specific project planning and appropriate consideration of public input" (*Forest Plan*, p. 2-20).

Please refer to response to S-2 in this appendix and to the Purpose and Need section of this EA.

## **Economic Concerns, Breedlove Access**

**E-1** C. Several campsite holders in Knightridge Kampground were concerned about the economic impact of the road construction project on their investment in the campground. Economic concerns include the loss of tranquility with increased traffic and the need to replace utilities buried in the road. They believe the water and power lines, a lift station and five holding tanks would be damaged if large trucks use the road during new home construction (5, 1).

R. This analysis is primarily designed to identify environmental effects. The ridge road would have the least environmental effects and provide the safest winter driving conditions. The

economic effect to the Knightridge Kampground is speculative at this time. Mr. Breedlove would need to acquire an easement and negotiate with the landowner. It is possible the road would need to be reconstructed through the campground. Buried utilities may need to be replaced to accommodate construction equipment if new homes were to be built. The possibility of one or even three homeowners on the Breedlove property may not appreciably increase traffic more than is presently produced by the occupants of the existing 60 trailers in the campground on the fork of the road that could access the Breedlove property (40 trailers on the other fork). We appreciate the buried utility concern, but Monroe County, not the Forest Service, has no jurisdiction over these lands.

## General Comments

**G-1** C. “I spoke with Mr. Breedlove and he does not want to cross our property (Knightridge Kampground). He wants to use Alternative G, Baxter Branch Higher Route” (5).

R. Mr. Breedlove has made the same comment in a letter to the Forest Service but has not submitted a formal application for this route. The route was analyzed and would have several difficult mitigation measures as outlined in the alternative description and mitigation discussion for Baxter Branch. An easement across the 75-foot Hoosier National Forest ownership would be contingent upon Mr. Breedlove acquiring easements from the property owners in Baxter Branch. The Forest Service would also require Mr. Breedlove to acquire a permit from Monroe County before an easement could be issued to him. The Monroe County permit would require certified engineer drawings providing a solution that would meet the 12% slope limit across the Pennington property and mitigation for the Baxter Branch crossing. The current road location, used in 1997, is too steep to meet county code. The Baxter Branch crossing used in 1996 is a ford. A bridge or large culvert would be required to cross Baxter Branch for year-round access.

**G-2** C. “May I suggest that the right-of-way should come in from Moores Creek road past the campgrounds by the National Forest. By using Baxter Branch road, I would only need 75 feet of National Forest property.” In addition to providing the Breedlove’s access to their property, the Penningtons would also have access to their land” (9).

R. This is an unofficial request by the proponent to change routes. This route, Alternative G, would require crossing Baxter Branch. This would also require streamside protection from Monroe County and a maximum slope of 12% as discussed in the previous comment. The Penningtons do not need access across the 75-foot piece of NFS land as they are east of the NFS land. They would need to acquire the same rights-of-way as Mr. Breedlove from Moores Creek Road to the Pennington property.

**G-3** C. One person commented that Monroe County “has lost more forest cover than any other county in the state...much of this is due to the rapid and extensive levels of development that have taken place in Monroe County, especially near Lake Monroe” (13).

R. Monroe County controls zoning and issues building permits on private land. This is not Forest Service jurisdiction. The Monroe County Planning Department has zoning ordinances in place to protect the Lake Monroe watershed. The applicant will have to meet Monroe County standards on activities on private lands. This is discussed in the Compliance with Monroe County Overlay Area Regulations in the EA.

**G-4** C. Landowners along the Swartz Ridge route expressed concern for impact to their land from road construction and a change in character of the woods. They permitted the temporary road use in 1996 but would not permit a permanent road easement across their property (4).

R. We appreciate your concern. Your comments and concerns are part of the official record.

**G-5** C. One landowner owns land beyond Knight Ridge Campground between the Grubb property and State land. He is landlocked and would also pursue access across the Knight Ridge Campground and State land (7).

R. The landowner would need to consult with both property owners for access, but no NFS land would be affected.

**G-6** C. Some respondents have expressed concern about private access rights of Mr. Breedlove. They support providing access to Mr. Breedlove (14, 15, 16, 10, 17).

R. The USDA Forest Service provided temporary access as requested by Mr. Breedlove in 1997. In January 2001, we received a request for permanent access into the property. This analysis is intended to identify the “best” year-round access route into the Breedlove property. The USDA Forest Service initiated the analysis to identify the best access route. Granting of access is a discretionary decision authorized under the Federal Land Management and Policy Act of 1976 (FLPMA).

**G-7** C. A respondent asked us not to destroy the “natural qualities” of their national forest (4, 22).

R. The EA discusses the environmental impacts of the various alternatives.

**G-8** C. A few respondents asked why the Hoosier National Forest did not purchase the Breedlove property and protect the Lake Monroe watershed (6, 13, 18).

R. The Hoosier National Forest has attempted to purchase the Breedlove property in the past. The most recent attempt to purchase the property was by The Trust for Public Land in 2000. Their offer of an appraised value was not sufficient to purchase the property.

**G-9** C. A respondent was “concerned about the poor precedent set if the forest lowers its standards for issuing road easements” (2).

R. The forest applies the same standard for evaluating access requests. Granting of access is a discretionary decision authorized under the Federal Land Management and Policy Act of 1976 (FLPMA). Issuing a permit for an access road is consistent with direction in the *Forest Plan*. This was discussed in the Purpose for Proposed Action section of the EA. Each request for access is evaluated on a case-by-case basis.

**G-10** C. Some respondents thought that granting an easement to Mr. Breedlove would set a precedent for other property owners around the lake (2, 21, 3).

R. Each case is different. This proposal has been analyzed with respect to Mr. Breedlove’s desire to have an access road to his landlocked property, the discretionary authority of the Forest Service to issue a permit to cross National Forest System land, and the foreseeable environmental consequences of various alternative routes, including a no action alternative.

**G-11** C. A few respondents favored granting a right-of way to both Mr. Breedlove and Mr. Pennington (10, 17, 23, 24, 25).

R. Thank you for your comments.

**G-12** C. A respondent asked that we not convert the land to a private driveway (4).

R. Various laws (Federal and State) guarantee access to landlocked properties. This analysis attempts to determine the best access route. Granting of access is a discretionary decision authorized under the Federal Land Management and Policy Act of 1976 (FLPMA). Issuing a permit for an access road is consistent with direction in the *Forest Plan*. This was discussed in the Purpose for Proposed Action section of the EA.

**G-13** C. A respondent noted that the route from Pine Grove Church might benefit him.

R. Thank you for your comment.