
ENVIRONMENTAL ASSESSMENT

Uwharrie National Forest

Rehabilitation of FDR 597
From SR 1179 to FDR 544
Montgomery County, North Carolina



Project NC PHF 49-1(3)

U.S. Department of Transportation
Federal Highway Administration
Eastern Federal Lands Highway Division

*Prepared in cooperation with the
United States Forest Service*

January 2009

*Prepared pursuant to the Council on Environmental Quality's regulations for implementing the
National Environmental Policy Act (43 CFR 1500) and 42 U.S.C 4332(2)(C)*

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Pursuant to 42 U.S.C. 4332 (2)(c) and 49 U.S.C. 303

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Abstract

This Environmental Assessment addresses the proposal by the Federal Highway Administration (FHWA) to widen and pave four miles of Forest Development Road (FDR) 597, also known as Badin Lake Road. The project is located in the Uwharrie National Forest, Montgomery County, North Carolina.

FDR 597 (Badin Lake Road) stretches approximately six miles, from FDR 576 (Moccasin Creek Road) to Secondary Route (SR) 1179 (Shamrock Road). FDR 597 runs south-north near the eastern shore of Badin Lake and is a gravel road with a speed limit of 25 miles per hour. It is part of Forest Highway (FH) 49, which is a south-north roadway within Uwharrie National Forest. FH 49 comprises all or part of the following roadways: FDR 576 (Moccasin Creek Road), FDR 544 (McLean's Creek Road), FDR 544 (Mark's Road), and FDR 597. FH 49 has been upgraded, widened, and paved within the last several years, with the exception of two sections. The proposed project is to widen and pave four miles of FDR 597 from FDR 544 (McLean's Creek Road) to SR 1179 (Shamrock Road) and to replace the vented ford over Reeves Spring Branch. This project is the next-to-last in the series of projects to upgrade FH 49; the last section to be improved is FDR 576 from the intersection with Reservation Road to the intersection with FDR 544. Once improvements have been finished and FDR 597 has attained North Carolina Department of Transportation (NCDOT) standards, the Forest Service anticipates transferring the road to NCDOT, which would add it to the state highway system.

FHWA's goal in selecting a preferred alternative is to provide a safe, long-lasting driving surface for residents, visitors, and Forest Service staff. Substantial effort has been given to preserving the Forest's natural and cultural resources by minimizing impacts to the environment from the proposed improvement.

This document determines which aspects of the proposed action have potential for social, economic, or environmental impacts and it identifies measures that may mitigate adverse impacts. The public involvement and coordination/consultation with other government agencies is also presented.

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1.0 Purpose and Need for Action

1.1 Introduction

FDR 597 (Badin Lake Road) stretches approximately six miles, from FDR 576 (Moccasin Creek Road) to Secondary Route (SR) 1179 (Shamrock Road). FDR 597 runs south-north near the eastern shore of Badin Lake and is a gravel road with a speed limit of 25 miles per hour (mph). It is part of Forest Highway (FH) 49, which is a south-north roadway within Uwharrie National Forest. FH 49 comprises all or part of the following roadways: FDR 576 (Moccasin Creek Road), FDR 544 (McLean's Creek Road), FDR 544 (Mark's Road), and FDR 597. FH 49 has been upgraded, widened, and paved within the last several years, with the exception of two sections. The proposed project is to widen and pave four miles of FDR 597 from FDR 544 (McLean's Creek Road) to SR 1179 (Shamrock Road) and to replace the vented ford over Reeves Spring Branch. This project is the next-to-last in the series of projects to upgrade FH 49; the last section to be improved is FDR 576 from the intersection with Reservation Road to the intersection with FDR 544.

Uwharrie National Forest consists of 50,189 acres of forest, rivers and streams, diverse vegetation, and wildlife habitats. The Forest is located in the Piedmont region of central North Carolina and is within a two hour drive of the state's largest population centers: Charlotte, the Triad (Greensboro, Winston-Salem, and High Point), and the Triangle (Raleigh, Durham, and Chapel Hill). It provides timber, wildlife, and water recreation opportunities to the area's population. Three of the Forest's popular recreational attractions are Badin Lake, the off-highway-vehicle (OHV) trail system, and the 20-mile Uwharrie National Recreation Trail. Hunting, camping, picnicking, horseback riding, fishing, and boating are also popular recreational uses of Uwharrie National Forest.

1.2 Project Background

1.2.1 Study Area Description

The project study area is located in Montgomery County, North Carolina. It extends 300 feet on either side of the FDR 597 centerline, including intersecting roads. The study area is approximately four miles, from FDR 544 (McLean's Creek Road) to SR 1179 (Shamrock Road). The roads intersecting FDR 597 in the study area are FDR 544 (McLean's Creek Road),

FDR 597A, Skiers Cove Road, Lakeland Drive, and SR 1179 (Shamrock Road). **Figure 1.1** shows the location of the study area.

Within the study area are several Forest facilities, private residences, and other cultural and natural resources. The Holt's Picnic Area, with a parking pullout large enough for 10 vehicles, is located along the west side of FDR 597, approximately midway through the study area (**Figures 1.2 and 1.3**). Other Forest facilities are located outside the study area but are accessed through the study area, including the Badin Lake Hiking Trail, King's Mountain Point and Floating Pier, Badin Lake Campground, Badin Lake Group Camp, and equestrian trails 702 (Josh/Lake trail) and 700 (Greg's Loop trail).

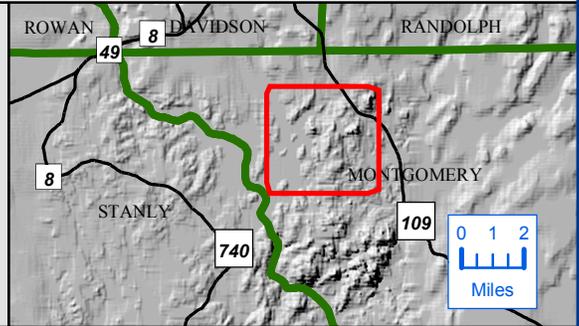
Figure 1.2: Holt's Picnic Area



Figure 1.3: Parking Pullout at Holt's Picnic Area



Figure 1.1 - Study Area



USGS Badin, NC, Quadrangle: 35080-D1-TF-024, 1994

Two residential communities are located along FDR 597. Wood Land Estates is a gated residential community on the west side of FDR 597, north of Holt’s Picnic Area. Skiers Cove is a residential community located on the west side of FDR 597, south of Holt’s Picnic Area, and is composed of houses and mobile homes. Two stand-alone residences are also located along FDR 597. One house is located on the east side of FDR 597 near the entrance to Wood Land Estates. The second is located on the east side of FDR 597 near the north end of the project, with a set of stairs located across the road leading down to a dock on Badin Lake.

Just north of the house and dock at Reeves Spring Branch is a vented ford built in 1937. A vented ford is a structure designed to allow water to flow underneath it or, when the water levels are high, over the top of it (see **Figure 1.4**). As part of the build alternatives for this project, the vented ford would be replaced.

Figure 1.4: Vented Ford at Reeves Spring Branch



1.2.2 Study Area History

The federal government purchased the land now known as Uwharrie National Forest in 1931. Originally known as the Uwharrie Reservation, the Uwharrie National Forest was officially designated as such by President John F. Kennedy in 1961. The Forest is named after the Uwharrie Mountains, which are some of the oldest mountains in North America. Geologists claim the 1,000 foot high mountains were part of a chain of ancient volcanoes that were once over 20,000 feet high. The Forest contains many pre-historic and historic settlements and has one of the greatest concentrations of archaeological sites in the southeast.

The first gold discovery in the United States was in 1799 at nearby Reed Gold Mine in Cabarrus County. Gold was discovered in the Uwharrie Mountains in the early 1800s. A second gold boom hit the area during the Great Depression in the 1930s. Old mining sites can still be found in the Forest, and panning for gold is a recreational opportunity for Forest visitors.

1.3 Purpose of the Action

The purpose of this project is to upgrade FDR 597 from FDR 544 to SR 1179 in Uwharrie National Forest to current North Carolina Department of Transportation (NCDOT) standards, while preserving the adjacent natural and cultural resources and minimizing impacts to private properties along the road corridor. This project includes widening and paving FDR 597, replacing a vented ford with a bridge at Reeves Spring Branch, and reconstructing two stone masonry headwall culverts. NCDOT anticipates adding FDR 597 to the state highway system following improvements.

1.4 Need for the Action

The primary reason for reconstructing FDR 597 is to meet current NCDOT design standards for Secondary Roads. These standards are based on safety criteria. The proposed project would provide safety improvements to FDR 597, including widening lanes, standardizing lane width, and improving the horizontal alignment. The existing gravel-surfaced road ranges from 13 to 16 feet wide, which is narrower than required by current NCDOT design standards and is inconsistent throughout the length of the project. The project also would improve the horizontal alignment at the intersection of FDR 597 and SR 1179 to a more perpendicular angle, which

would improve visibility at the intersection. Improving FDR 597 to NCDOT standards also allows the State to assume future maintenance for FDR 597.

The vented ford is a structure designed to allow water to flow underneath it or, when the water levels are high, over the top of it. The primary reason for replacing the vented ford is to meet current NCDOT design standards for Secondary Roads. The existing vented ford, which is approximately 20 feet long, is functionally obsolete. It is one lane wide, is susceptible to clogging by natural debris, and shows evidence of frequent overtopping. The US Bureau of Land Management guidelines for vented fords note that crossing can be dangerous during periods of overtopping. Replacing the existing structure with a bridge would allow natural debris to pass under the structure, would raise the roadway grade to meet NCDOT hydraulic design standards, and would provide more protection to drivers and passengers crossing during high water events.

Additionally, FDR 597 is one of two remaining sections of FH 49 that have not been upgraded, widened, and paved within the last several years. Improving FDR 597 would provide a more consistent south-north roadway for recreational and residential use.

1.5 Decision to be Made

The National Environmental Policy Act of 1969 (NEPA) requires consideration of the environmental impacts of a proposed federal action. This Environmental Assessment (EA) has been prepared to assist Federal Highway Administration (FHWA) decisionmakers in developing solutions to improve FDR 597 and in considering the environmental effects of the Preferred Alternative. The decision about the proposed project is one of three choices: accept the Preferred Alternative, accept the No Action Alternative, or accept a modified Preferred Alternative based on comments received and issues identified with the Preferred Alternative. **Chapter 2** has more information about the Preferred Alternative, the No Action Alternative, and alternatives considered but dismissed.

1.6 Impact Issues and Topics

In preparation for this EA the FHWA, US Forest Service (USFS), and NCDOT met to coordinate the project scope and to determine issues specific to the project that are to be highlighted during

this study (Agency Kickoff Meeting Minutes, March 22, 2006). These issues include archaeological resources, tourism and visitor use, and design speed and posted speed.

As required, this EA examines specific topics in order to address the potential natural, cultural, and social impacts that could result from the proposed construction work. These topics address both the requirements of federal laws, regulations and orders, as well as issues raised in the Uwharrie National Forest *Draft Proposed Land Management Plan* (US Department of Agriculture, Forest Service, February 2007). Topics in this EA focus on information that is presented and discussed in the Affected Environment and Environmental Consequences section (**Chapter 3**) of this document. Each topic relates to a specific aspect of the Forest and its surrounding community.

A brief rationale is provided below to explain why each impact topic either does or does not require further analysis in this EA.

- ***Socioeconomic Environment*** – Since the proposed action has the potential to impact residents, visitors, staff, and the local economy, this topic is discussed further in **Section 3.3**.
- ***Environmental Justice*** — Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, signed February 1994, requires federal agencies to identify and address any disproportionately adverse effects on human health or the human environment of minority and/or low income populations resulting from federal programs, policies and activities. This topic is evaluated further in **Section 3.4**.
- ***Cultural Resources*** — Cultural Resources addresses both historical and archaeological resources. As outlined in 36 CFR, Part 800, regulations issued by the Advisory Council on Historic Preservation implementing Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*), the potential impacts on cultural resources must be addressed. Under the “Criteria of Effect” (36 CFR Part 800.9(a)), federal undertakings are considered to have an effect when they alter the character, integrity, or use of a cultural resource, or qualities that qualify a property for listing on the National Register of Historic Places. In addition to the National Historic Preservation Act, the National Environmental Policy Act of 1969 (NEPA) further requires the United States Forest Service (USFS) to consider the effects of their proposed actions on cultural

resources. Additionally, the Uwharrie National Forest is rich in archaeological sites. This topic is discussed in this EA in **Section 3.5**.

- ***Wetlands*** — Executive Order 11990 (Protection of Wetlands) requires federal agencies to minimize the loss, destruction, or degradation of wetlands and to enhance their natural and beneficial values. Wetlands are located in the study area. Impacts to and potential mitigation of wetlands are addressed in this document in **Sections 3.6** and **3.10**.
- ***Floodplains*** — Development within floodplains and floodways is regulated by federal and state laws to reduce the risk of property damage and loss of life due to flooding as well as to preserve the natural benefits floodplain areas have on the environment. Executive Order 11988 (Floodplain Management) requires all federal agencies to avoid construction within 100-year floodplains unless no other practical alternative exists. Floodplains are located within the study area and are addressed in **Section 3.6**.
- ***Water Quality*** — The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, establishes a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters; to enhance the quality of water resources; and to prevent, control, and abate water pollution. Since the proposed action has the potential to impact water quality through stormwater runoff, this topic is discussed further in **Section 3.6**.
- ***Natural Environment*** — The NEPA requires an examination of impacts on the components of affected ecosystems. Impacts to resources such as soil, vegetation, and wildlife are included in this topic and are addressed for each alternative in **Section 3.7**.
- ***Special Status Species*** — Section 7 of the Endangered Species Act directs all federal agencies to use their authority in the furtherance of the conservation of rare, threatened, and endangered species. Federal agencies are required to consult with the US Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, and/or carried out by the agency does not jeopardize the continued existence of any listed species or critical habitat. Protection and preservation of special status species in the Forest are of critical importance and are discussed as part of this document in **Section 3.7**.
- ***Air Quality*** — The 1963 Clean Air Act, as amended (42 U.S.C. 7401 *et seq.*), requires federal land managers to protect Forest air quality. The act also assigns the federal land manager an affirmative responsibility to protect the Forest's air quality related values — including visibility, plants, animals, soils, water quality, cultural and historic resources

and objects, and visitors — from adverse air pollution impacts. Section 118 of the 1963 Clean Air Act requires the USFS to meet all federal, state, and local air pollution standards.

Because the proposed project would not increase traffic capacity and is not expected to increase traffic volumes, air quality impacts of traffic are not anticipated. Vehicular travel on the existing gravel-surfaced road raises dust particulate matter, therefore the proposed project could benefit air quality along the road. Air quality is addressed in general terms, concentrating on construction impacts, in **Section 3.8**.

- **Noise** — Because the proposed project would not increase traffic capacity and is not expected to increase traffic volumes, noise impacts of traffic are not anticipated to be an issue. Noise is addressed in general terms, concentrating on construction impacts, in **Section 3.8**.
- **Energy** — Energy requirements associated with the study area relate to the amount of energy that is required to operate and maintain buildings and other permanent facilities. Energy also is required for the operation of motor vehicles traversing the study area.

Because the proposed project would not increase traffic capacity and is not expected to increase traffic volumes, energy changes are not anticipated. Energy is addressed in general terms, concentrating on construction impacts, in **Section 3.8**.

- **Visitor Use, Forest Operations, and Public Safety** — Since the proposed action has the potential to impact visitor use and operations, this topic is discussed further in **Section 3.9**.
- **Hazardous Materials and Waste** — Potential hazardous waste sites will be addressed during the design phase of the project; therefore hazardous materials and waste do not require further analysis in this EA.

1.7 Permits

Impacts to “Waters of the United States” come under the jurisdiction of the USACE. Permits are required for highway encroachment into jurisdictional wetlands, streams, and ponds. The Nationwide Permit (NWP) 14 (Linear Transportation Projects) will likely cover the impacts to the jurisdictional wetland and streams within the project study area. NWP 33 (Temporary

Construction, Access, and Dewatering) may be needed for temporary construction access if that issue is not addressed in the NEPA document. The project impacts are expected to exceed the NWP 14 permit thresholds (300 linear feet of impact per stream and 0.5 acre cumulative wetland impact), therefore an Individual Section 404 permit likely will be required.

A Section 401 General Water Quality Certification is required for any activity that may result in a discharge into “Waters of the United States” or for which an issuance of a federal permit is required. The issuance of a required Section 401 certification is a prerequisite to the issuance of a Section 404 permit. Section 401 General Water Quality Certifications for NWP 14 and 33 are #3704 and #3688, respectively. If project impacts exceed the NWP 14 impact thresholds, an Individual Section 401 Water Quality Certification will be required.

Final determination of permit applicability lies with the USACE and DWQ.

1.8 Interrelationship with Other Plans and Projects

The Forest Service has developed a *Draft Proposed Land Management Plan for the Uwharrie National Forest* (February 2009). This plan establishes long-range strategies for resource management and visitor use; and it provides goals, objectives, and policies that support these strategies. This plan updates a 1986 land management plan for the Forest. The plan contains general guidelines for roadway maintenance and development but does not mention specific projects.

Aside from the planned improvement of FDR 576 from the intersection with Reservation Road to the intersection with FDR 544, there is one additional Forest Service projects in the vicinity of this section of FDR 597. The Fraley/Todd Equestrian Trail is proposed to be rerouted, with the planning process beginning in January 2009.

The Town of Troy has a draft land use plan. Montgomery County has a transportation plan from the 1970s which was never adopted.

Handy Sanitary District plans to provide sanitary sewer service along NC 109 from the intersection with Blaine Road to the Town of Troy. This project is called the Badin Lake Sewer Project. The sanitary sewer line crosses Forest land only where NC 109 crosses Forest land

(telephone conversation May 16, 2008 with Mr. Fred Hobbs, Hobbs, Upchurch, and Associates, Badin Lake Sewer Project Consultant Engineers).

2.0 Alternatives Analysis

Other than regularly scheduled maintenance, a no action alternative and four build alternatives were considered for this project. The four build alternatives considered were Alternative 2, Alternative 2 with Modifications, Alternative 3, and Alternative 3 with Modifications.

Alternative 1 is the No Action alternative, which consists of performing no actions to the road.

Alternative 2 is a build alternative with a 35 mile per hour (mph) design speed. Alternative 2 with Modifications differs from Alternative 2 in four places for the following reasons:

- to alter impacts to wetlands,
- to avoid cutting into a hill on a curve,
- to rebuild the Holt's Picnic Area parking pullout, and
- to provide another crossing option at Reeves Spring Branch.

Alternative 3 is a build alternative with a 30 mph design speed. Alternative 3 with Modifications differs from Alternative 3 in six places for the following reasons:

- to alter impacts to wetlands,
- to rebuild the Holt's Picnic Area parking pullout, and
- to align the FDR 597 / SR 1179 intersection more perpendicularly.
- Three modifications involve providing another crossing option at Reeves Spring Branch and/or avoiding an historic house.

The four build alternatives have the following characteristics in common:

- The horizontal and vertical alignment was designed to follow the existing roadway alignment when possible.
- In some areas the alignment was shifted to better balance cut and fill while meeting design criteria.
- The proposed cross-section provides two 10-foot lanes with four-foot shoulders on each side. The right-of-way (ROW) extends 30 feet on either side of the centerline, for a total ROW of 60 feet.

NCDOT standards for this type of road call for a 35 mph design speed with a 30 mph posted speed. Varying design speeds were evaluated because design speed affects how sharp a horizontal or vertical curve may be. As design speed increases, curves in the road must lengthen and flatten, which requires more land. Reducing the design speed reduces the length of the curve.

Because FDR 597's existing alignment has relatively sharp curves and steep topography, higher design speeds translate to more differences between existing and proposed alignments and therefore cause more impacts. The 30 mph design speed is much closer to the existing roadway alignment horizontally and is closer to the existing ground vertically than the 35 mph design speed. **Figure 2.1** illustrates the difference between a 35 mph and a 30 mph design speed (Station 44+00 to 56+00).

In addition to the no action and build alternatives, non-construction options have been considered. Non-construction options include traffic demand management, signage, and speed limit reduction.

Through analysis, Alternative 3 with Modifications was chosen as the Preferred Alternative. Four of the six modifications were included in the Preferred Alternative; the other two modifications were eliminated. Impacts of the Preferred Alternative were evaluated in detail and are presented in Chapter 3. The other build alternatives were considered but dismissed from further evaluation. A description of the dismissed alternatives and reasons for dismissal are found in **Section 2.3**.

2.1 No Action Alternative

Alternative 1 is the No Action Alternative. This alternative makes no changes in the project study area other than regularly schedule maintenance. The No Action Alternative is presented in this EA to provide a baseline of existing impacts continued into the future against which to compare impacts of the action alternatives.

2.2 Alternative 3 with Modifications, Preferred Alternative

In addition to the build alternative characteristics listed above, the Preferred Alternative (Alternative 3 with Modifications, shown in **Figures 2.2** through **2.4**) uses a 30 mph design speed horizontally and vertically. Modifications to Alternative 3 were made in four locations to reduce specific impacts. Each modification was evaluated on its individual impacts to the study area. These modifications are included in the Preferred Alternative and are discussed below. The attached compact disc illustrates them in greater detail.

2.2.1 Modification 3A: Station 16+00 to 26+85

The objective of Modification 3A is to eliminate impacts to 0.04 acres of wetlands. The proposed centerline of Modification 3A is approximately 50 feet west of the proposed centerline for Alternative 3 in the middle of the curve. While this modification would allow the proposed alignment to completely bypass the wetlands, construction of the modified centerline would cut into a hill, which would cause additional excavation. This modification would result in greater total land impact.

2.2.2 Modification 3B: Station 97+35 to 177+70

The objective of Modification 3B is to rebuild the pullout at the Holt's Picnic Area. This roadway alignment was shifted away from the pullout to allow for a 100-foot by 10-foot parking area with 10 spaces to be built at the existing location, which has 10 parking spaces. Slight alterations to the existing parking and recreational areas would be required. This modification would cause the least amount of impacted area at the pullout while still allowing for the pullout to be rebuilt.

2.2.3 Modification 3C: Station 176+65 to 198+91

The objective of Modification 3C is to construct a new crossing of Reeves Spring Branch that would allow for the existing roadway and vented ford crossing to remain open during construction. The new cored slab bridge would cross the creek at a new location just upstream from the existing crossing. A cored slab bridge is constructed of prestressed, precast concrete slabs that are bolted together and covered with asphalt. This type of bridge is used for spans up to 50 feet in length. Modification 3C results in slightly more impacts but would be able to be constructed without closing the road or requiring a detour for an extended period. Since this modification would be close to the existing crossing, it would require temporarily widening the existing road and placing temporary pipes during construction.

2.2.4 Modification 3F: Station 176+65 to 198+91

The existing T-intersection at SR 1179 (Shamrock Road) is not a 90-degree intersection. Since there are potential issues with visibility for approach vehicles, FDR 597 would be realigned to intersect more perpendicularly with SR 1179 while avoiding an historic property.

2.3 Alternatives Considered but Dismissed

The attached compact disc contains figures depicting all considered alternatives. **Tables 2.1 and 2.2** show the impacts for all four build alternatives.

2.3.1 Alternative 2

In addition to the build alternative characteristics listed above, Alternative 2 uses 35 mph design standards horizontally and vertically. Alternative 2 would not allow enough area to retain the Holt's Picnic Area parking pullout. This alternative crosses the creek at a new location approximately 230 feet downstream of the existing Reeves Spring Branch crossing. It would require a higher amount of excavation than Alternative 3 at the creek crossing due to the new location but could be constructed while keeping the existing road open to traffic.

During a meeting on July 13, 2006, the FHWA, USFS, and NCDOT agreed to use a 30 mph design speed in order to reduce impacts, maintain the same posted speed limit as is currently used in the adjacent roads, and retain as much of the character of the roadway as possible. With that decision, Alternative 2 and Alternative 2 with Modifications were removed from further consideration.

2.3.2 Alternative 2 with Modifications

Modifications to Alternative 2 were developed in four locations to reduce specific impacts. These modifications are discussed below.

2.3.2.1 Modification 2A: Station 15+33 to 26+28

The objective of Modification 2A is to reduce impacts to the wetlands. Alternative 2 would impact 0.07 acres of wetlands while Modification 2A would impact only 0.01 acres of wetlands. The proposed centerline of Modification 2A is approximately 50 feet west of the proposed centerline for Alternative 2 in the middle of the curve. While this modification would reduce the amount of wetlands impacted, construction of the modified centerline would cut into a hill, which would cause additional excavation and greater total land impact than Alternative 2.

**Table 2.1
Comparison of Impacts of Alternatives**

Alternative [modification]		Area of Impacts (acres)	Fill (cubic yards)	Excavation (cubic yards)	Streams (linear feet)	Wetlands (acres)
13+00 to 15+33	Alternative 2	0.26	22	304	0	0
15+33 to 26+28 Wetlands	Alternative 2 [2A]	1.35 [1.64]	1,640 [1,637]	1,336 [5,165]	0 [0]	0.07 [0.01]
26+28 to 42+70	Alternative 2	2.08	1,435	2,339	57	0
42+70 to 56+67	Alternative 2 [2B]	2.13 [2.05]	3,078 [6,254]	6,532 [2,346]	140 [347]	0 [0]
56+67 to 83+45	Alternative 2	3.09	2,528	4,070	37	0
83+45 to 123+60 Holt's Picnic Area	Alternative 2 [2C]	5.84 [6.29]	28,567 [15,612]	9,214 [32,242]	360 [315]	0 [0]
123+60 to 174+50	Alternative 2	6.39	4,951	12,597	67	0
174+50 to 198+74 Reeves Spring Branch	Alternative 2 [2D]	3.44 [3.11]	8,400 [5,654]	15,582 [6,474]	91 [64]	0 [0]
198+74 to 204+00 SR 1179 Intersection	Alternative 2	0.61	55	947	0	0
Alternative 2 Total [total with Modifications]		25.19 [25.52]	50,676 [38,148]	52,921 [66,484]	752 [887]	0.07 [0.01]
13+00 to 16+00	Alternative 3	0.34	79	482	0	0
16+00 to 26+61 Wetlands	Alternative 3 [3A]	1.30 [1.62]	1,470 [1,138]	1,035 [5,114]	0 [0]	0.04 [0]
26+61 to 97+35	Alternative 3	8.96	11,580	11,489	452	0
97+35 to 117+89 Holt's Picnic Area	Alternative 3 [3B]	2.83 [2.96]	12,470 [7,506]	2,441 [10,534]	96 [76]	0 [0]
117+89 to 176+65	Alternative 3	7.53	5,803	13,741	60	0
176+65 to 198+45 Reeves Spring Branch	Alternative 3 [3C]	2.47 [2.49]	4,858 [6,725]	2,712 [2,707]	68 [63]	0 [0]
198+45 to 207+13 SR 1179 Intersection	Modification 3F	[0.95]	[119]	[1,082]	[0]	[0]
Alternative 3 Total [total with Modifications]		24.38 [24.85]	36,379 [32,950]	32,982 [45,149]	676 [651]	0.04 [0]

Note: Preferred Alternative impacts are bolded.

Table 2.2 Summary of Impacts of Alternatives					
Alternative	Area of Impacts (acres)	Fill (cubic yards)	Excavation (cubic yards)	Streams (linear feet)	Wetlands (acres)
Impact Totals by Alternative					
Alternative 2	25.19	50,676	52,921	752	0.07
Alternative 2 with Modifications	25.52	38,148	66,484	887	0.01
Alternative 3	24.38	36,379	32,982	676	0.04
Alternative 3 with Modifications (Preferred Alternative)	24.85	32,950	45,149	651	0
Difference Between Alternatives Considered but Dismissed and Preferred Alternative¹					
Alternative 2	0.34	17,726	7,772	101	0.07
Alternative 2 with Modifications	0.67	5,198	21,335	236	0.01
Alternative 3	-0.47	3,429	-12,167	25	0.04

Note: Preferred Alternative impacts are bolded.

¹ Positive numbers indicate that the Preferred Alternative has fewer impacts; negative numbers indicate that the Preferred Alternative has greater impacts.

2.3.2.2 Modification 2B: Station 42+70 to 57+67

The objective of Modification 2B is to eliminate cutting into the hill on the inside of the curve near station 50+00. This modification would widen to the outside of Alternative 2 for the majority of the curve. Instead of the excavation impact of Alternative 2, there would be a substantial amount of fill caused by the steep embankment on the outside of this curve.

2.3.2.3 Modification 2C: Station 83+45 to 123+39

The objective of Modification 2C is to rebuild the pullout at the Holt's Picnic Area. The alignment for this modification was shifted away from the pullout to allow for a 100-foot by 10-foot parking area in the existing location. This modification would still require a slight alteration of the parking and recreation area by the lake. This modification also would require additional excavation as a result of cutting into the hills on either side of the pullout in order to keep the grade low at the pullout.

2.3.2.4 Modification 2D: Station 174+50 to 200+60

The objective of Modification 2D is to provide a second option for crossing Reeves Spring Branch at the existing vented ford location. The horizontal alignment closely follows the existing alignment in both approaches. There would be less impact, but this modification would require a detour and temporary bridge or full closure of the existing road.

2.3.3 Alternative 3

In addition to the build alternative characteristics listed above, Alternative 3 uses a 30 mph design speed. Alternative 3 without modifications crosses Reeves Spring Branch at the existing location, which would require constructing a detour and temporary bridge or closing of the existing road. This alternative was considered and dismissed because of the four modifications included in the Preferred Alternative would reduce impacts.

2.3.4 Individual Modifications from Alternative 3 with Modifications

Two of the six modifications originally proposed in Alternative 3 with Modifications were dismissed. Both of these modifications are described below.

2.3.4.1 Modification 3D: Station 165+42.25 to 197+51.79

Modification 3D was considered early in the process, when the vented ford was considered potentially historic. This modification is similar to Modification 3E in that it avoids the cabin location. Additionally, Modification 3D crosses Reeves Spring Branch downstream of the existing crossing in order to avoid impacting the vented ford. This new alignment would flatten the curve in the existing alignment. It would be able to be constructed without closing the existing road or requiring a detour for an extended period. This modification was dismissed as it was determined that staying on or close to the existing alignment between the cabin and the lake was preferable to building on new location.

2.3.4.2 Modification 3E: Station 165+42.25 to 182+59.99

The objective of Modification 3E is to provide an option that does not impact the house at Station 172+50. This modification would be constructed on a new alignment behind the house rather than widening the existing road. During a meeting on May 25, 2007, the FHWA, USFS, and NCDOT agreed to widen the existing roadway rather than move FDR 597 to a new location due to the anticipated impacts. As a result, Modification 3E was eliminated from further consideration.

2.3.5 Non-Construction Options

Two non-construction options also were examined. The first non-construction option is to add signs along FDR 597 to provide additional warning about pedestrians and equestrians to drivers. The second non-construction option is to create textured and/or colored crosswalks at major crossings to alert drivers to areas of likely pedestrian and equestrian crossing. Appropriate signing and pavement marking compatible with the scenic nature of the roadway will be determined during the final design of the project and incorporated into the project during construction.

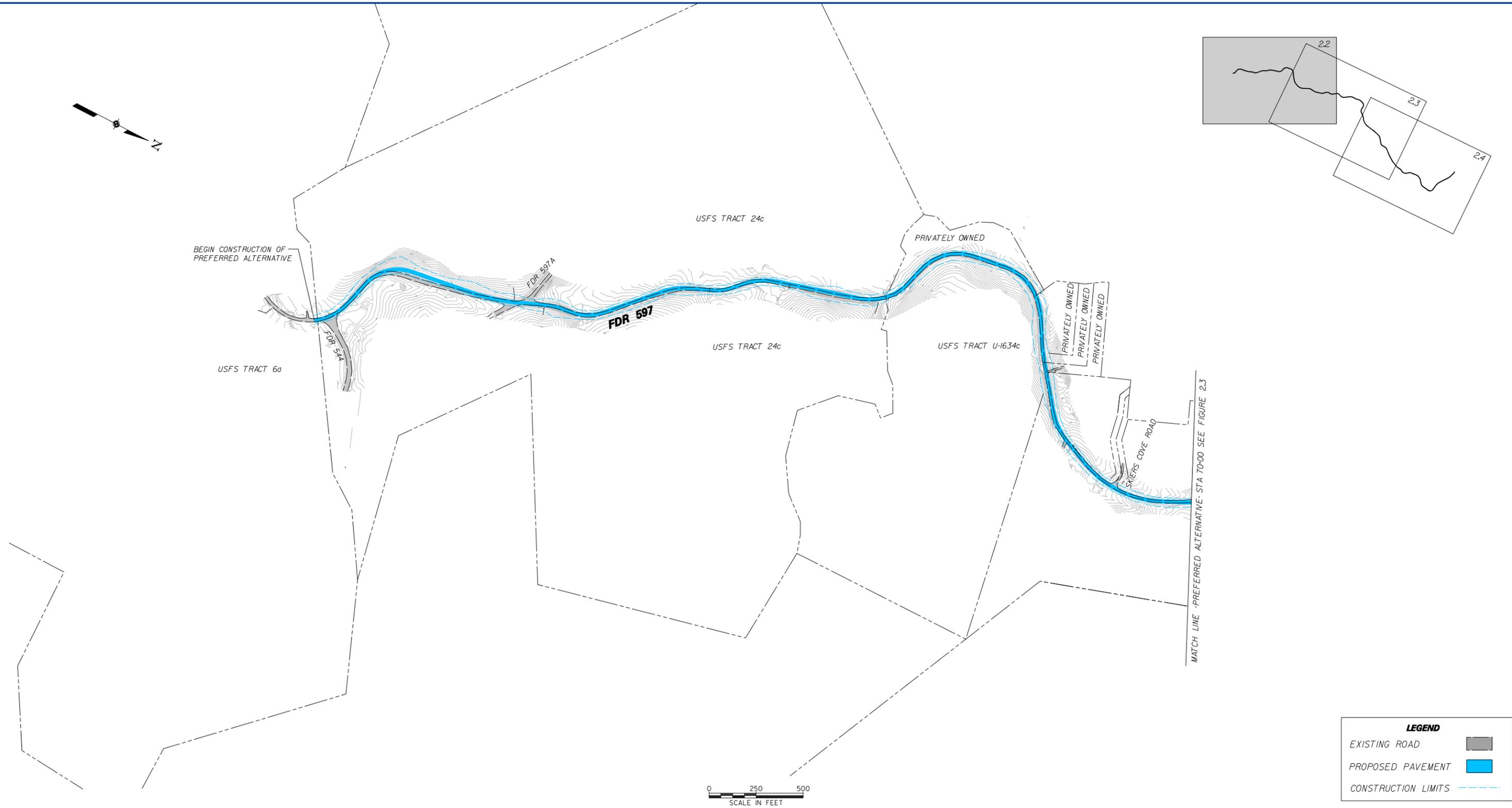
2.4 Selection of the Preferred Alternative

Alternative 3 with Modifications 3A, 3B, 3C, and 3F was chosen by the FHWA, USFS, and NCDOT as the Preferred Alternative. This alternative uses 30 mph design standards, which allows for the proposed roadway to follow the existing roadway alignment. In order to balance cut and fill and minimize impacts, the roadway alignment was shifted in several locations. There would be no impacts to wetlands or cultural resources. The existing one lane crossing of Reeves Spring Branch would be replaced with a new two-lane bridge which would allow for debris movement under the roadway and would accommodate flood waters so that water no longer would overtop the roadway. The parking at the Holt's Picnic area would be reconfigured for easier use. The intersection at SR 1179 would be aligned more perpendicularly to improve visibility and safety. Alternative 3 with Modifications would upgrade the existing roadway to NCDOT standards and improve safety and visitor access to potential recreation opportunities at Badin Lake and Holt's Picnic Area. Residents of Wood Land Estates and Skiers Cove would experience a more consistently maintained roadway. Alternative 3 with Modifications fully meets the purpose and need.

Under the No Action Alternative, the existing roadway would remain as an unpaved, gravel roadway, with a speed limit of 25 mph, and would not meet NCDOT design standards. Therefore, the No Action Alternative does not meet the purpose and need for this project but will be further analyzed in this EA to provide a baseline for comparison.

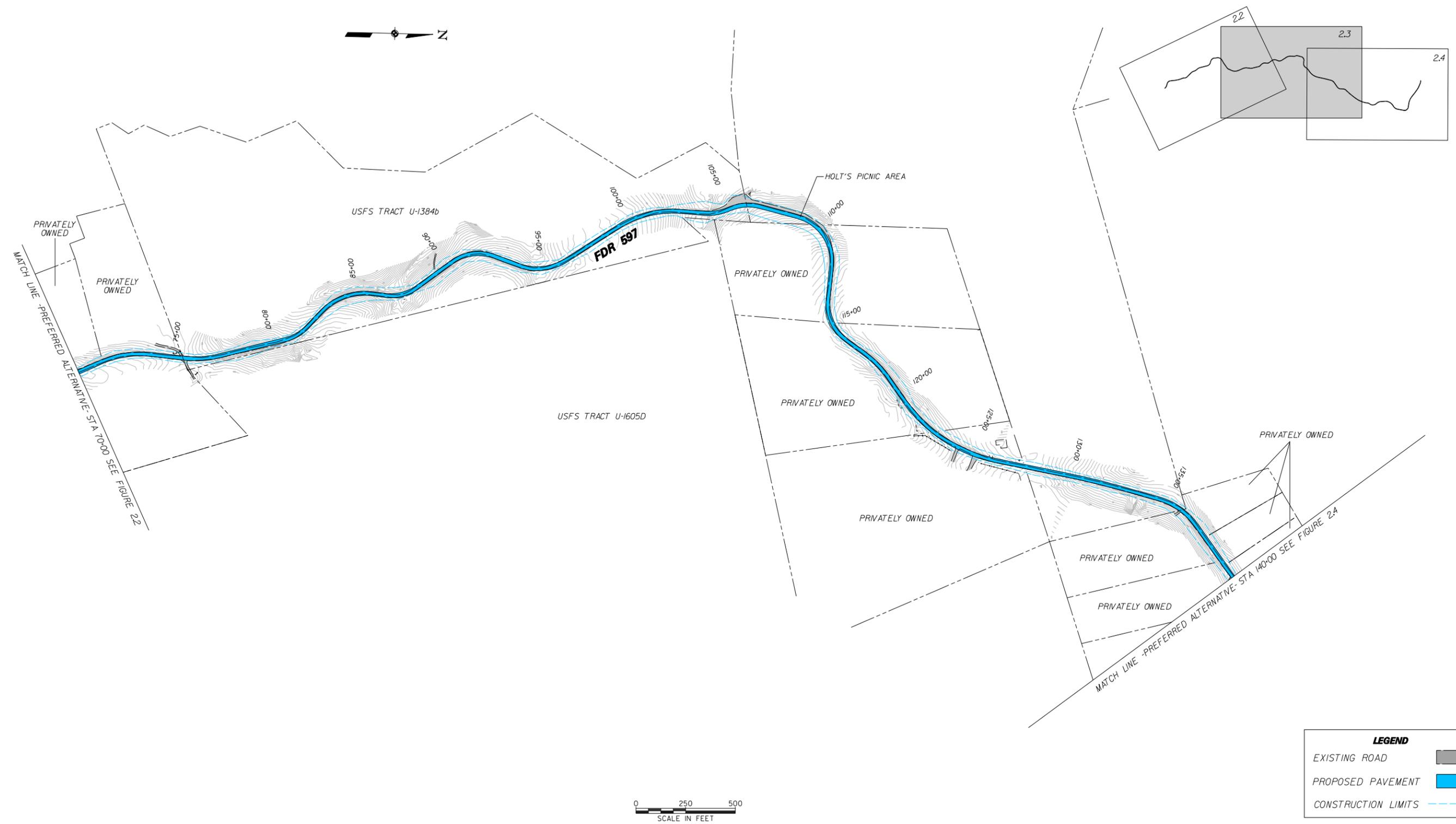
Preferred Alternative (1 of 3)

Figure 2.2



Preferred Alternative (2 of 3)

Figure 2.3



3.0 Affected Environment and Environmental Consequences

The following information addresses the affected environment and the environmental consequences for the No Action Alternative and the Preferred Alternative. Each primary affected environment section has one or more sub-sections for which environmental consequences (impacts) are discussed. When available, quantitative measures have been used to assess direct impacts. In the absence of quantitative data, impacts are based on best professional judgment.

All impacts are evaluated as either adverse or beneficial. The length of time and the magnitude of impacts also are included. Definitions of lengths of time are shown below:

- **Temporary Impacts** — Impacts anticipated during construction only, which is expected to last approximately two years. Upon completion of the construction activities, conditions are likely to return to those that existed prior to construction.
- **Short-Term Impacts** — Impacts that may extend past the construction period, but are not anticipated to last more than two years after the end of construction.
- **Long-Term Impacts** — Impacts that may extend well past the construction period, and are anticipated to last more than two years after the end of construction.

Impact magnitudes are defined as follows:

- **Negligible Impacts** — Little or no impacts (not measurable).
- **Minor Impacts** — Changes or disruptions may occur, but do not result in a substantial resource impact.
- **Major Impacts** — Easily defined and measurable, resulting in a substantial resource impact.

The affected environment has been assessed for direct, indirect, and cumulative impacts.

- **Direct Impacts** — which are caused by the action and occur at the same time and place.
- **Indirect (Secondary) Impacts** — which are caused by the action but are later in time and/or farther removed in distance but which are still reasonably foreseeable.
- **Cumulative Impacts** — which are incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions.

Direct and indirect impacts have been assessed for affected environment subtopics for both the No Action and Preferred Alternatives, and cumulative impacts have been assessed for all primary

topics. Where there are no direct or indirect impacts, there can be no cumulative impacts as a result of this project.

3.1 Cumulative Impacts: Explanation and Methodology

As distance and time increase from the environment in question, impacts lessen. Therefore, to determine cumulative impacts it is important first to establish spatial and temporal boundaries for the affected environments. Once these boundaries are established, past, present, and future actions within these boundaries can be determined and their impacts evaluated.

3.1.1 Spatial and Temporal Boundaries

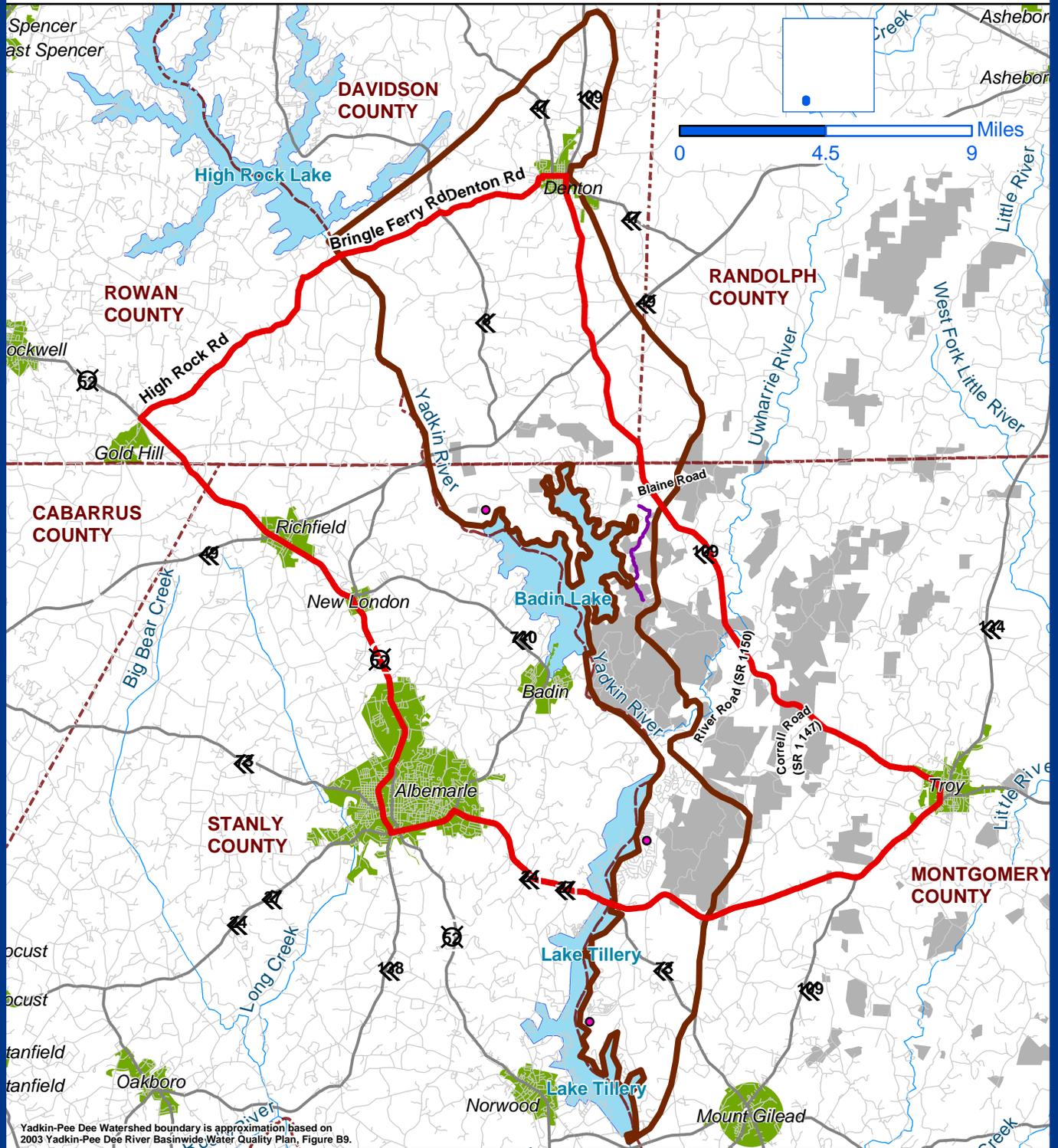
The spatial boundary for impacts to natural resources and biological communities is the east boundary of the Yadkin-Pee Dee River Subbasin 03-07-08 and the Yadkin River/Badin Lake/Lake Tillery on the west (**Figure 3.1**).

Because access to the Forest is an important predictor of impacts to land use, cultural resources, human environment, and visitor use and experience, the spatial boundaries for these topics are based on transportation routes in the area that could be important to the Forest. These boundaries are shown in **Figure 3.1** and are as follows:

- Northern: Denton Road/Bringle Ferry Road/High Rock Road in Denton, Davidson County, to Gold Hill, Rowan County.
- Western: US 52 in Gold Hill, Rowan County, to Albemarle, Stanly County.
- Southern: NC 24/27 in Albemarle, Stanly County, to Troy, Montgomery County.
- Eastern: NC 109 in Troy, Montgomery County, to Denton, Davidson County.

NC 49 is a direct route to the Forest for residents of Asheboro, Randolph County, and Greensboro, Guilford County. Residents from the large population centers to the east (Charlotte and surrounding cities) would access the Forest through Albemarle or along other state highways within the spatial boundaries.

Figure 3.1 - Spatial Boundaries for Cumulative Impacts



Yadkin-Pee Dee Watershed boundary is approximation based on 2003 Yadkin-Pee Dee River Basinwide Water Quality Plan, Figure B9.

Legend

- Spatial Boundary - Transportation
- Spatial Boundary - Natural Resources
- FDR 597
- Proposed Development
- Federal Land
- Municipality
- County
- Highway
- State Road



Information for past projects was compiled using the US Forest Service Schedule of Proposed Actions (SOPA), which was available through 1999. Present projects were listed based on the current SOPA (through March 2009), and future projects were from the NCDOT Transportation Improvement Program (through 2015). A determination of predictive measurable impacts to resources reduces to negligible after 10 years. Based on available data for past and future plans, the temporal boundaries for indirect and cumulative effects range from 1999 to 2015.

3.1.2 Past, Present, and Future Actions

3.1.2.1 Detail

Information about plans as well as past, present, and future actions, came from the following plans and reports:

- USFS *Draft Proposed Land Management Plan for the Uwharrie National Forest (LM Plan)* (February 2009). Establishes long-range strategies for resource management and visitor use. Provides guidance via goals, objectives, and policies, but does not promote specific projects. An update of the approved 1986 approved land use management plan.
- USFS *Schedule of Proposed Actions (SOPA)* (April 1999 – March 2009). Quarterly release from the USFS of all planned projects in the Forest.
- USFS *Roads Analysis Process Report: Uwharrie National Forest* (December 2003). Assessment of transportation needs and forest resource impacts.
- NCDOT *2009-2015 Transportation Improvement Program (TIP)*. Biennial list of transportation projects in the state, listed by county.
- Telephone calls to Town of Troy and Montgomery County (Hiram Marziano and Teresa Thompson, respectively; May 28, 2008).

The Town of Troy has a draft land use plan. Montgomery County has a transportation plan from the 1970s which was never adopted.

Past Actions

Past actions that are significant in the history of the Forest include the discovery of gold in the early 1800s, the federal land purchase of what was then known as the Uwharrie Reservation in 1931, work performed in the Forest by the Civilian Conservation Corps between 1934 and 1937, and the designation as a National Forest in 1961.

More recent past actions in the Forest are found in the quarterly SOPAs. **Appendix A** has a list of these past actions, which range from 1999 to 2008 (present actions first appear in January 2009). The SOPA actions can be divided into three groups: construction of or maintenance on Forest facilities; maintenance on or upgrade of Forest roads; and regular maintenance of Forest flora, including controlled burns, thinning, and destruction of unwanted plants. A summary of past actions that did not involve maintenance of Forest flora follows:

- Construction of a bathhouse
- Reconstruction of a boat ramp
- Pavement or repavement of roads
- Replacement of a bridge
- Construction of a shooting range
- Timber harvest and reforestation to manage ecosystem
- Closing an illegal OHV trail
- Construction of a mobile telephone tower

Although these actions appear beginning in a particular month and year, the actions may not occur during that timeframe. The SOPA does not list a projected start date.

Present Actions

Two present actions (defined as actions that appear in the current SOPA, January through March 2009) can be found in **Table 3.1**. Additionally, NCDOT has a multi-year project to increase bicycle routes and signage in the greater Uwharrie Lakes area.

Table 3.1 Present Actions in the USFS Schedule of Proposed Actions (SOPA)			
Year	Month	Project	Description
2009	January	Fraley/Todd Equestrian Trail Reroute	The proposed action will relocate a portion of the Fraley equestrian trail from its current location to an adjacent site. Approximately 1 mile of the existing trail would be relocated. The purpose of this relocation is to provide for public safety.
	On Hold	Reconstruction/Paving of Forest Service Roads 544 and 576	The proposed action involves the reconstruction and paving of approximately 1.3 miles of Forest Service Roads 544 and 576.

Also, there is a low-income housing initiative within the Town of Troy, which involves building two to three houses in the downtown area. The houses will utilize existing utilities and roadways. This project is scheduled to be built by 2010.

Future Actions

Table 3.2 lists the projects in the TIP for the four counties (Montgomery, Davidson, Rowan, and Stanly) within the spatial boundaries defined above. Project R-4069 completes the FH 49 improvements. Two projects increase vehicle capacity around the town of Troy, and a third project increases capacity on NC 49. The NC 49 project begins outside the above-defined spatial boundaries but ends within the spatial boundaries.

Table 3.2 NCDOT Projects within Spatial Boundaries				
TIP#	Road	In Progress Status	Construction Year	Description
R-2533	NC 49	Planning/Design	2010	Harrisburg to Yadkin River. Widen to multi-lanes (29.3 miles)
R-2527	NC 24/27	Planning/Design	2014	NC 73 to the Troy Bypass. Widen to multi-lanes (9.1 miles)
R-0623	NC 24/27	Planning/Design	2014	Troy Bypass, SR 1138 to East of Little River. Four lanes, part on new location (5 miles)
R-2903	US 52	Unfunded	Future Years	Multi-lanes south of NC 49 at Richfield to I-85 north of Salisbury. Four lanes divided on new location (coordinate with I-2511) (19.2 miles)
R-4069	FH 49	Federal Land Program Funding	Future Years	Uwharrie National Forest, PFH 554(1), Hunt's Camp to existing pavement. Reconstruct roadway (1.5 miles)
EB-3410	N/A	In Progress	Future Years	Uwharrie Lakes Region Bicycle Route mapping and signing

Additional future plans include the USFS' plans to improve FDR 576 (from the intersection with Reservation Road to the intersection with FDR 544) and the Handy Sanitary District's Badin Lake Sewer Project. Also, within Montgomery County, there are three future development projects. One project is near the northwestern shore of Badin Lake and is projected to have between 50 and 60 single-family houses. The second project is near the eastern edge of Lake Tillery and is projected to have between 15 and 30 single family houses. The third project is near

the southeastern part of Lake Tillery and is projected to have approximately 15 single family houses.

The above past, present, and future actions are used to determine cumulative impacts for the designated affected environment topics. Direct, indirect, and cumulative impact assessments for these topics can be found in the *Environmental Effects* subsection for each topic.

3.1.2.2 Summary

The USFS has past and present projects that create or improve Forest facilities. The NCDOT TIP contains future projects to widen the following roads: NC 49, which increases capacity from the Charlotte metro area; NC 24/27, which increases capacity from Albemarle and the Charlotte metro area; and US 52, which increases capacity from Salisbury, Lexington, and Winston-Salem (this project currently is unfunded). Also, the Handy Sanitary District plans to install sanitary sewer service along NC 109. Additionally, there is one small housing initiative within the Town of Troy, and there are three developments planned within Montgomery County which range from 15 to 60 single-family houses (**Figure 3.1**).

3.2 Land Use

3.2.1 *Affected Environment*

Users of FDR 597 consist of Uwharrie National Forest visitors, residents of communities along FDR 597 and the surrounding area, and Forest Service personnel. For the purpose of this study, only land uses within the study area and land uses that are accessed via FDR 597 are considered. Land uses in the area are either residential or are recreational and related to the Uwharrie National Forest.

3.2.1.1 Residential

Along FDR 597, one residential structure is located across from Wood Land Estates, and another residence with a dock on Badin Lake is located south of Reeves Spring Branch (see **Figure 3.2**). Skiers Cove Road leads to the residential community of Skiers Cove. Lakeland Drive leads to the residential community of Wood Land Estates.

Skiers Cove

Skiers Cove is a small residential community located along Skiers Cove Road off of FDR 597. Skiers Cove contains eight houses and approximately seven mobile homes.

Wood Land Estates

Wood Land Estates is a gated community located along Lakeland Drive, off of FDR 597. Aerial photography and Montgomery County tax records indicate that there are 12 houses located within the development. Many lots are large, with several over four acres. **Figure 3.3** shows the entrance to Wood Land Estates from FDR 597.

Figure 3.2: Private Dock on Badin Lake

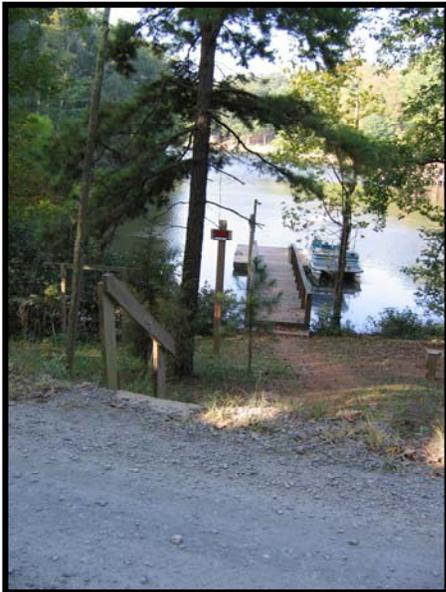


Figure 3.3: Wood Land Estates Entrance



3.2.1.2 Recreational

Recreational land uses include hiking, camping, picnicking, water sports, horseback riding, hunting, fishing, off-highway vehicle riding, and sight-seeing. Forest facilities for these activities are described in **Section 3.9.1.1**. The Badin Lake Campground, Badin Lake Group Camp, King's Mountain Point and Floating Pier, and the Badin Lake Hiking Trail are accessed via FDR 597A from FDR 597, and the Holt's Picnic Area is accessed directly from FDR 597 (see **Figure 3.4**).

3.2.2 *Environmental Effects*

3.2.2.1 No Action Alternative

Direct Impact: The No Action Alternative would have no direct impact, adverse or beneficial, to land use along FDR 597.

Indirect Impact: The No Action Alternative would have no indirect impact, adverse or beneficial, to land use along FDR 597.

3.2.2.2 Preferred Alternative

Direct Impact: Implementation of the Preferred Alternative would impact the house located south of Reeves Spring Branch. In addition, 15 other private parcels would be impacted, with the total area to be acquired from private owners of 0.74 acres. Any acquisition of property and/or relocation of residents, if applicable, would be done in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public law 91-646, as amended by 100-17; regulations at 49 CFR 24). The program is committed to assisting individuals and families find and relocate to decent, safe, and sanitary housing that is adequate to meet their needs and within their financial means. The direct impact to land use is long-term, minor, and adverse.

Figure 3.4 - Recreation Facilities and Topography



USGS Badin, NC, Quadrangle: 35080-D1-TF-024, 1994

Indirect Impact: Land inside Wood Land Estates is has already been divided into parcels, which presumes eventual development. Several tracts of land along FDR 597 are privately held and may be developed in the future. The proposed project could hasten but would not increase this development. Other privately-owned, non-lakefront parcels along FDR 597 are unlikely to be developed due to the lack of roadways leading to the inside of these tracts and the steep terrain indicated on topographic maps. With the improvement of FDR 597, the USFS could add to the Forest’s facilities along the road. The indirect impact of the proposed project is judged to be long-term, minor, and beneficial.

3.2.2.3 Cumulative Impact

Increasing access to utilities increases the development potential of land, which could bring new residents to the Forest. The combination of improving Forest facilities, increasing capacity and access, and increasing the potential of new residents could lead to increased use of the Uwharrie National Forest by the general public. This increased use supports the USFS’ motto (“Caring for the Land and Serving People”). Therefore, the cumulative impact on land use is long-term, minor, and beneficial.

3.3 Demographics

3.3.1 *Affected Environment*

To determine the socioeconomic characteristics of the study area, Census 2000 data were used. The study area is within Tract 9603. Block Group 1 within that tract is directly impacted. Within that block group, only four blocks – 1122, 1123, 1125, and 1146 – within or adjacent to the study corridor are populated. **Figure 3.5** shows the blocks within or adjacent to the study area. The block group boundaries extend beyond the borders of the map and thus are not shown. The following sections discuss the age, minority, and economic characteristics of the study area.

3.3.1.1 Age Characteristics

Table 3.3 shows the age distribution for the study area by Census block. As shown in the table, citizens ages 50 and older form a substantial portion of the population, while residents younger than 40 years old tend to be under-represented, compared to the county, state, and country.

Table 3.3 Age Distribution						
Location		Population	Age (Years)			
			<39	40-49	50-64	65+
Tract 9603, Block Group 1¹	Block 1122	5	0%	60.0%	40.0%	0%
	Block 1123	17	11.8%	0%	47.1%	41.2%
	Block 1125	5	20.0%	40.0%	0%	40.0%
	Block 1146	19	36.9%	10.5%	52.6%	0%
Tract 9603, Block Group 1 Total		1,881	39.2%	18.6%	26.3%	15.9%
Montgomery County		26,822	54.6%	14.8%	16.6%	14.0%
North Carolina		8,049,313	57.7%	14.9%	15.4%	12.0%
United States		281,421,906	57.6%	15.1%	14.9%	12.4%

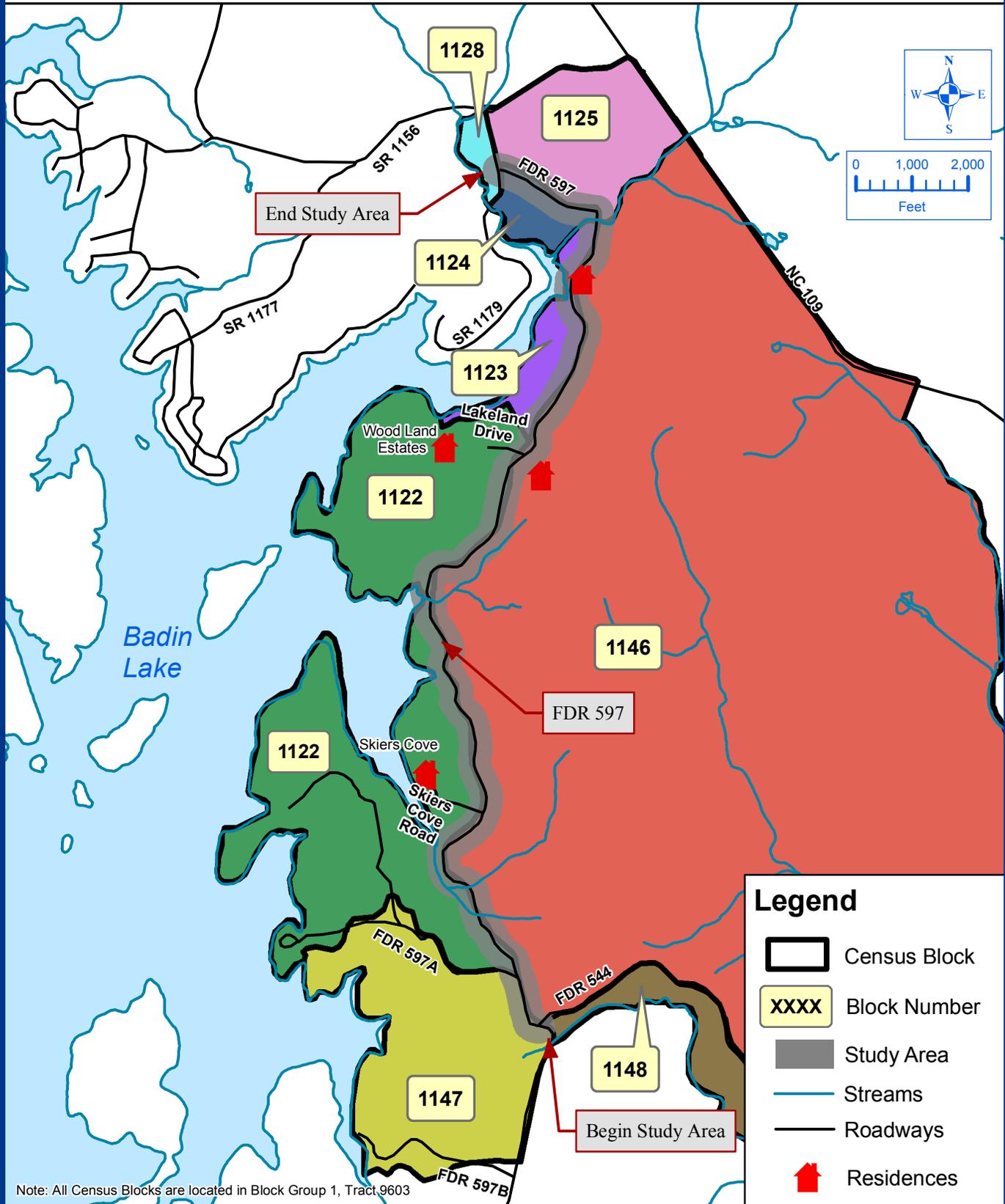
Source: U.S. Census Bureau Summary File 1, 100% Data, Census 2000 (March 2006).

¹ Blocks 1122, 1123, 1125, and 1146 are the only blocks within or adjacent to the study area in Tract 9603, Block Group 1 that are populated.

3.3.1.2 Minority Characteristics

The Census Bureau defines minorities as any race that is not white, including African-American, Asian, Native American or Alaskan, Pacific Islanders or Hawaiians, other unspecified races, or people who consider themselves to be two or more races (*U.S. Census Bureau, 2006*). Minority populations within Census blocks within or adjacent to the study area were appraised to determine whether concentrations of minority populations exist. The results of the analysis show that in the study corridor there are no minority residents present, compared to 30 percent minority residents in Montgomery County, 27 percent minority residents in North Carolina, and 23 percent minority residents in the United States.

Figure 3.5 - Census Blocks



Note: All Census Blocks are located in Block Group 1, Tract 9603

3.3.1.3 Economics

To better understand Montgomery County and the study area from an economic viewpoint, several factors were examined. The block group containing the study area was compared to Montgomery County, to North Carolina, and to the United States (**Table 3.4**). Economic information is not available by block. Poverty status is determined by the Census Bureau and is based on income versus a poverty threshold, which varies according to family size and ages of family members. The same thresholds are used throughout the United States and are updated annually for inflation (*U.S. Census Bureau*).

Location	Median Household Income	Per Capita Income	Percent Below Poverty Level
Tract 9603, Block Group 1	\$40,486	\$27,216	8.1%
Montgomery County	\$39,616	\$16,504	15.4%
North Carolina	\$39,184	\$20,307	12.3%
United States	\$41,994	\$21,587	12.4%

Source: U.S. Census Bureau Summary File 3, 100% Data, Census 2000 (March 2006).

As shown in **Table 3.4**, the percent of people below the poverty level in the block groups in the study area is lower than in the county, the state, or the country. Correspondingly, the median household income and the per capita income in the census block study area are higher than for the county and the state.

Table 3.5 shows the unemployment rates for Montgomery County, North Carolina, and the United States. This information is not available for the study area. The unemployment rates in Montgomery County have been consistently higher than in North Carolina or the United States since 2001.

Table 3.5 Unemployment Rates					
Area	Percent Unemployed[†]				
	2000	2001	2002	2003	2004
Montgomery County	3.9%	6.8%	8.2%	9.0%	7.3%
North Carolina	3.6%	5.5%	6.8%	6.4%	5.5%
United States	4.0%	4.7%	5.8%	6.0%	5.5%

Source: The Employment Security Commission of North Carolina, Labor Market Information (2006) (<http://www.ncesc.com>).

[†]Not seasonally adjusted.

3.3.2 Environmental Effects

The proposed project’s effects on the study area’s demographic characteristics are summarized in the Environmental Justice section (**Section 3.4**).

3.4 Environmental Justice

3.4.1 Affected Environment

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, directs federal agencies to consider proposed actions on minority and/or low-income populations to ensure that agency actions do not have a disproportionate adverse impact on these communities.

3.4.2 Environmental Effects

Direct Impact: There are no minority residents in the study area (see **Section 3.3.1.2**). The poverty level in the study area is substantially less than in the county, state, and country (see **Section 3.3.1.3**). Therefore there would be no direct disproportionate adverse impacts on Environmental Justice populations for either the No Action or the Preferred Alternative.

Indirect Impact: There would be no disproportionate adverse indirect impacts on Environmental Justice populations.

3.4.2.1 Cumulative Impact

There would be no disproportionate adverse cumulative impacts on Environmental Justice populations.

3.5 Cultural Resources

Archaeological and historic cultural resources were summarized in the *Phase I Archaeological Survey* (New South Associates, March 2008), *Rehabilitation of FDR 597 From SR 1179 to FDR 544, Uwharrie National Forest* (New South Associates, June 2007), *Existing Conditions: Cultural Resources Survey* (New South Associates, May 2006), and *Archaeological Survey and Evaluation of 11 Sites (November 2008)* (all are appended by reference) and are discussed below.

3.5.1 Affected Environment

The following sections describe the archaeological and historic resources in the study area.

3.5.1.1 Archaeological Resources

Archaeological Research

The Area of Potential Effect (APE) for the Archaeological Research section was defined as 200 feet on either side of the center line of the existing road for the length of the project.

Background research was conducted at the North Carolina Office of State Archaeology (OSA) in Raleigh, and at the Uwharrie National Forest office in Troy.

In Raleigh, the archaeological site files and associated report library at OSA were examined to identify previously recorded sites in or near the project area, to determine the extent of previous archaeological surveys in or near the project area, and to generate expectations for the types and densities of as yet undiscovered sites in or near the project area. In Troy, the archaeological atlas was examined to obtain better information on site boundaries. Secondary historic resources and the compartment records also were examined to establish a timeline for settlement of the area.

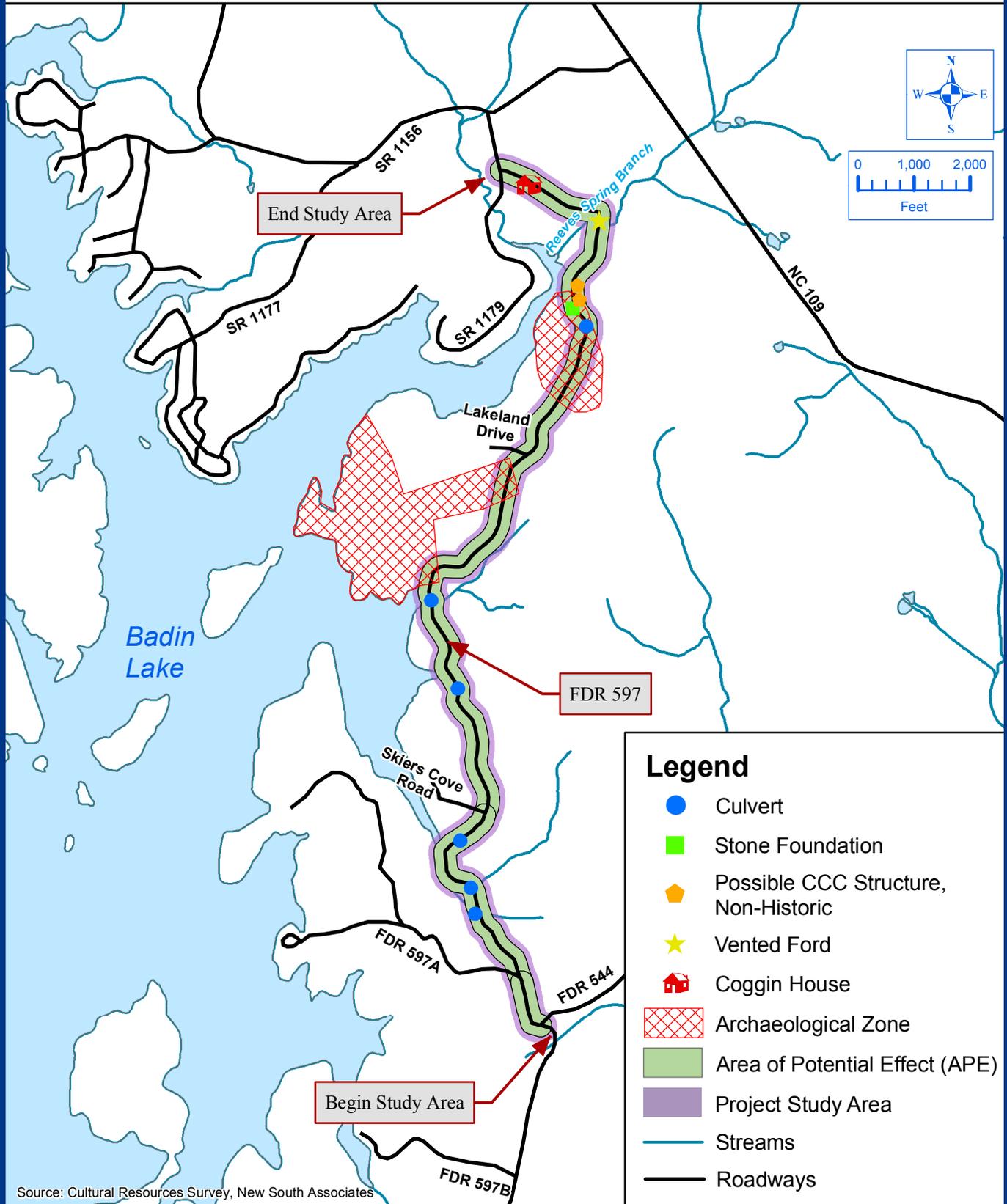
The review determined that the entire area from the existing road to the shore of Badin Lake had previously been surveyed by a series of projects by the USFS. This area contains a high density of prehistoric and historic sites, including 11 sites within the APE. The site density to the east of

the existing road is lower, but only because that area has not been intensively surveyed. Details of some of the previous surveys are as follows:

- Sites 31MG498 to 31MG524 (inclusive) were discovered during the Catawba College survey of 4,875 acres of Uwharrie National Forest (Cooper and Norville 1979). The survey totally relied on surface survey, and no site delineations or evaluations were completed. Typically, roads, trails, and other areas of exposed soils are examined for artifacts. Above-surface features such as chimney piles and cemetery headstones were noted as sites. This 1979 survey examined all of the APE west of the existing center line.
- The 1991 survey of the proposed Reeves Spring Branch timber sale resulted in the revisit or discovery of 11 sites (Harmon and Snedeker 1991). No site evaluations were completed. The sites included: 31MG502, 31MG503, 31MG504, 31MG505, 31MG507, 31MG510, 31MG511, 31MG601, 31MG874, 31MG875, and 31MG876.
- Harmon and Snedeker (1993) surveyed proposed recreation areas at Badin Lake. Among the sites they discovered were 31MG517, 31MG521, 31MG575, 31MG518, and 31MG1032. It is unclear if the report and recommendations were accepted by the OSA.
- In 2002, Harmon conducted an evaluation of sites 31MG514/514, 31MG630, 31MG575, and 31MG1697/1697. All four sites were recommended not eligible, and the OSA concurred with those recommendations.

In recognition of areas of high archaeological potential, the Uwharrie National Forest designated Archaeological Zones in their draft Forest Management Plan. Archaeological Zones represent areas of preservation priority. Two Archaeological Zones are partially within the APE (see **Figure 3.6**).

Figure 3.6 - Cultural Resources



The general project area was used in all prehistoric periods as a source for Morrow Mountain rhyolite, a stone used for tools. This material was used by groups throughout North Carolina but has only limited exposures in the state. Accordingly, many sites were created near the project area by groups extracting the rhyolite and/or settling near a convenient source of the material. The full prehistoric sequence – Paleoindian [12,000-7,500 Before Current Era (B.C.E.)], Early Archaic (7,500-6,000 B.C.E.), Middle Archaic (6,000-3,000 B.C.E.), Late Archaic (3,000-700 B.C.E.), Early Woodland [700 B.C.E.-Current Era (C.E.) 200], Middle Woodland (C.E. 200-800), Late Woodland (C.E. 800-1,000), and Mississippian (C.E. 1,000-1,600) – is represented in the Badin Lake vicinity. Sites from these periods may range from extremely short-term stone knapping episodes, and overnight hunting camps, to seasonal base camps, and intensively utilized quarries.

Archaeological Fieldwork and Findings

A Phase I Archaeological Survey and site delineation were completed for the Preferred Alternative. The fieldwork for the Archaeological Fieldwork and Findings section was performed as part of the Phase I Archaeological Survey. Because this fieldwork occurred after the Preferred Alternative was selected, the APE for the Archaeological Fieldwork and Findings section was defined as all land within the proposed cut and fill lines of the Preferred Alternative for the length of the project.

A survey conducted in March 2008 entailed the excavation of 324 shovel tests at 30-meter intervals for site discovery. Five sites were discovered. Shovel tests were excavated at 15-meter intervals to delineate the four sites within the APE, all of which were determined to not be eligible for the National Register of Historic Places (NRHP). In October 2008, the entire APE was resurveyed. This survey entailed the excavation of 314 shovel tests at 30-meter intervals for site discovery. Fifteen sites were discovered, including the four sites from the original survey. Of the 15 sites, two of the previous delineations were determined to be sufficient (31MG509/1835/1835** and 31MG1836**), two sites were outside of the APE (31MG876 and 31MG1926**), and the remaining 11 sites were delineated using shovel tests at 15-meter intervals. All 15 sites are recommended not eligible for the NRHP.

3.5.1.2 Historic Resources

The Area of Potential Effect (APE) for the Historic Resources section was defined as 200 feet on either side of the center line of the existing road for the length of the project.

Historical Research

Background research was conducted at the North Carolina Department of Cultural Resources Office of Archives and History, where state architectural survey files, maps, and National Register of Historic Places nomination forms were consulted. Additional historic context research was conducted in the local history/genealogy room at the Montgomery County Public Library in Troy, North Carolina. Tax records and deeds of the surveyed properties were consulted at the Montgomery County Administrative Building located in Troy.

Also, Uwharrie National Forest land acquisition records and other background history sources were obtained from the Uwharrie Ranger Station in Troy. Local residents in Blaine, the closest community to the project area, were informally interviewed during fieldwork to gain local oral history information on the surveyed properties. An attempt was made to visit the North Carolina State Archives in Raleigh, but it was closed for remodeling during the fieldwork phase of the project. The state library holdings, however, were available during the remodeling and provided sources in the state's architectural history.

Additionally, archival research was undertaken at the National Archives in Washington, D.C., to better understand the scope of Civilian Conservation Corps (CCC) activities in Montgomery County and to determine where CCC camps were located. (CCC crews worked on government land throughout the country. Their projects including road building and road improvements, and their efforts improved transportation networks in the National Forests.) All available CCC records for Montgomery County found in Record Group 35, Box 156 were reviewed. One folder labeled "North Carolina, Co. 2410, F-17, Montgomery County, Troy" had area-specific information. Research indicates that a CCC camp (Camp NC P-17, Camp Albert R. Ives, Company 2410, December 20, 1934 – May 11, 1937) was located in the Troy vicinity, with Troy being the closest railhead and post office to the camp.

A windshield survey and subsequent field survey of the APE confirmed the location of a farmhouse, two CCC-derived cabins, a CCC-style vented ford (marked "1937"), and 25 stone culverts in the project area roadbed (see **Figure 3.7**).

Figure 3.7: Stone Culvert



Historical Fieldwork and Findings

Civilian Conservation Corps (CCC)

FDR 597 was built by the CCC in 1934 to replace an earlier road that was inundated by the creation of Badin Lake in 1917. It features several resources associated with the CCC, including a stone vented ford, 25 stone culverts, and two small cabins (one in ruins).

The roadbed of FDR 597 is a product of CCC construction or improvement, but it does not possess the distinctive physical characteristics of other historically significant park or forest roads such as scenic vistas, retaining walls, or turnouts. The collection of 25 stone culverts found in the road bed might have constituted a sort of “CCC culvert district,” but taken together the culverts do not retain a sufficient level of integrity to convey their historic significance. Many of the smaller culverts’ stone end walls are collapsed or buried by decades of erosion. The larger surveyed culverts appear to have been better maintained through the years because they contain

large streams. They display a higher level of integrity, but on their own do not possess enough distinctive design characteristics to make them historically significant CCC-designed structures.

The presence of the cabins suggests that they represent either a small CCC side camp, or that they were salvaged from an abandoned CCC camp elsewhere, possibly Camp F-17 at Troy. As noted, Camp F-17, which housed Unit 2410, was established in December 1934 and received its water and sewer services directly from the city of Troy. Camp F-17, therefore, was located in or immediately adjacent to Troy, 10 miles from the FDR 597 survey area. This documentary evidence and a metal-detector reconnaissance confirm the absence of a full CCC unit camp near the cabins. These cabins do not appear to be associated with any particular historically significant event, such as an historically significant project within Montgomery County or the establishment of a major CCC company camp.

Coggin House

At the north end of the project area is the circa 1845 Coggin House, a one-story T-plan farmhouse with associated outbuildings. The Coggin House is individually eligible for nomination to the NRHP for architecture as an intact example of an antebellum T-plan farmhouse. It has distinctive characteristics of type, period, and method of construction as an early-nineteenth century vernacular T-plan “Palladian-inspired” farmhouse. This house type has been documented in two major scholarly works on North Carolina architecture and is recognized as an historically significant vernacular house type during the state’s Federal period. Moreover, the examples cited in current scholarship are limited to the more common two-story T-plan house, making the Coggin House all the more historically significant as a rare one-story version of the type.

It does not appear that this house type has been previously identified in Montgomery County; no examples are included in the North Carolina State Historic Preservation Office architectural survey or NRHP files. The period of significance associated with the house coincides with its period of use as an agricultural property from circa 1845-1917. The Coggin House with its two outbuildings and surrounds are also NRHP-eligible as an agricultural property.

3.5.2 Environmental Effects

3.5.2.1 No Action Alternative

Archaeological Resources

Direct Impact: There is no direct impact, adverse or beneficial, to archaeological resources as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to archaeological resources as a result of the No Action Alternative.

Historic Resources

Direct Impact: There is no direct impact, adverse or beneficial, to historic resources as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to historic resources as a result of the No Action Alternative.

3.5.2.2 Preferred Alternative

Archaeological Resources

Although no previously recorded archaeological sites are present in the APE, the vicinity has a high density of prehistoric and historic archaeological sites. As a result, a Phase I Archaeological Survey was completed. This initial field survey discovered four archaeological sites within the APE. Subsequent surveys revealed 11 additional sites. The archaeological survey team determined that none of the artifacts found would provide appreciably more understanding about the Badin Lake prehistoric or historic era. Based on the field results, no sites have been determined eligible or potentially eligible to the NRHP.

Direct Impact: There is no direct impact, adverse or beneficial, to eligible archaeological resources as a result of this project.

Indirect Impact: There is no indirect impact, adverse or beneficial, to eligible archaeological resources as a result of this project.

Historic Resources

Civilian Conservation Corps (CCC)

The culverts and roadbed are unelaborated, practical examples of 1930s era engineering that lack distinction. As a group, they do not constitute either a landscape or district that can convey the historical significance of CCC activities in Montgomery County. The other CCC resources lack distinction and many suffer from a loss of integrity. The cabins, ford, and culverts are of standardized construction, and further study of the architecture of the buildings or the structures would not yield historically significant information. Additionally, neither the buildings nor structures on FDR 597 are associated with an historically significant person, and the lack of documentary and archaeological support for a larger camp around the cabins lessens their historical interest. As such, the CCC-related historic resources identified by this survey are not recommended eligible for the NRHP.

Coggin House

The Coggin House is considered individually NRHP eligible as an example of an antebellum vernacular T-plan house type. The house, outbuildings and surrounds may also be eligible under Criterion A as an agricultural property associated with Montgomery County subsistence agriculture in the nineteenth and twentieth centuries. The road alignment has been developed to avoid this property.

Direct Impact: There is no direct impact, adverse or beneficial, to any NRHP-eligible historic resources by the Preferred Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to any NRHP-eligible historic resources by the Preferred Alternative.

3.5.2.3 Cumulative Impact

Because there are no direct or indirect impacts on archaeological or historic resources, there are no cumulative impacts.

3.6 Natural Resources

3.6.1 Affected Environment

The following sections describe natural resources in the study area.

3.6.1.1 Jurisdictional Topics

Waters of the United States

The Clean Water Act (CWA) defines “Waters of the United States” as waterbodies including lakes, rivers and streams, and wetlands. Section 404 of the Clean Water Act requires regulation of discharges into “Waters of the United States.” The U.S. Environmental Protection Agency (USEPA) is the principal administrative agency of the CWA; however, the U.S. Army Corps of Engineers (USACE) has the responsibility for implementing, permitting, and enforcing provisions of the Act. The USACE regulatory program is defined in 33 CFR 320-330.

Wetlands, streams, and open waters are regulated by the USACE pursuant to Section 404 of the CWA (33 U.S.C 1344). The NC Department of Environment and Natural Resources (NCDENR) Division of Water Quality (NCDWQ) also has regulatory input through Section 401 Water Quality Certification. Streams are described in **Section 3.6.1.3**, and wetlands are described below. There are no open waters in the study area.

Jurisdictional Wetlands

Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The project study area was surveyed for jurisdictional wetlands in accordance with guidelines for wetland definition as given in the *1987 Corps of Engineers Wetlands Delineation Manual*. This approach incorporates three criteria in delineating wetlands, (1) the presence of hydrophytic vegetation, (2) the presence of hydric soils, and (3) evidence of wetland hydrology. All three criteria must be present in a given location for an area to be considered a jurisdictional wetland.

One jurisdictional wetland was identified and delineated within the project study area. The boundary of the wetland location was identified in the field and located using GPS survey

methods. The wetland, shown in **Figure 3.8**, is located at the southern end of the project study area and is the headwaters for Stream #13. Dominant vegetation includes carex (*Carex crinita*), juncus (*Juncus effusus*), and various other *Carex* spp. Based on the Cowardin classification, the wetland is a Palustrine Emergent wetland system.

Hydrology indicators for the wetland included saturation in the upper 12 inches of soil, drainage patterns in the wetlands, hydrophytic-dominated plant species, and a reduced soil matrix (Munsell moist) with a chroma of one within the first 12 inches of the soil surface. Hydrology for this wetland is dominated by groundwater discharge.

3.6.1.2 Floodplains

The Federal Emergency Management Agency (FEMA), in cooperation with federal, state, and local governments, has developed floodway boundaries and Flood Insurance Rate Maps (FIRMs) for Uwharrie National Forest. The base, or 100-year, flood is defined as an event that is equaled or exceeded on average once every 100 years. There are 17.7 acres of 100-year floodplains within the study area, located at five places along FDR 597. The water surface elevation of the current 100-year floodplain is 519.11 feet above sealevel. **Figure 3.8** shows the 100-year floodplains.

3.6.1.3 Water Resources

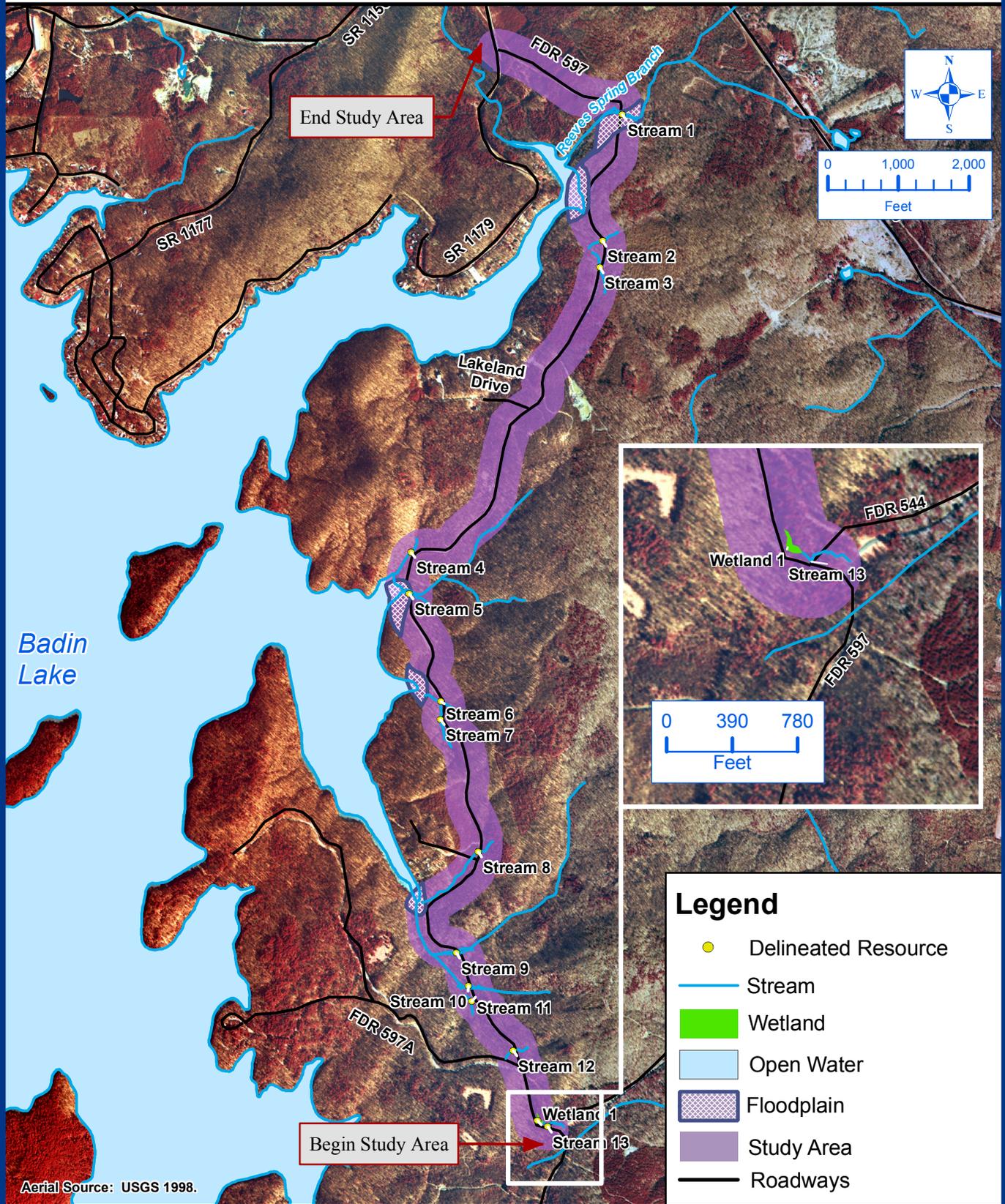
Streams, creeks, and tributaries within the project vicinity are part of the Yadkin-Pee Dee River basin. The Yadkin-Pee Dee River basin covers 7,221 square miles in portions of seventeen counties. The Yadkin Pee-Dee River basin headwaters are located in northwestern North Carolina and southern Virginia and flow through central North Carolina into South Carolina. The project study area falls within the USGS hydrologic unit codes 03040103050110 and 03040103050090, sub-basins 03-07-09 and 03-07-08.

Physical Characteristics of Surface Waters

Reeves Spring Branch, eleven unnamed tributaries (UTs) of the Yadkin-Pee Dee River, and one UT of Moccasin Creek represent the surface waters in the project study area (**Figure 3.8**).

Reeves Spring Branch and the UTs of the Yadkin-Pee Dee River flow into Badin Lake, which is an impoundment created by a dam on the Yadkin-Pee Dee River. The UT of Moccasin Creek flows into Moccasin Creek and eventually into the Yadkin-Pee Dee River. Stream classification determinations were made according to NCDWQ's *Identification Methods for the*

Figure 3.8 - Water Resources



Aerial Source: USGS 1998.

Origins of Intermittent and Perennial Streams (Version 3.1, February 28, 2005). These methods define a perennial stream channel as one that meets any of the following criteria: biological indicators such as fish, crayfish, amphibians, or clams are present in the channel; a numerical value of 30 or greater is determined based on the DWQ Stream Classification Form; or the presence, as later instar larvae, of more than one benthic macroinvertebrate that requires water for entire life cycles. Reeves Spring Branch, the UT of Moccasin Creek, and all the UTs to Yadkin-Pee Dee River except for UT3 are perennial.

To differentiate between intermittent and ephemeral streams, DWQ Stream Classification methodology uses a numerical cutoff value of 19. Streams that score between 19 and 30 are intermittent, while those with scores below 19 are considered ephemeral. The descriptions and surface water characteristics of each stream are summarized in **Table 3.6**.

Water Quality and Best Usage Classification

The NCDWQ classifies surface waters of the state based on their intended best uses. This section of the Yadkin-Pee Dee and its tributaries are classified as “WS-IV & B, CA” waters. Reeves Spring Branch is classified as “WS-IV CA,” while Moccasin Creek is classified as “WS-IV.” NCDWQ defines “Water Supply” (WS) as a surface water classification intended for waters used as sources of water supply. “WS-IV” waters are generally in moderately to highly developed watersheds or Protected Areas. NCDWQ defines class “B” as freshwaters protected for primary recreation and other uses suitable for Class C. NCDWQ defines class “C” as waters suitable for aquatic life propagation and maintenance of biological integrity, wildlife, secondary recreation, and agriculture. NCDWQ defines “CA” as a critical area, which is an area within a half mile of and draining into water supplies. Sources of water pollution that preclude any of these uses on either a short-term or long-term basis are considered to be violating water quality standards.

In accordance with Section 303(d) of the Clean Water Act (33 U.S.C 1344), states are required to develop a list of waterbodies not meeting federal water quality standards or that have impaired uses. North Carolina’s Section 303(d) list is a comprehensive public accounting of all impaired waterbodies in the state (NCDENR – DWQ, 2006). An impaired waterbody is one that does not meet water quality standards including designated uses, numeric and narrative criteria, and anti-degradation requirements defined in 40 CFR 131. No Section 303(d) waters are located within the project study area.

No High Quality Waters or Outstanding Resource Waters occur within one mile of the project study area. Montgomery County is not one of the 25 mountain counties designated by the North Carolina Wildlife Resources Commission (NCWRC) as containing Mountain Trout Waters. Montgomery County is not one of the 13 coastal counties under the jurisdiction of North Carolina's Coastal Area Management Act.

The Ambient Monitoring System (AMS) is a network of stream, lake, and estuarine water quality monitoring stations used for the collection of physical and chemical water data. Ambient water quality is not currently being monitored within the project study area. The nearest AMS station is located three miles from the project study area on the Uwharrie River. All AMS stations are located downstream of the study area.

Point and Nonpoint Source Discharges

Point source discharges are permitted through the National Pollutant Discharge Elimination System (NPDES) program. Dischargers are required by law to register for a permit. Based upon NCDWQ's database (accessed October 31, 2007), there are four NPDES permitted sites located downstream of the project study area, the closest of which is 2.5 miles away.

Nonpoint source (NPS) discharge refers to runoff that enters surface waters through stormwater, snowmelt, or atmospheric deposition. Land use activities such as land development, construction, mining operations, crop production, animal feeding lots, failing septic systems, landfills, roads, and parking lots are contributors of nonpoint source pollutants. The dominant land use within and surrounding the project study area is forest. There is little NPS runoff from the project study area except for runoff from FDR 597, associated parking, and the development of residential homes in the project vicinity.

Land clearing disturbs soils to a degree where they are susceptible to erosion, which can lead to sedimentation in streams. Loss of streamside vegetation, which can be caused by construction activities, also can contribute to erosion and sedimentation. Sediment is the most widespread cause of NPS pollution in North Carolina. Sedimentation can clog the gills and/or feeding mechanisms of benthic organisms, fish, and amphibian species. Sedimentation may also cover benthic macroinvertebrates with excessive amounts of sediment that inhibits their ability to obtain oxygen.

**Table 3.6
Stream Information**

Table 3.6 Stream Information											
	Description					Characteristics					
Stream Name	Stream Number	Top of Bank Width (ft)	Channel Depth (ft)	Water Clarity	Linear Feet Within Project Study Area	NCDWQ Stream Index #	Water Quality (all are WS-IV)	Benthos Present	NCDWQ Rating #	USACE Stream Quality Score	Classification
Reeves Spring Branch	1	15-20	4-6	Cloudy	356	03-07-08	CA	Yes	48.5	75	Perennial
UT Moccasin Creek	13	1	1	Cloudy	244	03-07-09	-	Yes	27.5	61	Intermittent
<i>Unnamed Tributaries to Yadkin-Pee Dee River</i>											
UT1	2	3-4	3-4	Cloudy	308	03-07-08	B, CA	Yes	38	74	Perennial
UT2	3	2-3	1-2	Cloudy	602	03-07-08	B, CA	Yes	31.5	69	Perennial
UT3	4	3-4	1	Cloudy	563	03-07-08	B, CA	No	22	64	Intermittent
UT4	5	6-8	2	Cloudy	350	03-07-08	B, CA	Yes	34	66	Perennial
UT5	6	2-3	2	Cloudy	225	03-07-08	B, CA	Yes	31.5	65	Perennial
UT6	7	4	1	Cloudy	730	03-07-08	B, CA	Yes	32	66	Perennial
UT7	8	4-6	1	Cloudy	1451	03-07-08	B, CA	Yes	30	64	Perennial
UT8	9	4-6	1.5	Cloudy	556	03-07-08	B, CA	Yes	30.5	64	Perennial

Table 3.6, continued

Table 3.6, continued											
	Description					Characteristics					
Stream Name	Stream Number	Top of Bank Width (ft)	Channel Depth (ft)	Water Clarity	Linear Feet Within Project Study Area	NCDWQ Stream Index #	Water Quality (all are WS-IV)	Benthos Present	NCDWQ Rating #	USACE Stream Quality Score	Classification
UT9	10	2	1	Cloudy	390	03-07-08	B, CA	Yes	26.5	61	Intermittent
UT10	11	2-3	1-2	Clear	315	03-07-08	B, CA	Yes	33	65	Perennial
UT11	12	2	1	Cloudy	348	03-07-08	B, CA	Yes	30.5	62	Perennial

Note: Class B waters are defined as freshwaters protected for primary recreations and other uses suitable for Class C. Class C waters are defined as waters suitable for aquatic life propagation and maintenance of biological integrity, wildlife, secondary recreation, and agriculture.

Buffer Rules

Currently, there are no buffer regulations in the Yadkin-Pee Dee River Basin. Therefore, no buffer rules apply for the proposed project.

3.6.1.4 Physiography and Soils

Physiography

Montgomery County is situated in the southeastern portion of the Piedmont physiographic province of North Carolina. The geography of the county consists predominantly of steep hills and valleys along most streams. The elevations in the project study area range from approximately 520 feet above Mean Sea Level (MSL) near the drainage ways to approximately 650 feet above MSL along ridgelines, as depicted on the Badin, North Carolina, United States Geological Survey (USGS) topographic quadrangle map (see **Figure 3.4**). The dark green areas of the map represent Uwharrie National Forest lands, while the light green areas represent privately owned land.

Soils

Soil associations are classified as a group of defined and named taxonomic soil units occurring together in an individual and characteristic pattern over a general region. The soils within an association generally vary in depth, slope, stoniness, drainage, and other characteristics. Based on information contained in the draft soil survey data for Montgomery County (2005), the soils within the project study area are composed of six soil series. The soils are mapped as Badin-Tarrus complex, Cullen silt loam, Wynnott-Enon complex, and Georgeville silt loam.

- The ***Badin series*** consists of moderately deep, well-drained, moderately permeable soils, which formed in residuum weathered from fine-grained metavolcanic rocks of the Carolina Slate Belt. These soils are located on the gently sloping to steep uplands of the project study area.
- Soils of the ***Tarrus series*** are deep, well-drained, moderately permeable soils, which formed in residuum from argillite or other fine-grained metavolcanic rocks of the Carolina Slate Belt. These soils are located on gently sloping to very steep uplands of the project study area.

- Soils of the *Cullen series* are very deep, well-drained, moderately permeable soils, which formed in residuum from mixed mafic and felsic crystalline rocks. These soils are located on upland ridgetops and side slopes of the project study area.
- The *Wynott series* consists of moderately deep, well-drained, slow permeability soils, which formed in residuum from gabbro, diorite, and other dark colored mafic rocks. These soils are located on gently sloping to steep uplands.
- The *Enon series* consists of very deep, well drained, slowly permeable soils on ridgetops and side slopes within the project study area. They have formed in clayey residuum weathered from mafic or intermediate igneous and high-grade metamorphic rocks such as diorite, gabbro, diabase, or hornblende gneiss or schist. Enon soils are located on gently sloping ridgetops and sloping to steep side slopes of the project study area.
- The *Georgeville series* consists of very deep, well-drained, moderately permeable soils, which formed in material mostly weathered from fine-grained metavolcanic rocks of the Carolina Slate Belt. These soils are located on gently sloping to moderately steep uplands within the project study area.

The Natural Resources Conservation Service defines a hydric soil as one that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil. Such soils usually support hydrophytic vegetation. Based on information obtained from the Montgomery County soil survey, none of the soils mapped within the project study area are designated by the NRCS as hydric; however, soils designated as non-hydric may develop hydric characteristics where the presence of surface and/or groundwater is conducive to the formation of a wetland area. Wetlands are discussed in detail in **Section 3.6.1.1** of this report.

3.6.2 Environmental Effects

3.6.2.1 No Action Alternative

Jurisdictional Topics

Direct Impact: There is no direct impact, adverse or beneficial, to “Waters of the US” (surface waters or wetlands) as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to “Waters of the US” (surface waters or wetlands) as a result of the No Action Alternative.

Floodplains

Direct Impact: There is no direct impact, adverse or beneficial, to the existing 100-year floodplains as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to the existing 100-year floodplains as a result of the No Action Alternative.

Water Resources

Direct Impact: The No Action Alternative would not adversely affect the physical characteristics of the surface waters or the existing water quality classifications. There are no point source discharges within one mile of the study area. Nonpoint source discharges from the existing, unpaved FDR 597 and surrounding residential developments would remain the same and would not be adversely impacted. There are no buffer regulations in the Yadkin-Pee Dee River Basin; therefore, neither alternative would be subject to surface water buffer rules. Overall, there would be no direct impact, adverse or beneficial, to water resources as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to water resources as a result of the No Action Alternative.

Physiography and Soils

Direct Impact: There is no direct impact, adverse or beneficial, to the study area’s physiography or soils as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to the study area’s physiography or soils as a result of the No Action Alternative.

3.6.2.2 Preferred Alternative

Jurisdictional Topics

Direct Impact: There is no direct impact, adverse or beneficial, to “Waters of the US” (surface waters and wetlands) as a result of the Preferred Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to “Waters of the US” (surface waters or wetlands) as a result of the Preferred Alternative.

Floodplains

Direct Impact: At Reeves Spring Branch, the proposed project is expected to increase the water surface elevation of the 100-year floodplain from the existing 519.11 feet above sea level to 519.25 feet above sea level. As a result, the proposed project would have a long-term, negligible, adverse impact on the existing drainage pattern and water courses.

Indirect Impact: There is no indirect impact, adverse or beneficial, to floodplains as a result of the Preferred Alternative.

Water Resources

No Section 303(d) waters are located within the project study area; no High Quality Waters or Outstanding Resource Waters occur within one mile of the project study area; Montgomery County is not one of the 25 mountain counties designated by the NCWRC as containing Mountain Trout Waters; and Montgomery County is not one of the 13 coastal counties under the jurisdiction of North Carolina’s Coastal Area Management Act.

There are no point source discharges within one mile of the study area. Because the Preferred Alternative is not expected to induce development beyond full build-out of current residential patterns in Wood Land Estates and Skiers Cove, additional point source discharge sites are not expected as a result of this project.

There are no buffer regulations in the Yadkin-Pee Dee River Basin, therefore, no buffer rules apply to the proposed project.

Direct Impact: The Preferred Alternative is expected to impact 651 linear feet of streams within the study area during construction, although it is not expected to change the physical characteristics of the streams permanently. Therefore, the overall impact would be temporary, minor, and adverse.

The Preferred Alternative would produce slightly more automobile-associated nonpoint source discharge because the automobile effluent – primarily oil and gas – would have less pervious

surface into which it can drain. Because the expected change in volume of traffic is long-term and negligible, the resulting automobile effluent would have only negligible adverse impacts; therefore the impact to water quality of the streams would be long-term and negligible. More information on expected future traffic volumes is found in **Section 3.9.1.4**.

The removal of streamside vegetation and placement of fill material during construction enhances erosion and possible sedimentation. Erosion and sedimentation may carry soils, toxic compounds, trash, and other materials into the aquatic communities at the construction site, although the presence of toxic compounds is unlikely given the length of time that the Uwharrie National Forest has been a protected area. Quick revegetation of these areas helps to reduce the impacts by stabilizing the underlying soils. Best Management Practices would be used during construction to prevent or minimize erosion, sedimentation, and other adverse water quality impacts. Material staging and stockpiling would occur in parking lots or other disturbed areas. Sedimentation and erosion impacts would be short-term and minor.

Indirect Impact: Privately-owned parcels along FDR 597 have already been subdivided. While the improvements to FDR 597 might increase the pace of development, there is not expected to be an increase in the amount of developable land due to the improvements. As such, the amount of cut and fill or of sedimentation and erosion is not expected to increase as an indirect result of the proposed project. Therefore, there is no indirect impact, adverse or beneficial, to water resources as a result of the Preferred Alternative.

Physiography and Soils

Direct Impact: The improvements proposed by the Preferred Alternative would require an estimated 45,149 cubic yards of excavation and 32,950 cubic yards of fill. The Preferred Alternative was chosen in part because of its lower design speed, which requires less excavation and fill than a higher design speed. The Preferred Alternative would cause long-term, minor, adverse impacts on physiography and soils.

Indirect Impact: Privately-owned parcels along FDR 597 have already been subdivided. While the improvements to FDR 597 might increase the pace of development, there is not expected to be an increase in the amount of developable land due to the improvements. As such, the amount

of cut and fill or of sedimentation and erosion is not expected to increase as an indirect result of the proposed project. Therefore, there is no indirect impact, adverse or beneficial, to physiography or soils as a result of the Preferred Alternative.

3.6.2.3 Cumulative Impact

The USFS has past and present projects that create or improve Forest facilities, the NCDOT TIP contains future projects to increase capacity and access, and three housing developments are slated for Montgomery County. Access to utilities will improve inside and outside the Forest boundaries, which increases development potential. An increase in visitors and potential residents would cause increased vehicle effluent, which could adversely affect wetlands and water quality. Although the USFS Draft *LM Plan* states that the USFS is avoiding building roads on new locations, paving existing gravel roads would cause more construction-related sedimentation, erosion, and possible loss of streamside vegetation. These impacts could adversely affect floodplains, water quality, and physiography and soils. The temporal boundary for which this document assesses cumulative impacts is 2015. It is unlikely that major changes in new residents and visitation would occur by that time. Given the temporal boundary, cumulative impacts on floodplains, water quality, and physiography and soils are judged to be long-term, minor, and adverse. There would be no cumulative effect on wetlands since there are no direct or indirect impacts.

3.7 Biological Communities

3.7.1 Affected Environment

This section describes the existing vegetation and associated wildlife that occur within the project study area. Descriptions of the terrestrial communities are presented in the context of plant community classifications based on Schafale and Weakley, *Classification of the Natural Communities of North Carolina, Third Approximation* (1990). Additional detail is in the *Natural Resources Technical Report* (October 2008).

The project study area is composed of five different vegetative communities based on topography, soils, hydrology, and disturbance. These systems are interrelated and, in many aspects, interdependent. Scientific nomenclature and common name (when applicable) are

provided for each plant and animal species listed. Subsequent references to the same organism include only the common name.

3.7.1.1 Plant Communities

Five plant communities were observed in the project study area: dry oak-hickory forest, Piedmont monadnock forest, dry-mesic oak-hickory forest, mesic mixed hardwood forest (Piedmont subtype), and maintained-disturbed areas. Maintained-disturbed areas do not correspond to any Schafale and Weakley (1990) community classification because the native vegetation has been removed and/or altered. Maintained-disturbed areas include the maintained road shoulders, utility corridors, and a clearcut located within the project study area. Figure 4 in the *Natural Resources Technical Report* shows terrestrial communities in the study area.

Dry-mesic oak-hickory forest is the dominant plant community within the project study area. This community is dominated by various oaks and hickories and is typically found on mid slopes with acidic soils. Dry-mesic oak-hickory forest grades into dry oak-hickory forest or Piedmont monadnock forest on the upper slopes and ridge lines. On the lower slopes and stream drainage ways dry-mesic oak hickory forest grades into mesic mixed hardwood forest.

Dry Oak-Hickory Forest

The dry oak-hickory forest is located on and near the ridgelines where site conditions are drier. The canopy is dominated by similar species to the dry-mesic oak-hickory but also includes blackjack oak (*Quercus marilandica*). The understory and herb layer is less diverse and dense due to the drier conditions.

Piedmont Monadnock Forest

Piedmont monadnock forest contains similar species to dry oak hickory forest except there is more chestnut oak (*Quercus montana*) in the canopy. These forests are also located on the ridgelines on the drier sites.

Dry-Mesic Oak-Hickory Forest

The canopy of the dry-mesic oak-hickory forest is dominated by white oak (*Quercus alba*), scarlet oak (*Quercus coccinea*), mockernut hickory (*Carya tomentosa*), southern red oak (*Quercus falcata*), and black oak (*Quercus velutina*) with scattered loblolly pine (*Pinus taeda*) and shortleaf pine (*Pinus echinata*). The midstory consists of a variety of smaller oaks, sourwood

(*Oxydendrum arboreum*), redbud (*Cercis canadensis*), and red maple (*Acer rubrum*). The understory is composed of a variety of shrubs including blueberries (*Vaccinium vacillans* and *V. corymbosum*), black haw (*Viburnum prunifolium*), dogwood (*Cornus florida*), fringe tree (*Chionanthus virginicus*), and strawberry bush (*Euonymus americanus*). Common vines include greenbriar (*Smilax rotundifolia*) and grape (*Vitis rotundifolia*). The herbaceous layer include Christmas fern (*Polystichum acrostichoides*), crane-fly orchid (*Tipularia discolor*), and Japanese honeysuckle (*Lonicera japonica*).

Mesic Mixed Hardwood Forest

The Piedmont subtype of mesic mixed hardwood forests generally occurs in areas along the drainage ways of the numerous streams. A variety of moist upland soils support mesic mixed hardwood forests. The canopy is composed of a variety of hardwoods similar to dry-mesic oak hickory forest except it includes such canopy species as poplar (*Liriodendron tulipifera*) and sweetgum (*Liquidambar styraciflua*). All of the stream drainage ways have a narrow fringe of mesic mixed hardwood forest on either side of the stream channel. Some common understory shrub species include witch-hazel (*Hamamelis virginiana*), spicebush (*Lindera benzoin*), buckeye (*Aesculus sylvatica*), Chinese privet (*Ligustrum sinense*), elderberry (*Sambucus canadensis*), tag alder (*Alnus serrulata*), musclewood (*Carpinus caroliniana*), dogwood, and sapling of American holly (*Ilex opaca*) and black cherry (*Prunus serotina*). Common herbs include *Hepatica* spp., *Hexastylis* spp., Solomon's seal (*Polygonatum biflorum*), jack-in-the-pulpit (*Arisaema triphyllum*), (*Microstegium virmineum*), partridge berry (*Mitchella repens*), cross vine (*Bignonia capreolata*), foamflower (*Tiarella cordifolia*), and black cohosh (*Cimicifuga racemosa*).

Agricultural/Maintained-Disturbed Area

The maintained-disturbed areas include the grassed shoulders along roads, utility corridors, and a clearcut located in the northern portion of the project study area. The vegetation within these areas varies with different management regimes. The road shoulders contain various turf grasses including fescue (*Festuca* spp.) and Bermuda grass (*Cynodon dactylon*) with scattered herbs, which include (*Lespedeza cuneata*), Japanese honeysuckle, *Galium* sp., goldenrod (*Solidago* sp.), green and gold (*Chrysogonum virginianum*), coral honeysuckle (*Lonicera sempervirens*), bluets (*Houstonia caerulea*), *Oxalis* spp., windflower (*Thalictrum thalictroides*), *Rumex* sp., henbit (*Lamium amplexicaula*), black-eyed Susan (*Rudbeckia hirta*), whorled coreopsis (*Coreopsis major*), (*Lespedeza bicolor*), rabbit tobacco (*Gnaphalium obtusifolium*), and onion (*Allium* sp.).

The clearcut included dog fennel (*Eupatorium capillifolium*), blackberry, *Aster* spp., smooth sumac (*Rhus glabra*), and winged sumac (*Rhus copallina*).

3.7.1.2 Terrestrial Wildlife

The continuous forested areas provide abundant cover and foraging habitat for a variety of wildlife. Evidence of white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphis virginiana*), and gray squirrel (*Sciurus carolinensis*) were observed during the site visit. Northern cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Parus carolinensis*), robin (*Turdus migratorius*), Carolina wren (*Thryothorus ludovicianus*), American crow (*Corvus brachyrhynchos*), wild turkey (*Meleagris gallopavo*), black vulture (*Coragyps atratus*), and turkey vulture (*Cathartes aura*) also were observed.

Common mammals that could be expected to utilize the project study area habitat include the striped skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), and various shrews, moles, bats, and mice.

Reptiles likely to use the area include the rat snake (*Elaphe obsoleta*), eastern box turtle (*Terrapene carolina*), slider (*Trachemys scripta*), five-lined skink (*Eumeces fasciatus*), southeastern five-lined skink (*Eumeces inexpectatus*), southern dusky salamander (*Desmognathus auriculatus*), eastern garter snake (*Thamnophis sirtalis sirtalis*), water snakes (*Nerodia* spp.), toads (*Bufo* spp.), leopard frogs (*Rana* spp.), tree frogs (*Hyla* spp.), and salamanders (*Ambystoma* spp.). Other aquatic species likely to be found in the project vicinity include the snapping turtle (*Chelydra serpentina*), eastern mud turtle (*Kinosternon subrubrum*), and the yellow belly slider (*Chrysemys scripta*).

3.7.1.3 Aquatic Habitats and Wildlife

Reeves Spring Branch, the associated tributaries of the Yadkin-Pee Dee River, the UT of Moccasin Creek, and Badin Lake provide aquatic habitat within the project study area. The physical characteristics (size and water quality) of a waterbody, as well as the adjacent terrestrial community, directly influence the faunal composition of the aquatic community. The quality of aquatic habitat within the project study area is expected to be high due to the lack of development within the watershed. Woody debris located throughout the streams provides habitat, shade, and concealment pockets for several aquatic species. Aquatic invertebrates are a major component of

aquatic ecosystems, as primary and secondary consumers, as well as prey items for organisms higher in the food chain.

Macrobenthos were observed in the streams within the project study area indicating good water quality. Aquatic insects observed include caddisflies (*Trichoptera*), stoneflies (*Plecoptera*), and midges (*Diptera*). Crayfish (*Decapoda*) were also observed.

Fish species expected to occur within the project vicinity include bullhead catfish (*Ameiurus* spp.), sunfish (*Lepomis* spp.), darters (*Etheostoma* spp.), shiners (*Notropis* spp. and *Cyprinella* spp.), and eastern mosquitofish (*Gambusia holbrooki*). In addition, Badin Lake supports warm water fish species such as largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), pickerel (*Esox niger*), and pumpkinseed (*Lepomis gibbosus*).

3.7.1.4 Rare and Protected Species

Federal law under the provisions of Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires that any action likely to adversely affect a federally protected species be subject to review by the USFWS. Separate state laws may protect additional species. These federal and state lists are all-inclusive for the Forest and include species outside of the project study area.

Field surveys were conducted by trained biologists on October 20, 2005 and April 19, 2006. The surveys included an assessment of the presence of the federally listed species within the proposed project study area. A letter was received from Pete Benjamin of USFWS (May 22, 2006; see **Appendix B**) stating that this project is not expected to impact any threatened and endangered species.

Field surveys were only done for those species protected under federal law by the Endangered Species Act. Other rare or protected species that could be present in the study area are identified through county-wide database lists and coordination with USFWS and NCDENR.

Federally Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the ESA. An endangered species is one that is in danger of extinction throughout all,

or a significant portion, of its range. According to the January 31, 2008, USFWS internet listing, there are four endangered species listed for federal protection in Montgomery County: Schweinitz's sunflower (*Helianthus schweinitzii*), the eastern cougar (*Puma concolor cougar*), the red-cockaded woodpecker (*Picoides borealis*), and the smooth coneflower (*Echinacea laevigata*). More detailed information on these species is detailed below. None of these listed endangered species are aquatic species.

A threatened species is likely to become endangered within the foreseeable future throughout all, or a significant portion, of its range. Currently, there are no threatened species, proposed endangered species, or proposed threatened species listed for federal protection in Montgomery County.

"Critical habitat," as defined in the ESA, is a term for habitat given special protection for the benefit of a listed species. Critical habitat is not designated for any species listed in Montgomery County, North Carolina.

Schweinitz's Sunflower

Schweinitz's sunflower is a tall perennial herb growing from 3 to 6 feet in height with a tuberous root system. The stems are usually solitary, branching only at or above mid-stem. The stem is usually pubescent and purple. The yellow disk and ray flowers are formed on small heads, and the disc is a little more than 0.5 inch across. The petals are 0.75 to a little less than 1.25 inches. The leaves are opposite with the uppermost leaves on the stem alternate. The leaf is scabrous (rough) above and tomentosa (downy) underneath. Leaf margins are entire or with a few obscure serrations and also are somewhat revolute.

Schweinitz's sunflower is typically found in open habitats where naturally occurring periodic fires suppress competition and allow sufficient sunlight. Schweinitz's sunflower also inhabits maintained areas such as power line rights of way, railroad rights of way, and roadsides where regular maintenance simulates the effects of fires. Schweinitz's sunflower grows from a variety of soil types but generally is found growing on shallow, poor, clayey, and/or rocky soils, especially those derived from mafic rocks (USFWS 1994).

All suitable habitats for Schweinitz's sunflower within the study corridor were surveyed during its flowering period. No populations of Schweinitz's sunflower were found during this search. The

North Carolina Natural Heritage Program's (NCNHP) database (reviewed January 22, 2006) documents the location of several known populations of the sunflower within 0.5 miles west and southwest of the study corridor. As of August 2008, no new occurrences were recorded within two miles of the project corridor.

Eastern Cougar

The eastern cougar is a large, unspotted, long-tailed cat. Its body and legs are a uniform fulvous or tawny hue with a pale reddish or reddish-white belly. The inside of this cat's ears are light-colored, with blackish color behind the ears.

Cougars feed primarily on deer, but their diet may also include small mammals, wild turkeys, and occasionally domestic livestock, when available. Their primary habitat need is large wilderness areas with an adequate food supply. Male cougars of other subspecies have been observed to occupy a range of 25 square miles or more and females from five to 20 square miles.

Although there are large tracts of forested land available, no eastern cougars have been sighted within the last 50 years in Montgomery County. The eastern cougar is considered by many to be extirpated from North Carolina. In addition, NCNHP records (August 2008) did not document the location of any known populations of the eastern cougar in or immediately adjacent to the study corridor.

Red-Cockaded Woodpecker

Typically, red-cockaded woodpeckers inhabit the Coastal Plain plant communities dominated by large tracts (i.e., 25+ acres) of pine trees. Suitable red-cockaded woodpecker foraging habitat includes pine or pine/hardwood stands 30 years of age or older. Nesting occurs in stands of mature 60 year-old or older pine trees, usually longleaf pine (*Pinus palustris*), with a sparsely vegetated understory less than 20 feet tall. The birds nest in live trees that are identifiable by the resin that surrounds the nesting cavity.

Although there are large pines scattered throughout the project study area, there is no suitable habitat available for red cockaded woodpeckers either adjacent to or within the project study area. No cavity trees or individual birds were observed during the field surveys. NCNHP records (August 2008) did not document the location of any known populations of the red-cockaded woodpecker in or immediately adjacent to the study corridor.

Smooth Coneflower

Smooth coneflower is a tall rhizomatous perennial herb that grows up to 5 feet in height. The stems are smooth with leaves that are lance-ovate to elliptic. The smooth to slightly rough leaves are acuminate, i.e., taper to a slender point, with often coarse serrations. The ray flowers (2 to 3 inches long) are light pink to purple, usually drooping. Flower heads are usually solitary with flowering occurring from May through July (USFWS 2005).

Smooth coneflower typically inhabits open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights of way. The smooth coneflower is associated with the gabbro and diabase parent material soil types, which are usually rich in magnesium and calcium (USFWS 1995).

All suitable habitats for smooth coneflower within the study corridor were surveyed. No populations of smooth coneflower were found during this search. The search area was not within a mile of other known location of the plant. NCNHP records (August 2008) did not document the location of any known populations of the smooth coneflower in or immediately adjacent to the study corridor.

Candidate Species

Candidate species are defined as species under consideration for listing for which there is sufficient information to support listing as threatened or endangered; however, they have not yet been added to the Threatened and Endangered Species list. Candidate species are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. The status of these species may be upgraded at any time, which is why they are included here for consideration. Two species are listed under consideration for listing and are noted here as candidate species. These species are the Yadkin River goldenrod (*Solidago plumosa*) and the Georgia aster (*Symphotrichum georgianum*). The study area provides suitable habitat for both Georgia aster and Yadkin River goldenrod.

Federal Species of Concern

There are 15 Federal Species of Concern (FSC) listed by the USFWS for Montgomery County. (The USFWS list was updated by the USFWS January 31, 2008.) FSC are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until

they are formally proposed or listed as Threatened or Endangered. FSC are defined as species under consideration for listing for which there is insufficient information to support listing as threatened or endangered. The status of these species may be upgraded at any time, which is why they are included here for consideration. **Table 3.7** lists the federal species of concern and the existence of suitable habitat within the project study area.

State Species

Organisms which are listed as Endangered (E), Threatened (T), or Special Concern (SC) by the NCDENR Natural Heritage Program (NHP) list of Rare Plant and Animal Species are afforded state protection under the State Endangered Species Act of 1979. The state definition for an endangered plant species is “any species or higher taxon of plant whose continued existence as a viable component of the State's flora is determined to be in jeopardy” (GS 19B 106: 202.12). The state definition for an endangered animal species is “any native or once-native species of wild animal whose continued existence as a viable component of the State's fauna is determined by the NCWRC to be in jeopardy or any species of wild animal determined to be an 'endangered species' pursuant to the Endangered Species Act” (Article 25 of Chapter 113 of the General Statutes; 1987). **Table 3.8** shows species protected by the State of North Carolina.

The study area provides suitable aquatic and terrestrial habitat for many of the state-listed species; however, field surveys were not conducted to determine the presence of these species. NCNHP records (reviewed on August 18, 2008) document occurrences of 10 state-listed species within a mile of the study area: piedmont indigo-bush (*Amorpha schwerinii*), thin-pod white wild indigo (*Baptisia albescens*), piedmont horsebalm (*Collinsonia tuberosa*), littleleaf sneezeweed (*Helenium brevifolium*), smooth sunflower (*Helianthus laevigatus*), Schweinitz's sunflower, glade wild quinine (*Parthenium auriculatum*), Georgia aster, buffalo clover (*Trifolium reflexum*), and four-toed salamander (*Hemidactylium scutatum*).

Table 3.7			
Federal Species of Concern Listed for Montgomery County, North Carolina			
Common Name	Scientific Name	Habitat	Habitat Present
Bog spicebush	<i>Lindera subcoriacea</i>	Streamhead pocosins, white cedar swamps, seepage slopes	No
Atlantic pigtoe	<i>Fusconaia masoni</i>	Most Atlantic drainages, in lower Piedmont and upper Coastal Plain; also in Black River in lower Coastal Plain	Yes
Carolina creekshell	<i>Villosa vaughaniana</i>	Pee Dee and Catawba systems (endemic to North Carolina and adjacent South Carolina)	Yes
Savannah lilliput	<i>Toxolasma pullus</i>	Number of Atlantic drainages	Yes
Yellow Lampmussel	<i>Lampsilis cariosa</i>	Number of river systems; mainly near the Fall Line	Yes
Carolina darter	<i>Etheostoma collis collis</i>	Streams in the Yadkin - Pee Dee and Catawba drainages	Yes
Northern pine snake	<i>Pituophis melanoleucus melanoleucus</i>	Dry and sandy woods, mainly in pine/oak sandhills	No
Pinewoods Darter	<i>Etheostoma mariae</i>	Streams of Lumber drainage, mainly in the sandhills; perhaps in adjacent Pee Dee drainage	No
Sandhills chub	<i>Semotilus lumbee</i>	Streams in the sandhills	No
Bog Oatgrass	<i>Danthonia epilis</i>	Seepage bogs, wet seepy powerlines	No
Piedmont Aster	<i>Eurybia mirabilis</i>	Rich slopes and bottomlands	Yes
Ravine sedge	<i>Carex impresinervia</i>	Rich alluvial forests	No
American eel	<i>Anguilla rostrata</i>	Catadromous	No
Brook floater	<i>Alasmidonta varicosa</i>	Piedmont systems and along Blue Ridge escarpment of Catawba River system	Yes
Carolina redbhorse	<i>Moxostoma sp. 2</i>	Yadkin-Pee Dee River system	Yes

Source: US Fish and Wildlife Service

**Table 3.8
State Species Protection List for Montgomery County, North Carolina**

Common Name	Scientific Name	State Status	Federal Status	County Status	Habitat	Habitat Present
Invertebrate Animal						
Carolina Elktoe	<i>Alasmidonta robusta</i>	EX	None	Obscure	Small, freshwater creek with varying substrates	Yes
A Bivalve (Uwharries region)	<i>Alasmidonta sp.2</i>	SR	None	Current	Small, freshwater creek with varying substrates	Yes
Triangle Floater	<i>Alasmidonta undulata</i>	T	None	Current	Big rivers with moderate current in muddy sand; small streams with slow current in varying substrates	Yes
Greensboro Burrowing Crayfish	<i>Cambarus catagius</i>	SC	None	Current	Permanent or temporary ponds and swamps	Yes
Roanoke Slabshell	<i>Elliptio roanokensis</i>	T	None	Current	Large rivers or their tributaries in near-shore troughs with sand/gravel substrate	No
Mottled Duskywing	<i>Erynnis martialis</i>	SR	None	Current	Hilly areas near woods or in open brushy fields	No
Atlantic Pigtoe	<i>Fusconaia masoni</i>	E	FSC	Current	Most Atlantic drainages, in lower Piedmont and upper Coastal Plain; also in Black River in lower Coastal Plain	Yes
Spine-crowned Clubtail	<i>Gomphus abbreviatus</i>	SR	None	Obscure	Lotic; clear rivers and streams	Yes
Yellow Lampmussel	<i>Lampsilis cariosa</i>	E	FSC	Current	Number of river systems; mainly near the Fall Line	Yes
Eastern Lampmussel	<i>Lampsilis radiata</i>	T	None	Current	Small streams, large rivers, ponds, lakes in a wide variety of substrate types.	Yes
Green Floater	<i>Lasmigona subviridis</i>	E	FSC	Current	Pools and calm water areas in gravel and sand in 1-4 ft of water	Yes
Northern Oak Hairstreak	<i>Satyrium favonius ontario</i>	SR	None	Current	Open woodlands, oak groves, cedar barrens	Yes
Creepers	<i>Strophitus undulatus</i>	T	None	Current	Wide distribution in streams, rivers, lakes, and ponds	Yes

Table 3.8, continued						
Common Name	Scientific Name	State Status	Federal Status	County Status	Habitat	Habitat Present
Savannah Lilliput	<i>Toxolasma pullus</i>	E	FSC	Current	Number of Atlantic drainages	Yes
Notched Rainbow	<i>Villosa constricta</i>	SC	None	Current	Tributary and headwater creeks and rivers with coarse substrate within its historical range	Yes
Eastern Creekshell	<i>Villosa delumbis</i>	SR	None	Current	Pools of small creeks and rivers in mud or soft sand	Yes
Carolina Creekshell	<i>Villosa vaughaniana</i>	E	FSC	Current	Pee Dee and Catawba systems (endemic to North Carolina and adjacent South Carolina)	Yes
Agoyan Cataract Moss	<i>Scopelophila cataractae</i>	SR-D	None	Current	Copper rich soils	Yes
Vascular Plant						
Piedmont Indigo-bush	<i>Amorpha schwerinii</i>	SR-T	None	Current	Xeric and rocky forest and woodlands	Yes
Southern Anemone	<i>Anemone berlandieri</i>	SR-P	None	Current	Forested slopes with shallow, circumneutral soils	Yes
Thick-pod White Wild Indigo	<i>Baptisia alba</i>	SR-P	None	Current	Open woodlands, clearings	Yes
Thin-pod White Wild Indigo	<i>Baptisia albescens</i>	SR-P	None	Current	Open pine or pine-oak woodlands, barrens, clearings, banks, roadsides	Yes
Prairie Blue Wild Indigo	<i>Baptisia minor var. aberrans</i>	T	None	Current	Short-grass plains, prairie relicts, pastures; calcareous-clay, rocky slopes, limestone bluffs	No
American Barberry	<i>Berberis canadensis</i>	SR-T	None	Current	Open forests and glades on basic soils	Yes
Dissected Toothwort	<i>Cardamine dissecta</i>	SR-P	None	Current	Rich woods, cove forests, bottomlands	No
Ravine Sedge	<i>Carex impressinervia</i>	SR-T	FSC	Current	Rich alluvial forests	No
Carolina Thistle	<i>Cirsium carolinianum</i>	SR-P	None	Current	Forests and disturbed areas, mostly on basic soils	Yes
Piedmont Horsebalm	<i>Collinsonia tuberosa</i>	SR-P	None	Current	Rich hardwood forests	Yes
Bog Oatgrass	<i>Danthonia epilis</i>	SR-T	FSC	Current	Seepage bogs, wet seepy powerlines	No

Table 3.8, continued

Common Name	Scientific Name	State Status	Federal Status	County Status	Habitat	Habitat Present
A Witch Grass	<i>Dichanthelium annulum</i>	SR-P	None	Historical	Dry sandy or rocky open woods and borders of thickets	Yes
Eastern Shooting-Star	<i>Dodecatheon meadia</i> var. <i>meadia</i>	SR-P	None	Current	Rich, rocky woods, over mafic or calcareous rocks	Yes
Smooth Coneflower	<i>Echinacea laevigata</i>	E-SC	E	Historical	Open woods, cedar barrens, roadsides/rights of way, clearcuts, dry limestone bluffs,	Yes
Piedmont Aster	<i>Eurybia mirabilis</i>	SR-T	FSC	Current	Rich slopes and bottomlands	Yes
Large Witch-alder	<i>Fothergilla major</i>	SR-T	None	Current	Dry ridgetop or bluff forests	No
Indian Physic	<i>Gillenia stipulata</i>	SR-P	None	Current	Forests and open woods, mainly over mafic rocks	Yes
Littleleaf Sneezeweed	<i>Helenium brevifolium</i>	E	None	Current	Bogs, seeps, riverbanks	Yes
Smooth Sunflower	<i>Helianthus laevigatus</i>	SR-P	None	Current	Open woods and roadsides/rights of way	Yes
Schweinitz's Sunflower	<i>Helianthus schweinitzii</i>	E	E	Current	Open habitats with fire or regular maintenance (roadsides/rights of way)	Yes
Sarvis Holly	<i>Ilex amelanchar</i>	SR-P	None	Current	Blackwater swamps and riverbanks	No
Bog Spicebush	<i>Lindera subcoriacea</i>	T	FSC	Current	Streamhead pocosins, white cedar swamps, seepage slopes	No
Glade Wild Quinine	<i>Parthenium auriculatum</i>	SR-T	None	Current	Glades and openings over mafic rocks	Yes
Heller's Rabbit-Tobacco	<i>Pseudognaphalium helleri</i>	SR-P	None	Current	Dry woodlands, openings, and glades, especially over mafic rocks	Yes
Bluff Oak	<i>Quercus austrina</i>	SR-P	None	Current	Bluff and bottomland forests	No
Pursh's Wild-petunia	<i>Ruellia purshiana</i>	SR-O	None	Current	Glades and woodlands, especially over mafic or calcareous rocks	Yes
Azure Sage	<i>Salvia azurea</i>	SR-P	None	Current	Sandhills	No
Yadkin River Goldenrod	<i>Solidago plumosa</i>	E	C	Current	Riverside rocks	Yes
Western Rough Goldenrod	<i>Solidago radula</i>	SR-P	None	Current	Dry woodlands, over mafic rocks	Yes

Table 3.8, continued

Common Name	Scientific Name	State Status	Federal Status	County Status	Habitat	Habitat Present
Freshwater Cordgrass	<i>Spartina pectinata</i>	SR-P	None	Historical	Freshwater marshes	No
A Hedge-nettle	<i>Stachys sp. 1</i>	SR-T	None	Current	Sandy edges of forested floodplains	Yes
Mountain Camellia	<i>Stewartia ovata</i>	SR-P	None	Current	Bluffs and forests, usually with rhododendrons	Yes
Georgia Aster (=Aster georgianus)	<i>Symphotrichum georgianum</i>	T	C	Current	Open woods and roadsides	Yes
Virginia Spiderwort	<i>Tradescantia virginiana</i>	SR-P	None	Historical	Rich woods on circumneutral soils	Yes
Chapman's Redtop	<i>Tridens chapmanii</i>	SR-P	None	Current	Dry pine and oak woods, sandy roadsides	Yes
Buffalo Clover	<i>Trifolium reflexum</i>	SR-T	None	Current	Open woods and clearings	Yes
Prostrate Blue Violet	<i>Viola walteri</i>	SR-T	None	Current	Rich cove forests	Yes
Vertebrate Animal						
Mole Salamander	<i>Ambystoma talpoideum</i>	SC	None	Current	Breeds in fish-free semi-permanent woodland ponds; forages in adjacent woodland	No
Timber Rattlesnake	<i>Crotalus horridus</i>	SC	None	Obscure	Rocky upland forests	Yes
Carolina Darter - Central Piedmont Population	<i>Etheostoma collis pop. 1</i>	SC	FSC	Current	Streams in the Yadkin - Pee Dee and Catawba drainages	Yes
Pinewoods Darter	<i>Etheostoma mariae</i>	SC	FSC	Current	Streams of Lumber drainage, mainly in the sandhills; perhaps in adjacent Pee Dee drainage	No
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T	None	Current	Mature forests near large bodies of water	Yes
Four-toed Salamander	<i>Hemidactylium scutatum</i>	SC	None	Current	Wetlands (pools, bogs) in hardwood forests	Yes
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SC	None	Current	Open grasslands, herbaceous fields, pastures	No

Table 3.8, continued						
Common Name	Scientific Name	State Status	Federal Status	County Status	Habitat	Habitat Present
Coachwhip	<i>Masticophis flagellum</i>	SR	None	Current	Dry/sandy woods in pine/oak sandhills	No
Red-cockaded Woodpecker	<i>Picoides borealis</i>	E	E	Current	Longleaf Pine or Pine/Hardwood stands 60+ yrs old with sparsely vegetated understory	No
Northern Pine Snake	<i>Pituophis melanoleucus melanoleucus</i>	SC	FSC	Current	Dry and sandy woods, mainly in pine/oak sandhills	No
Eastern Cougar	<i>Puma concolor cougar</i>	E	E	Historical	Large wilderness areas	Yes
Sandhills Chub	<i>Semotilus lumbee</i>	SC	FSC	Historical	Streams in the sandhills	No
Pigmy Rattlesnake	<i>Sistrurus miliarius</i>	SC	None	Current	Pine/Oak Forests	Yes

Source: NC Natural Heritage Program, database updated on May 4th, 2008

3.7.1.5 Significant Natural Heritage Areas

The Registry of Natural Heritage Areas inventories areas with significant natural areas and diversity. The registry is a non-regulatory program that strives to protect examples of unique and diverse natural features. There is one Significant Natural Heritage Area within the study area, the West Branch/Eldorado Forest, shown on **Figure 3.8**. According to the North Carolina Natural Heritage Program (letter dated May 30, 2006 in **Appendix B**), this area contains a diverse collection of typical and rare Piedmont natural communities in exemplary condition.

3.7.1.6 Exotic Species

Exotic species are those species that are not part of the indigenous ecosystems. These non-native species are of concern because they can be aggressive invaders and can out-compete native species. While field surveyors did not search for exotic species during fieldwork, surveyors noted the presence of Japanese honeysuckle and Chinese privet. **Table 3.9** below shows the invasive species about which the USFS is most concerned at the Forest (list provided via email from Gary Kauffman, USFS, April 1, 2008).

Common Name	Scientific Name
Honeysuckle shrubs	<i>Lonicera</i> shrubs (<i>standishii/maackii/morrowii</i>)
Bicolor Lespedeza	<i>Lespedeza bicolor</i>
Sericea Lespedeza	<i>Lespedeza cuneata</i>
Chinese Privet	<i>Ligustrum sinense</i>
Japanese Clover	<i>Kummerowia striata</i>
Russian/Autumn Olive	<i>Elaeagnus umbellata/pungens</i>
Multiflora Rose	<i>Rosa multiflora</i>
Johnson Grass	<i>Sorghum halepense</i>
Stilt Grass	<i>Microstegium virmineum</i>
Princess Tree	<i>Paulownia tomentosa</i>
Tree-of-Heaven	<i>Ailanthus altissima</i>
Chinese Silver Grass	<i>Miscanthus sinense</i>
Mimosa	<i>Albizia julibrissin</i>
Japanese Honeysuckle	<i>Lonicera japonica</i>

Source: NC Wildlife Resources Commission

3.7.2 Environmental Effects

3.7.2.1 No Action Alternative

Plant Communities

Direct Impact: There is no direct impact, adverse or beneficial, to existing plant communities as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to existing plant communities as a result of the No Action Alternative.

Terrestrial Wildlife

Direct Impact: There is no direct impact, adverse or beneficial, to existing terrestrial wildlife as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to existing terrestrial wildlife as a result of the No Action Alternative.

Aquatic Habitat and Wildlife

Direct Impact: There is no direct impact, adverse or beneficial, to existing aquatic habitat and wildlife as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to existing aquatic habitat and wildlife as a result of the No Action Alternative.

Rare and Protected Species

Direct Impact: There is no direct impact, adverse or beneficial, to rare and protected species as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to rare and protected species as a result of the No Action Alternative.

Significant Natural Heritage Areas

Direct Impact: There is no direct impact, adverse or beneficial, to any significant natural heritage areas as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to any significant natural heritage areas as a result of the No Action Alternative.

Exotic Species

Direct Impact: The No Action Alternative would not perpetuate exotic species in the area. Therefore, there is no direct impact, adverse or beneficial, to existing plant communities as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to exotic species as a result of the No Action Alternative.

3.7.2.2 Preferred Alternative

Plant Communities

Any changes to maintained-disturbed areas are not noteworthy because the original, native plant communities no longer exist in these areas.

Direct Impact: The primary plant communities affected by the proposed Preferred Alternative would be the dry-mesic oak-hickory forest, and the mesic mixed hardwood forest. Improvements at stream channels would affect the mesic mixed hardwood forest, and remaining improvements would affect the dry-mesic oak-hickory forest. The amount of forestland that would be adversely impacted at any given point depends on the width of the existing road, which varies, as well as construction limits of the proposed widening. The proposed project would cause long-term, minor, adverse impacts to 6.54 acres of forestland.

Indirect Impact: There is no indirect impact, adverse or beneficial, to plant communities as a result of the Preferred Alternative.

Terrestrial Wildlife

Direct Impact: Loss of wildlife is an unavoidable aspect of development. Temporary fluctuations in populations of animal species that utilize communities within the study area are anticipated during the course of construction of the Preferred Alternative. Slow-moving, burrowing, and/or subterranean organisms may be directly impacted by construction activities, while mobile organisms may be displaced to adjacent communities. The Preferred Alternative would cause short-term, minor, adverse impacts to terrestrial wildlife.

Indirect Impact: There is no indirect impact, adverse or beneficial, to terrestrial wildlife as a result of the Preferred Alternative.

Aquatic Habitat and Wildlife

Aquatic organisms are acutely sensitive to changes in their environment. Environmental impacts from construction of a new bridge could result in long term or irreversible effects. Impacts usually associated with in-stream construction include alterations to the substrate and impacts to adjacent streamside vegetation. Such disturbances within the substrate lead to increased siltation, which can clog the gills and/or feeding mechanisms of benthic organisms, fish, and amphibian

species. Siltation may also cover benthic macroinvertebrates with excessive amounts of sediment that inhibit their ability to obtain oxygen.

Increased light penetration from the removal of streamside vegetation may increase water temperatures. Warmer water contains less oxygen, thus reducing aquatic life dependent on high oxygen concentrations. Quick revegetation of these areas helps to reduce the impacts by stabilizing the underlying soils.

Direct Impact: Overall impacts to aquatic habitat and wildlife are judged to be long-term, minor, and adverse.

Indirect Impact: There is no indirect impact, adverse or beneficial, to aquatic habitat and wildlife as a result of the Preferred Alternative.

Rare and Protected Species

Direct Impact: Three of the four federally protected species listed for Montgomery County have suitable habitat within the Uwharrie National Forest. Based on fieldwork conducted by a trained biologist on October 20, 2005, and April 19, 2006, no populations of these species were found. There is no suitable habitat for the red-cockaded woodpecker within one mile of the project study area. As such, the proposed project would have no impact, adverse or beneficial, on rare and protected species. Other rare or protected species identified that had suitable habitat present in the study area were assumed to be present in order to complete the impact analysis.

Impacts to any of the Candidate Species, Federal Species of Concern, and state-listed species that occur in the study area are assumed to be minor. If present, non-mobile species, and those with limited mobility will be impacted during removal of the existing vented ford, construction of the bridge at Reeves Spring Branch, and the widening of the existing roadway. Mobile species will move into directly adjacent, similar habitat during construction. Due to the nature of the project, as well as the existing conditions of the proposed project corridor and surrounding area, no significant reduction of habitat will occur.

Indirect Impact: There is no indirect impact, adverse or beneficial, to rare and protected species as a result of the Preferred Alternative.

Significant Natural Heritage Areas

Any changes to maintained-disturbed areas are not noteworthy because the original, native plant communities no longer exist in these areas.

Direct Impact: There is one significant natural heritage area that would be impacted by the Preferred Alternative, the West Branch/Eldorado Forest. The amount of natural heritage area that would be adversely impacted at any given point depends on the width of the existing road, which varies, as well as construction limits of the proposed widening. Correspondence from the North Carolina Natural Heritage Program (letter dated May 30, 2006 in **Appendix B**) indicates that this impact is considered insignificant if it is confined to a narrow area immediately adjacent to the existing road right of way. Cut and fill was minimized through this area to reduce impacts. Therefore, the proposed project would cause long-term, minor, adverse impacts to approximately 3.1 acres of natural forests within this area.

Indirect Impact: There is no indirect impact, adverse or beneficial, to any significant natural heritage areas as a result of the Preferred Alternative.

Exotic Species

Direct Impact: Any new disturbance has the potential to create a suitable environment for aggressive non-native species to become established. During construction it is important that any materials brought into the Forest are free of exotics. In accordance with Executive Order 13112: Invasive Species, signed by President Clinton on February 3, 1999, the FHWA, which oversees the construction of the proposed action, would require that only invasive-free mulches, topsoil, and seed mixes be used on the project. The final construction plans would include directions and specifications to the Contractor for revegetating disturbed areas with non-invasive species as specified by the USFS. The continued absence of exotic species is beneficial. Therefore, the Preferred Alternative would cause a long-term, negligible, beneficial impact on exotic species.

Indirect Impact: There is no indirect impact, adverse or beneficial, to exotic species as a result of the Preferred Alternative.

3.7.2.3 Cumulative Impact

The USFS has past and present projects that create or improve Forest facilities, the NCDOT TIP contains future projects to increase capacity and access, and three housing developments are slated for Montgomery County. Access to utilities will improve inside and outside the Forest boundaries, which increases development potential. Increased visitation could negatively impact air quality for ozone via increased vehicular and boat emissions. Because Montgomery County is in attainment for ozone, however, it is unlikely that the amount of increased ozone would be great enough to adversely impact plant communities. Aquatic species and habitat, particularly in the streams, could be adversely impacted by construction via sedimentation and erosion. The USFS, however, is committed to protecting Forest resources by using aggressive sedimentation and erosion protection plans and practices, so it is unlikely that these impacts would be more than temporary. Evaluations of impacts on rare and protected species would be done by project, so few future direct impacts are expected. Suitable habitat for rare and protected species exists in the area, and at some point in the future, populations could appear. If such an event occurs, an increase in residents and visitors to the FDR 597 corridor could adversely affect these vulnerable species. Within the temporal boundaries (2015), however, it is unlikely that Forest development and/or visitor use would be great enough to have a major adverse impact on these species. Increasing visitation to and development within the Forest could give rise to more exotic species, although again, the USFS' commitment to preserving Forest resources should serve to lower this risk. The combination of improving Forest facilities, increasing capacity and access, and increasing the potential of new residents could lead to increased use of the Uwharrie National Forest by the general public. This increased use supports the USFS' motto ("Caring for the Land and Serving People"). Overall, the cumulative impact on the human environment is long-term, minor, and adverse.

3.8 Human Environment

3.8.1 *Affected Environment*

3.8.1.1 Aesthetics and Viewsheds

Most of the area surrounding FDR 597 is forested. There are several locations where Badin Lake can be seen from the road such as south of the vented ford, near Holt's Picnic Area, and south of Skiers Cove Road. At Holt's Picnic Area, there is a small parking area for motorists to stop.

Currently FDR 597 is an unpaved road and dust from vehicles may diminish the visual quality of the area.

3.8.1.2 Air Quality

Montgomery County is currently in attainment with all U.S. Environmental Protection Agency (USEPA) air quality standards, including standards for fine particulate matter. The county is therefore designated as a non-attainment area. Particulate matter is a general term used for a mixture of solid particles and liquid droplets in the air. It can include aerosols, smoke, fumes, dust, ash and pollen. Particulate matter that is 2.5 microns in diameter or less is also known as fine particulate matter.

3.8.1.3 Noise

The area surrounding FDR 597 is relatively quiet, with only infrequently passing motorists and motorboats on Badin Lake creating noise in the area.

3.8.1.4 Energy

Energy requirements associated with the study area relate to the amount of energy that is required to operate and maintain buildings and other permanent facilities. These include any outbuildings at Uwharrie National Forest, the operation of maintenance vehicles and equipment (grounds maintenance equipment), and the operation of USFS equipment. Energy also is required for the operation of motor vehicles traversing the study area.

Energy sources utilized include electricity and petroleum products (heating oils and fuels). The operations related to the study area are dependent upon the continued availability of the existing energy sources.

3.8.1.5 Utilities

Progress Energy provides electricity and Sprint provides telephone service to Forest residents. Although the Town of Troy provides water, sewer, and solid waste pickup for Town residents, the Forest is outside of the town limits, and Forest residents do not receive these services. Charter Communications provides cable service to Town residents but not to residents immediately adjacent to the Forest. **Figure 3.9** shows the location of electric and telephone lines.

3.8.2 Environmental Effects

3.8.2.1 No Action Alternative

Aesthetics and Viewsheds

Direct Impact: The No Action Alternative would not affect existing aesthetics or viewsheds in the study area. Dust from the unpaved roadway would continue to detract from the view. The impact, therefore, is long-term, negligible, and adverse.

Indirect Impact: There is no indirect impact, adverse or beneficial, to the existing aesthetics or viewsheds as a result of the No Action Alternative.

Air Quality

Direct Impact: Dust from the existing gravel-surfaced road would continue to adversely affect air quality. Therefore, the impact is long-term, negligible, and adverse.

Indirect Impact: There is no indirect impact, adverse or beneficial, to air quality as a result of the No Action Alternative.

Noise

Direct Impact: There is no direct impact, adverse or beneficial, to existing noise as a result of the No Action Alternative.

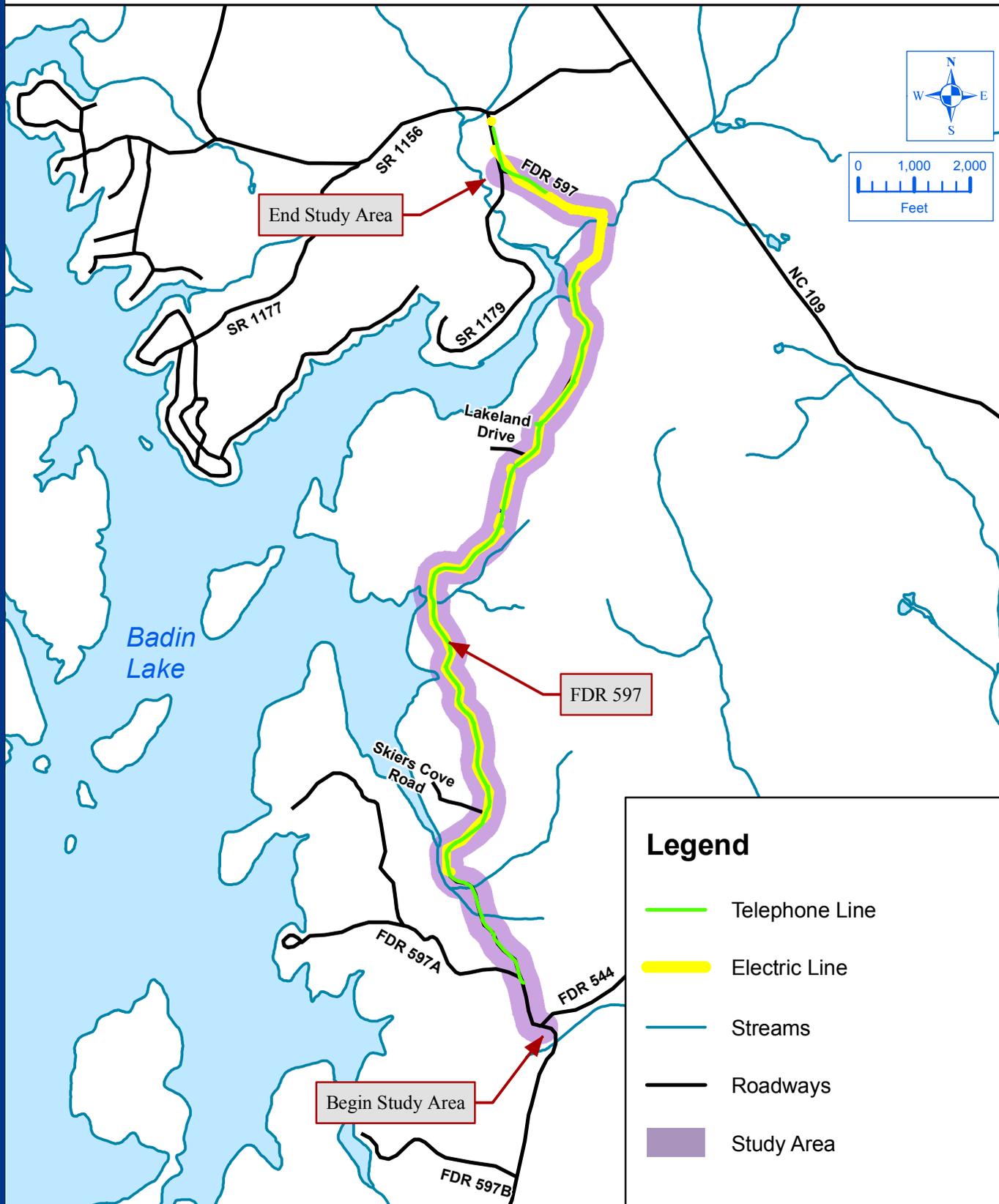
Indirect Impact: There is no indirect impact, adverse or beneficial, to existing noise as a result of the No Action Alternative.

Energy

Direct Impact: There is no direct impact, adverse or beneficial, to the supply or usage of energy as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to the supply or usage of energy as a result of the No Action Alternative.

Figure 3.9 - Utilities



Utilities

Direct Impact: There is no direct impact, adverse or beneficial, to existing utilities as a result of the No Action Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to existing utilities as a result of the No Action Alternative.

3.8.2.2 Preferred Alternative

Aesthetics and Viewsheds

Direct Impact: The parking area at Holt's Picnic Area would remain in the same location, therefore views from this area would not change. Views of this area would change slightly as the configuration and size of the parking area would be modified. The vented ford would be replaced, which would affect the aesthetics at Reeves Spring Branch; however vehicles traveling along the roadway are not able to view the sides of the crossing, so the impact would be negligible.

The view of the roadway while driving would change because there would be an asphalt road instead of a gravel road. The road near Reeves Spring Branch would be temporarily widened while under construction, which could cause a temporary change in the location's aesthetics. Paving FDR 597 would reduce the amount of dust raised by traffic, which would improve the view.

Views of the lake from FDR 597 could improve: cut and fill would require that trees be removed, which in turn would provide additional lake views and/or longer stretches where the lake is visible currently. The grade in low-lying areas would be raised, which would lead to better views of these areas. Forest views would remain essentially the same. Overall impacts on aesthetics and viewsheds caused by the Preferred Alternative are judged to be long-term, minor, and beneficial.

Indirect Impact: There is no indirect impact, adverse or beneficial, to the existing aesthetics or viewsheds as a result of the Preferred Alternative.

Air Quality

Direct Impact: The Preferred Alternative would affect ambient air quality in the study area during construction due to the exhaust emissions from diesel-burning construction equipment as well as an increase in airborne particles that result from ground disturbance activities. Proper vehicle maintenance, limiting the duration of idling of construction equipment and trucks, not allowing on-site incineration of construction materials, frequent wetting of exposed soil, and proper use of required erosion control Best Management Practices would be expected to minimize these temporary, minor adverse effects.

Fine particulate matter conditions would be expected to improve once FDR 597 is paved due to the reduction of airborne dust from the existing gravel surface. The long-term benefits from reducing dust by paving the road would be negligible. Overall impact on air quality caused by the Preferred Alternative is judged to be temporary, minor, and adverse.

Indirect Impact: There is no indirect impact, adverse or beneficial, to air quality as a result of the Preferred Alternative.

Noise

Direct Impact: The Preferred Alternative temporarily would affect noise conditions in the study area during construction from the noise of the equipment engines and from the construction activity itself. Construction activities such as excavation, milling, and paving would be limited to daylight hours, Monday through Friday, and would not occur on holidays. Work that produces objectionable noise would be limited to occur outside peak visitor hours. The increase in noise levels during construction would be temporary and minor.

Tire friction on a paved road is quieter than on a gravel road. Final noise conditions caused by vehicles are anticipated to decrease negligibly. Overall impact on noise caused by the Preferred Alternative is judged to be long-term, negligible, and beneficial.

Indirect Impact: There is no indirect impact, adverse or beneficial, to existing noise as a result of the Preferred Alternative.

Energy

Direct Impact: A temporary increase in energy consumption is expected during construction. The expected increase is due to fuel use of construction machinery. The frequency of maintenance required on FDR 597 would decrease, however. Overall impact on energy caused by the Preferred Alternative is judged to be long-term, negligible, beneficial impact.

Indirect Impact: Energy costs, particularly oil costs, are rising. The temporary, minor, and adverse impact of the Preferred Alternative on energy is rising construction costs. Depending on final energy usage, the impact could be major, although such a change is not anticipated.

Utilities

Direct Impact: All utility poles are within the proposed project's construction limits and so would be temporarily impacted. No change in final distribution of utilities (electric and telephone) is expected. Construction would be coordinated with local utility companies in order to avoid or minimize temporary disruption of service. Impacts to utilities would be temporary, minor, and adverse.

Indirect Impact: The decision to replace utility lines above or below ground or a combination of the two is the jurisdiction of the utility companies. If lines are replaced solely below ground, indirect impacts are that service is less likely to be disrupted by high winds, falling trees, and ice accumulation. However, if service problems arise, underground lines take longer to repair. If lines are placed solely above ground, they are more vulnerable to storm, wind, and ice events. Problems with these lines would be easier to repair due to accessibility. Lines placed in a combination of the above have of the advantages and disadvantages of both options. Regardless of placement, impacts would be long-term.

3.8.2.3 Cumulative Impact

The USFS has past and present projects that create or improve Forest facilities, the NCDOT TIP contains future projects to increase capacity and access, and three housing developments are slated for Montgomery County. Access to utilities has recently improved inside and outside the Forest boundaries, which increases development potential. Increased visitation could negatively impact air quality via vehicular and boat emissions. Although unlikely, increased emissions could adversely affect plant communities (see Biological Communities **Section 3.7**), which could adversely affect Forest aesthetics. Noise conditions could also be negatively impacted by an

increase in the number of vehicles and boats. It is unclear whether the recent Embarq installation is a harbinger of future increases in utilities access in the Forest, which also could expand the number of residents within Forest boundaries. An increase in the number of residents could negatively affect aesthetics. The combination, however, of improving Forest facilities, increasing capacity and access, and increasing the potential of new residents could lead to increased use of the Uwharrie National Forest by the general public. This increased use supports the USFS' motto ("Caring for the Land and Serving People"). Overall, the cumulative impact on the human environment is long-term, minor, and adverse.

3.9 Visitor Use and Experience

3.9.1 Affected Environment

There are a number of activities for visitors within the Forest, several of which are within or are accessed from FDR 597 within the study area. The recreational activities that exist within or are accessed via the study area are shown on **Figure 3.4** and described in more detail in **Section 3.9.1.1**.

3.9.1.1 Visitation and Facilities

The Holt's Picnic Area is the only visitor facility within the study area. Several other facilities, such as the Badin Lake Campground, the Badin Lake Group Camp, the Badin Lake Hiking Trail, and King's Mountain Point and Floating Pier, are located outside the study area but must be accessed via FDR 597. Fishing is permitted year-round and hunting for turkey, small game, deer, and waterfowl is permitted during designated hunting seasons. Hunting season dates change every year; the 2007-2008 hunting season dates are shown in **Table 3.10**.

Table 3.10 2007-2008 Hunting Season Dates in Montgomery County, North Carolina		
	Begins	Ends
Deer - Bow & Arrow	9/8/07	11/2/07
Deer - Muzzleloading	11/3/07	11/9/07
Deer - Gun	11/10/07	1/1/08
Wild Boar*	See Note	
Wild Turkey	4/12/08	5/10/08
Youth Turkey Hunt Day	4/5/08	4/5/08
Squirrel - Gray/Red	10/15/07	1/31/08
Rabbit	11/17/07	2/29/08
Take by Falconry (Red/Gray Squirrel, Rabbit)	10/15/07	2/29/08
Quail	11/17/07	2/29/08
Grouse	10/15/07	2/29/08
Pheasant	11/17/07	2/1/08
Bobcat	10/15/07	2/29/08
Raccoon & Opossum	10/17/07	2/29/08
Fox	11/17/07	1/1/08
Beaver	Any Open Season	
Groundhog	No Closed Season	
Coyote	No Closed Season	
Nutria	No Closed Season	
Striped Skunk	No Closed Season	

Source: NC Wildlife Resource Commission

* In Montgomery County, feral pigs are not considered wild boars and so are not regulated by the NC Wildlife Resources Commission.

A wide variety of water sports are permitted in Badin Lake, such as boating, kayaking, canoeing, and water skiing. Access is provided through Forest facilities along the lake, as well as through private access points. OHV trail use, another popular recreational activity in Uwharrie National Forest, is available from April 1 to December 15 of every year. Although no OHV trails are located near the study area, the trails draw many visitors to the Forest who may use other

facilities or drive along roads that are within the study area. A description of the facilities located along or accessed via the study area follows, as shown in **Figure 3.4**.

Holt's Picnic Area

Located along FDR 597 inside the study area, the Holt's Picnic Area is a day-use facility located on the shore of Badin Lake (see **Figure 3.10**). Tables, fire-grates, a pull-in parking area, and toilet facilities are provided for the public.

Figure 3.10: Holt's Picnic Area



Badin Lake Group Camp

The Badin Lake Group Camp is located on FDR 597A near the Badin Lake Campground. The group camp features three campsites designed for families, clubs, and other groups, each with a capacity of 50 people. Each site contains tent pads, grills, and tables, while centrally located

toilet facilities, water spigots, and showers serve all three sites. The Badin Lake Hiking Trail runs through the group camp. The Forest Service charges a \$40 fee per site per night, and the sites must be reserved in advance. Badin Lake Group Camp is open year round.

Badin Lake Campground

Badin Lake Campground is located on FDR 597A, and features 37 sites for tent and trailer camping. Tables, grills, lamp posts, and tent pads are available in each camp site. Water spigots, toilets, showers, and pay phones are available in central locations. Some campsites are located along the shore of Badin Lake. The Badin Lake Hiking Trail runs through the campground, along the lakeshore. An occupancy fee of \$12 per site per night is charged to campground users. The campground is open year round.

King's Mountain Point and Floating Pier

King's Mountain Point and Floating Pier is accessed via FDR 597A. Hiking, fishing, picnicking, and swimming are available in this area. A floating pier is provided for fishing in Badin Lake and the Badin Lake Hiking Trail runs through the area.

Badin Lake Hiking Trail

The Badin Lake Hiking Trail begins at the Cove Boat Ramp, runs along the shore of Badin Lake, and then returns to its starting point via an inland hardwood forest, forming a 5.6 mile loop. A shorter 2.5-mile loop is part of the trail. The trail provides scenic views of the lake, as well as access to camping and fishing areas along the lakeshore. The trail runs through Arrowhead Campground, Cove Boat Ramp, Badin Lake Campground, Badin Lake Group Camp, and King's Mountain Point. Although portions of the trail are located close to FDR 597, the trail does not enter the study area.

Equestrian Use

Uwharrie National Forest contains a large network of equestrian trails along with two horse camps. The horse camps (Badin Lake Horse Camp and Canebrake Horse Camp) are located east of the study area along FDR 544, and provide camping facilities along with facilities for housing horses overnight. The equestrian trail network covers approximately 40 miles of the Uwharrie National Forest. Trails 702 (the Josh/Lake trail) and 700 (the Greg's Loop trail) intersect FDR 597 within the study area. Trail 702 crosses FDR 597 at FDR 597A and at FDR 544. Trail 700 intersects with FDR 597 in the vicinity of Skiers Cove Road.

Off-Highway-Vehicle (OHV) Trails

Several miles south of the study area are 16 miles of off-highway-vehicle (OHV) trails. A user fee of \$5 per vehicle per day, or \$30 per vehicle per season, is charged for OHV use in the Forest. While OHV use does not occur within the study area, a spike in traffic volumes on opening day of OHV season (see **Section 3.9.1.4**) indicates that traffic volumes on FDR 597 are influenced by OHV use.

Number of Visitors

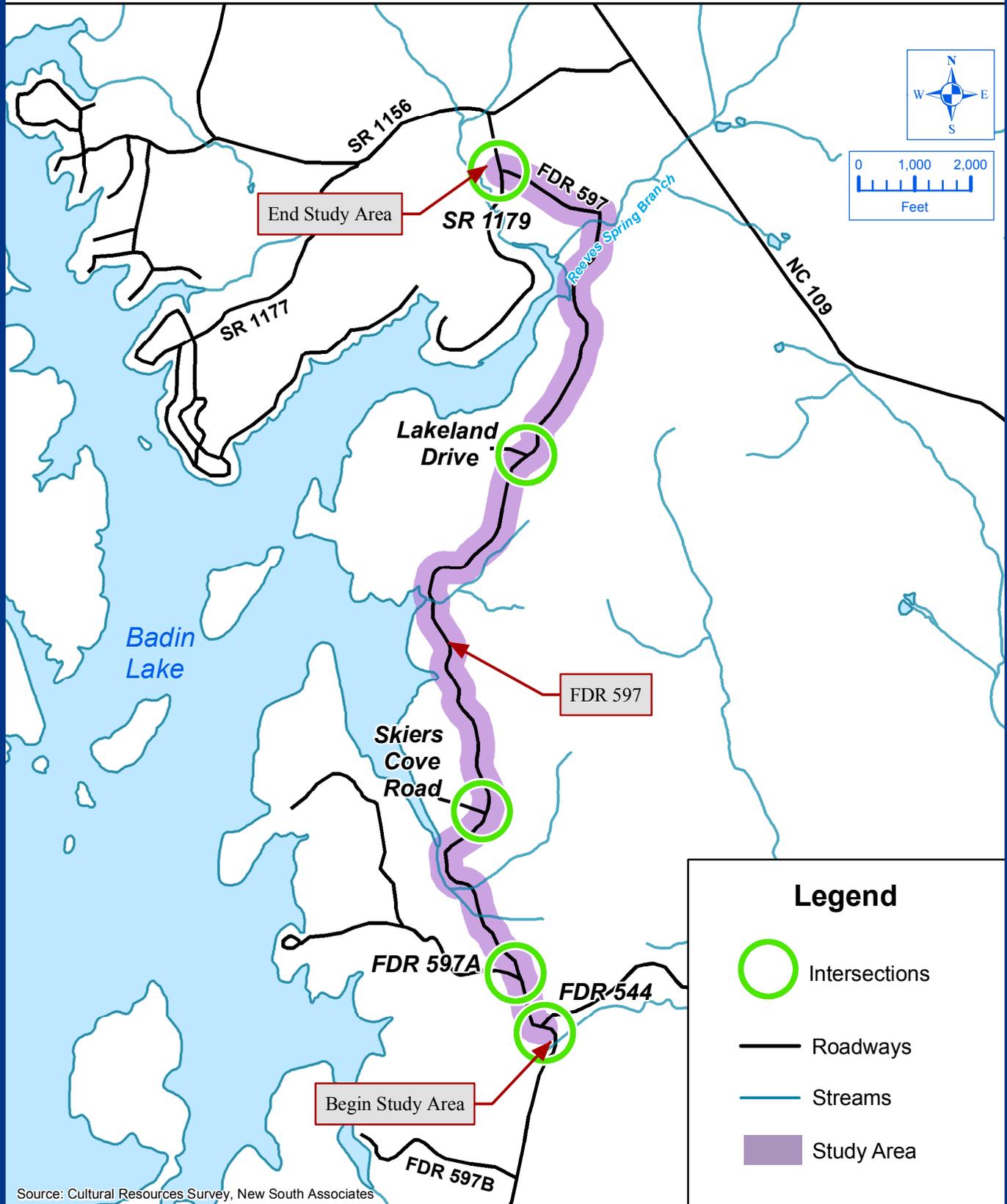
The Forest Service does not track visitor usage in the Uwharrie National Forest. The number of OHV passes sold in recent years suggests that the total number of visitors to the Forest is increasing each year. **Table 3.11** shows the number of OHV passes sold between 2004 and 2007. The USFS believes that the estimated number of passes sold in 2007 is an anomaly and not indicative of future sales. Sales from January – April 2008 have been brisk.

Year	Day		Annual	
	# of Passes	% Annual Increase	# of Passes	% Annual Increase
2004	16,000	N/A	1,077	N/A
2005	18,000	12.5%	1,300	20.7%
2006	20,000	11.1%	2,000	53.8%
2007	15,000	-25%	2,000	0%

3.9.1.2 Existing Roadways

The roadway network within the study area (see **Figure 3.11**) includes FDR 597, SR 1179, Lakeland Drive, Skiers Cove Road, FDR 544, and FDR 597A.

Figure 3.11 - Roadway Network and FDR 597 Intersections



FDR 597

FDR 597, Badin Lake Road, is a part of FH 49, and runs from FDR 576 north to SR 1179 through Uwharrie National Forest. It is approximately six miles long. The road varies in width from 13 feet to 16 feet wide and is currently unpaved with a gravel surface. There are two houses located along the road, in addition to access to the Skiers Cove and Wood Land Estates communities. The posted speed limit on FDR 597 is 25 mph. Stone masonry headwall culverts are located at mile posts 1.9 and 2.4. There is one parking area along the road at Holt's Picnic Area.

A vented ford is located at Reeves Spring Branch near the northern end of the project (see **Figure 3.12**). As noted in **Section 1.2.1**, a vented ford is a bridge-type structure designed to allow water to flow underneath or over the top of it. The existing vented ford is one lane wide and has a concrete slab with stone headwalls and triple 30-inch corrugated metal pipe culverts.

Figure 3.12: FDR 597 Vented Ford at Reeves Spring Branch



FDR 544 (McLean's Creek Road)

FDR 544 (McLean's Creek Road) is a paved road that begins at a stop-controlled intersection at the southern end of the study area. FDR 544 currently provides access from FDR 597 east to NC 109.

SR 1179 (Shamrock Road)

FDR 597 has its northern terminus at SR 1179. SR 1179 is a paved NCDOT road, which runs from Badin Lake on the south to NC 109 on the north. The intersection between FDR 597 and SR 1179 is a T-intersection, with FDR 597 as the stop-controlled road.

FDR 597A

FDR 597A leads west towards Badin Lake at a stop-controlled T-intersection with FDR 597 just north of the FDR 544 intersection. This road has an unpaved gravel surface with similar characteristics to FDR 597. FDR 597A provides access to Badin Lake Campground, Badin Lake Group Camp, King's Mountain Point and Floating Pier, and the Badin Lake Hiking Trail. It ends at Badin Lake Campground.

Skiers Cove Road

Skiers Cove Road provides access to Badin Lake and the Skiers Cove community from FDR 597. It is an unpaved private road that ends near an arm of Badin Lake.

Lakeland Drive

Lakeland Drive provides access to the Wood Land Estates gated community on the west side of FDR 597. This paved road has a stop-controlled T-intersection with FDR 597.

3.9.1.3 Existing Intersections

FDR 597 in the study area has five intersections, shown in **Figure 3.11** and listed below from south to north:

- FDR 544 (McLean's Creek Road)
- FDR 597A
- Skiers Cove Road
- Lakeland Drive
- SR 1179 (Shamrock Road)

The intersection at FDR 597 and FDR 544 was analyzed in detail in the traffic portion of this report (**Section 3.9.1.4**).

3.9.1.4 Traffic Volumes

Traffic data were summarized in the *Traffic Needs and Safety Report* (Kimley-Horn and Associates, Inc., June 2006; appended by reference) and are discussed below.

Vehicular traffic in the study area consists primarily of personal automobiles and Forest vehicles. The corresponding traffic-generating activities are recreational and residential. In addition to vehicular traffic, some pedestrian traffic and equestrians use trails and other visitor facilities. Current and historic traffic count data (daily counts and turning movement counts) were gathered and analyzed to determine traffic characteristics and historic traffic growth.

Historic Traffic Volumes

To estimate the traffic growth that can be expected to occur in the study area, historical traffic counts were gathered from NCDOT. Six years of historic Annual Average Daily Traffic (AADT) counts were obtained for two locations along NC 109 in the northern part of Montgomery County. These two locations are just south of the Randolph County line and just south of River Road near the town of Uwharrie. The historic traffic counts are indicative of approximately 2.6 percent growth in average daily traffic per year. The 2004 AADT counts were between 2,000 and 2,500 for both locations. **Appendix D** includes more detail on historic traffic volumes.

Current Traffic Volumes

To determine current traffic demand along FDR 597, automated daily counts were conducted by Carolina Traffic Services at four locations along the study corridor over a two-week period from March 25, 2006 to April 8, 2006. Accurate counts could not be obtained at a fifth location, FDR 597 north of FDR 544, due to the topography and alignment of the roadway. This two-week period included one week before OHV season began and one week after the season began, and it included opening day. A turning movement count also was conducted at the intersection of FDR 544 and FDR 597 from 7:00 AM to 7:00 PM on April 1, 2006 (opening day of OHV season). The automated daily counts were taken at the following locations:

- FDR 544 east of FDR 597
- FDR 597 south of FDR 544
- FDR 597A west of FDR 597
- FDR 597 south of SR 1179

Figure 3.13 shows the locations of the turning movement count and the daily counts. Weekend peak times are mid-afternoon (2:00 PM to 4:00 PM). These peak times are independent of OHV season, although during OHV season the traffic counts are higher at all locations studied. Weekday peaks occur in the afternoon as well, although the volume of traffic is less than on weekends. Approximately 85 vehicles traveled through the intersection of FDR 597 and FDR 444 during the weekend peak hour prior to OHV season. Traffic volumes nearly doubled during weekends in the OHV season when compared with weekend traffic volumes prior to OHV season. More information on traffic counts can be found in **Appendix D**.

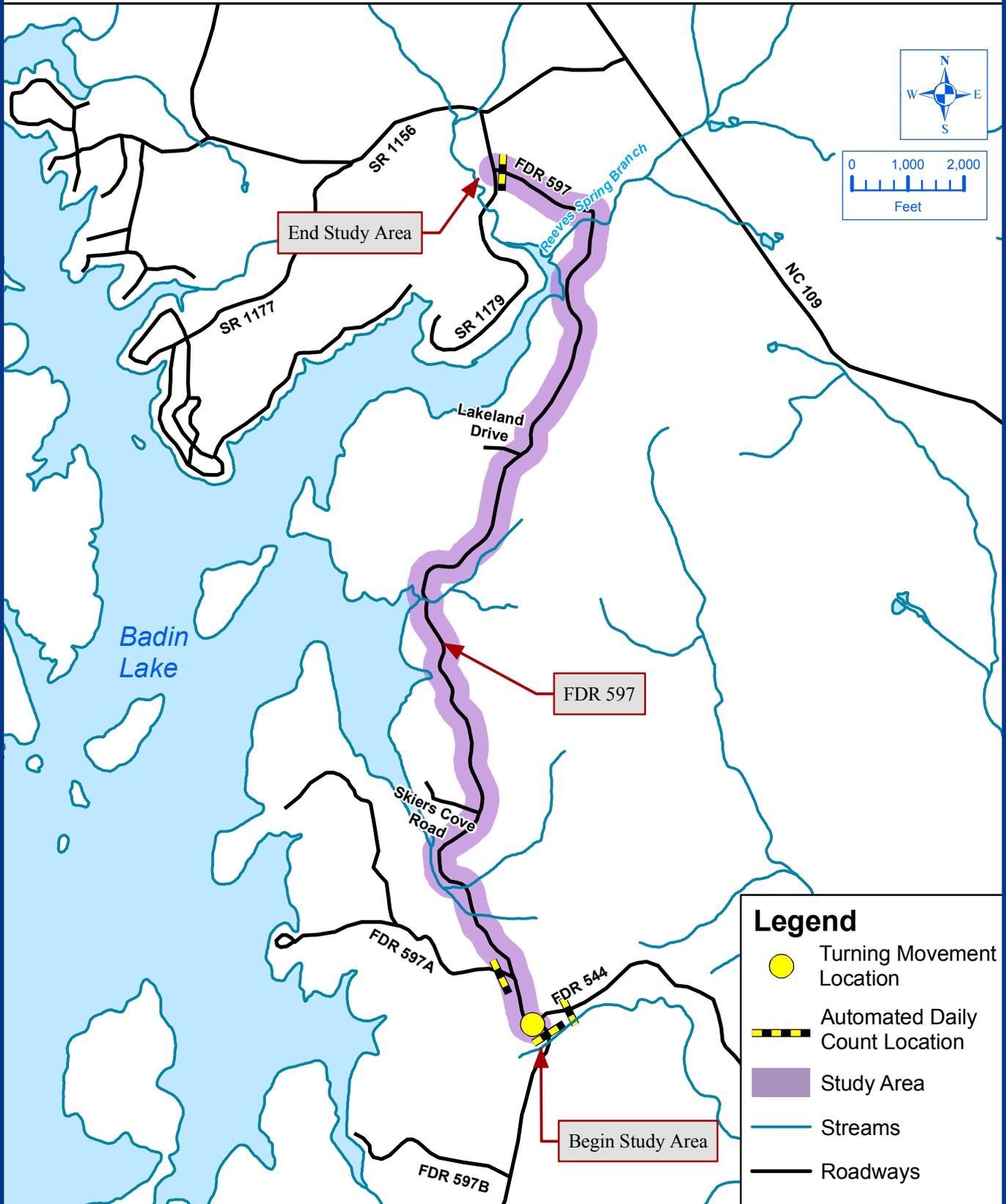
Future Traffic Volumes

Traffic volumes were projected for the year 2030 at the intersection of FDR 597 and FDR 544 in order to determine how well the facility is expected to operate in the future. Traffic volumes are expected to increase along FDR 597 for two reasons: background traffic growth and additional development along FDR 597.

Background traffic growth reflects increases in traffic levels due to growth in the state and region. As noted previously, the historical growth rate along NC 109 in northern Montgomery County was 2.6 percent. Since NC 109 is a state highway providing access from Troy to the northwest, it can be expected to have a higher growth rate than FDR 597 since only a portion of that total growth is related to Uwharrie National Forest. Based on historical growth rates in the area, a growth rate of 2.0 percent per year was assumed for FDR 597.

Several tracts of land along FDR 597 are privately held along and may be developed in the future. Currently the Wood Land Estates gated community has 12 houses. Aerial photography indicates that the houses are on lots of approximately four acres each. It is expected that any new development at Wood Land Estates would take place on similar sized lots at a similar density to the current development.

Figure 3.13 - Turning Movement and Daily Count Locations



On the east side of FDR 597, across from the Wood Land Estates, there are several large tracts of land that are privately owned. Due to the lack of lakefront property, the lack of roadways leading to the inside of these tracts, and the steep terrain indicated on topographic maps, it is unlikely that these tracts would be fully developed. A conservative assumption was made that the entire area would be developed at a similar density to Wood Land Estates.

Based on the relative size of the tracts, it was assumed that 10 additional residences could be built in Wood Land Estates, and 26 additional residences could be built on the east side of FDR 597, for a total of 36 new residential dwelling units with potential future access to FDR 597. It was assumed that this development would occur regardless of the proposed improvements to FDR 597.

The new residential trips were calculated using the trip generation rate formula from the Institute of Transportation Engineers' (ITE) *Trip Generation* (2003). During the weekday peak hour, 11 new residential trips are projected to occur on the peak segment of FDR 597. This results in a total of 83 projected trips on FDR 597 at FDR 544 during the peak weekday hour, which occurs from 3:00 PM to 4:00 PM on Friday. Trip generation was also calculated to determine the number of trips generated per day on FDR 597. On weekend days in 2030, a total of 883 trips are projected to occur on FDR 597; while on weekdays, a total of 442 trips are projected. More detail on projected trips is in **Appendix D**.

3.9.1.5 Operational Analysis

To analyze the traffic operations characteristics of the intersection of FDR 544 and FDR 597, a traffic operations model was developed using the software Synchro 5.0. Traffic volume data and roadway and intersection geometry were obtained in April 2006, on the opening day of OHV season, which is one of the peak traffic volume days of the year for the Forest. The traffic volumes and geometry were input into the Synchro network to perform capacity analyses for existing weekend peak hour conditions. The intersection was analyzed for the peak hour of volume to provide a worst-case analysis for the intersection. The Highway Capacity Manual (*TRB Special Report 209, 2000*) control delay methods were used in reporting the results. A segment analysis using Highway Capacity Manual methods was performed on the segment with the highest volume.

Capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a given period. Capacity is combined with level of service (LOS) to describe the operating characteristics of a road segment or intersection. LOS is a qualitative measure describing operational conditions and motorist perceptions within a traffic stream. The Highway Capacity Manual defines six levels of service, LOS A through LOS F, with A representing the shortest average delays and F representing the longest average delays.

Intersection of FDR 597 at FDR 544

The study intersection is a T-intersection with a stop sign on FDR 544. FDR 544 is a two-lane road with a single lane approach to FDR 597 from the east. FDR 597 is an unpaved road with no separate turn lanes. The intersection currently operates at LOS A overall, with all approaches operating at LOS A during the weekend peak hour. In the design year 2030, the intersection of FDR 597 and FDR 544 is projected to still operate at LOS A overall, with all approaches operating at LOS A during the weekend peak hour in 2030 (Table 3.12).

Table 3.12 Level of Service at the Intersection of FDR 597 and FDR 544		
Movement	LOS (Delay in Seconds per Vehicle)	LOS (Delay in Seconds per Vehicle)
	2006 Weekend Peak Hour	2030 Weekend Peak Hour
Minor-Road Approach	A (8.8)	A (9.1)
Major-Road Left Turn	A (2.3)	A (2.5)
Overall	A (4.0)	A (4.1)

FDR 597 Segment Analysis

A segment analysis was performed on FDR 597 to determine the current level of service along the road. The Highway Capacity Manual methodology for a Class II two-lane road was used. According to the existing daily traffic counts, the most heavily traveled segment of FDR 597, at the southernmost end of the study area in the vicinity of the intersection with FDR 544, carried 58 vehicles in both directions during the weekend peak hour. Highway Capacity Software was used to determine the level of service on this segment based on the volumes and the existing physical

characteristics of the roadway. FDR 597 currently operates at LOS A on its most heavily traveled segment, and therefore on all other segments as well.

The segment analysis was again performed to determine the future level of service along the roadway. According to the projected traffic volumes, the most heavily traveled segment of FDR 597 is expected to carry 106 vehicles in both directions during the peak hour. Highway Capacity Software was used to determine the level of service based on the projected volumes and both the existing physical characteristics of the roadway, as well as a paved roadway with 10-foot lanes and 4-foot shoulders, the minimum values that can be used in the software. In both cases, the roadway is expected to operate at LOS A.

Operational Analysis Summary

The study intersection currently operates at LOS A during peak season peak hour. In the design year, the intersection would still operate at LOS A. Additionally, the roadway segments along FDR 597 operate at LOS A presently and in the future.

3.9.1.6 Crash History

Traffic crash data for the period from October 2003 to June 2006 has been obtained for the roadways and intersections in the FDR 597 study area from the United States Forest Service. This data has been reviewed and analyzed to determine the level of safety needs at the study intersections.

Only one crash occurred within the study area during the time period studied. The crash occurred on October 26, 2003 when a Jeep overturned onto its side. No injuries were reported, and the crash was not severe enough to report to the State of North Carolina. Weather conditions were clear and lighting conditions were dark when the crash occurred.

The crash rate was calculated for the study area of FDR 597. The crash rate was computed at 94.12 crashes per hundred million vehicle miles. The low AADT of only 326 vehicles per day on FDR 597 means that there would always be a low sample size of crashes on the roadway, and one crash can drastically impact the crash rate on the roadway. The crash rate on FDR 597 is substantially lower than the crash rate on a typical rural secondary road in North Carolina and in Montgomery County, which were 355.13 and 339.02 respectively. A rural secondary road is the most similar road type to FDR 597 for which NCDOT collects crash statistics.

Three other crashes occurred within Uwharrie National Forest, but outside the study area during the same time period. Two of the crashes involved cars driving off the road into a ditch. The third involved an abandoned car found crashed into a tree, possibly as a result of excessive speed. No injuries were reported in any of the crashes.

3.9.2 Environmental Effects

3.9.2.1 No Action Alternative

Visitation and Facilities

Direct Impact: There is no impact, adverse or beneficial, to visitation or Forest facilities as a direct result of the No Action Alternative.

Indirect Impact: There is no impact, adverse or beneficial, to visitation or Forest facilities as an indirect result of the No Action Alternative.

Existing Roadways

Direct Impact: FDR would continue to operate below NCDOT design standards, which are based on safety criteria. This impact is long-term, negligible, and adverse.

Indirect Impact: There is no impact, adverse or beneficial, to existing roadways as an indirect result of the No Action Alternative.

Existing Intersections

Direct Impact: The No Action Alternative would not improve existing intersections, including the intersection with SR 1179. This intersection, which is not at a 90-degree angle, provides poor visibility to drivers. This impact is long-term, minor, and adverse.

Indirect Impact: There is no impact, adverse or beneficial, to existing intersections as an indirect result of the No Action Alternative.

Traffic Volumes

Direct Impact: There is no impact, adverse or beneficial, to traffic volumes as a direct result of the No Action Alternative.

Indirect Impact: There is no impact, adverse or beneficial, to existing intersections as an indirect result of the No Action Alternative.

Safety

Direct Impact: The No Action Alternative would not improve safety along FDR 597 or at existing intersections. The intersection with SR 1179 would continue to have poor visibility, vehicles would still cross the vented ford during times of high flow and overtopping, and FDR 597 would continue to operate below NCDOT design standards, which are based on safety criteria. The combined impact of these conditions is long-term, minor, and adverse.

Indirect Impact: There is no indirect impact, adverse or beneficial, to safety as a result of the No Action Alternative.

3.9.2.2 Preferred Alternative

Visitation and Facilities

Direct Impact: While the Preferred Alternative would expand the existing parking area to 100x10 feet, the number of parking spaces would remain at 10. Slight modifications to the existing recreational area would be required.

Paving and widening FDR 597 would improve the driving conditions for residents along FDR 597 and for visitors who use the Forest facilities accessed via FDR 597. The impact is long-term, minor, and beneficial.

Indirect Impact: There is no indirect impact, adverse or beneficial, to visitation and facilities as a result of the proposed project.

Existing Roadways

Direct Impact: Paving and widening FDR 597 would improve the driving conditions for residents and visitors. It would also improve access to existing Forest facilities. Replacing the vented ford would eliminate dangerous travel over moving water. By re-aligning the intersection at FDR 597 and SR 1179, the Preferred Alternative would improve visibility by allowing drivers to better see vehicles approaching in either direction. The impact is long-term, minor, and beneficial.

Indirect Impact: There is no indirect impact, adverse or beneficial, to existing roadways as a result of the proposed project.

Existing Intersections

Direct Impact: The existing T-intersection at SR 1179 is not a 90-degree intersection. Since there are potential issues with visibility for approach vehicles, FDR 597 would be realigned to intersect more perpendicularly with SR 1179 while avoiding a historic property.

By re-aligning the intersection at FDR 597 and SR 1179, the Preferred Alternative would improve visibility by allowing drivers to better see vehicles approaching in either direction. The impact of this change combined with the benefit of avoiding the historic property is judged to be long-term, minor, and beneficial.

Indirect Impact: There is no indirect impact, adverse or beneficial, to existing intersections as a result of the proposed project.

Traffic Volumes

Direct Impact: Traffic volumes were calculated based on an assumption of full build-out in accordance with current density. The Preferred Alternative is not anticipated to induce development beyond this density and therefore is not expected to increase traffic volumes along FDR 597. There is no direct impact, adverse or beneficial, on traffic volumes caused by the Preferred Alternative.

Indirect Impact: There is no indirect impact, adverse or beneficial, to traffic volumes as a result of the proposed project.

Safety

Direct Impact: The Preferred Alternative would improve safety along FDR 597 by upgrading it to meet NCDOT design standards. The existing roadway would be widened and lane widths would be made consistent. Improvements to the existing T-intersection at SR 1179 would improve safety at that location by realigning it to intersect more perpendicularly, which would allow drivers to better see vehicles approaching from both directions. Replacing the vented ford would eliminate the need for vehicles to cross moving water. The impact is long-term, minor, and beneficial.

Indirect Impact: There is no indirect impact, adverse or beneficial, to safety as a result of the proposed project.

3.9.2.3 Cumulative Impact

The USFS has past and present projects that create or improve Forest facilities, the NCDOT TIP contains future projects to increase capacity and access, and three housing developments are slated for Montgomery County. Access to utilities will improve inside and outside the Forest boundaries, which increases development potential. The combination of improving Forest facilities, increasing capacity and access, and increasing the potential of new residents could lead to increased use of the Uwharrie National Forest by the general public. This increased use supports the USFS' motto ("Caring for the Land and Serving People"). Therefore, the cumulative impact on visitor use and experience is long-term, minor, and beneficial.

3.10 Summary of Mitigation

The Council on Environmental Quality has defined mitigation of impacts to include the following: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20). Each of the three main aspects (avoidance, minimization, and compensatory mitigation) must be considered in sequential order.

Avoidance

Avoidance examines all appropriate and practicable possibilities of averting impacts.

- Modification 3A avoids all impacts on wetlands.
- Modification 3B allows the Holt's Picnic Area parking pullout to be rebuilt. This modification avoids reducing easy access to a Forest facility, which is beneficial to Forest visitors.
- The realignment of FDR 597 with SR 1179 has been designed to avoid any impacts to the historic property at that location.
- Modification 3C constructs a new crossing of Reeves Spring Branch in order to allow the existing roadway and crossing to remain open during construction. This modification allows the proposed project to avoid inconveniencing Forest visitors and residents.
- Although the existing curve at the intersection of FDR 597 with FDR 544 is substandard, it would not be improved since traffic volumes are low. This would avoid all construction impacts at that location.

Minimization

Minimization includes the examination of appropriate and practicable steps to reduce adverse impacts. Implementation of these steps would be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, right-of-way widths, fill slopes, and/or road shoulder widths.

- The Preferred Alternative has a design speed of 30 mph. This design speed allows the proposed alignment to adhere more closely to the existing alignment than a higher speed would allow. It also permits sharper curves in the alignment. Both of these advantages minimize the amount of cut and fill material needed. Impacts to biological communities and water resources are minimized with the lower design speed as well, since construction on new alignment is minimized.
- During the design process, the alignment was shifted to balance the amount of cut and fill material required. Balancing cut and fill minimizes the amount of material that would need to be imported to or exported from the Forest.
- Modification 3F creates greater visibility at the intersection of FDR 597 and SR 1179. This modification minimizes the chance of future crashes.

Other methods are suggested below to minimize adverse impacts to the Forest.

- Strictly enforce best management practices (BMPs) to control sedimentation and erosion during project construction. Stage and stockpile materials in parking lots or other disturbed areas to minimize construction traffic and impacts.
- Minimize clearing and grubbing, which protects biological communities and natural resources as well as helps to prevent sedimentation and erosion.
- Decrease or eliminate discharges into surface waters, which protects water quality and aquatic wildlife and habitats.
- Minimize “in-stream” activity.
- Quickly reestablish vegetation on exposed areas, particularly streamsides. This method reduces sedimentation and impacts by stabilizing underlying soils.
- Ensure that materials brought into the Forest are free of exotic species in order to avoid adverse effects from invasive species.

Additionally, in compliance with the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 et seq), if during construction human remains are discovered, all work would stop and the USFS and SHPO would be notified immediately in order to minimize impacts as much as possible.

Compensatory Mitigation

Compensatory mitigation is not normally considered until anticipated impacts to “Waters of the United States” have been avoided and minimized to the maximum extent possible. As there are no impacts to wetlands from the Preferred Alternative, no compensatory mitigation would be required for wetland impacts. If compensatory mitigation is required for the 651 feet of stream impacts, it would be determined during coordination with USACE.

3.11 Section 4(f)

In accordance with Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303) and 23 CFR 771.135, FHWA “may not approve the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that: (i) there is no feasible and prudent alternative to the use of land from the property; and (ii) the action includes all possible planning to minimize harm to the property resulting from such use.”

The proposed project is an improvement that is located entirely within the Uwharrie National Forest. The Uwharrie National Forest is a mixed resource used for logging as well as recreation. No archaeological sites or historic resources would be impacted by the proposed action. Therefore, there is no use under Section 4(f).

4.0 Summary of Direct Impacts/Alternatives

Table 4.1 summarizes and compares the likely results of implementing the Preferred Alternative as it relates to the environment. The No Action Alternative would not disturb the adjacent natural and cultural resources and would not affect private properties; therefore it would cause no impacts. It also would not provide the safety benefits that current NCDOT design standards support. The Preferred Alternative would upgrade both FDR 597 and the vented ford to current NCDOT roadway and hydraulic design standards, thereby increasing safety along the corridor. This alternative does impact the natural environment and would affect some private properties along the corridor.

Table 4.1 Summary of Direct Impacts	
Topic	Preferred Alternative
Construction	
Area of Impacts	24.89 acres
Excavation	45,219 cubic yards
Fill	32,959 cubic yards
Land Use	One residential relocation
Socioeconomics and Community	No impact
Environmental Justice	No impact
Cultural Resources	
Archaeological Resources	No impact
Historic Resources	No impact
Natural Resources	
Jurisdictional Wetlands	0
Floodplains	0.14 feet above sea level
Streams	651 linear feet
Water Quality	Temporary, minor , adverse impact; Long-term, negligible, adverse impact
Geology and Soils	Long-term, minor, adverse impact

Table 4.1, continued

Biological Communities	
Plant Communities	6.54 acres forestland
Terrestrial Wildlife	Short-term, minor, adverse impact
Aquatic Habitat and Wildlife	Long-term, minor, adverse impact
Rare and Protected Species	No impact
Exotic Species	Long-term, negligible, beneficial impact
Human Environment	
Aesthetics and Viewshed	Long-term, minor, beneficial impact
Air Quality	Temporary, minor , adverse impact
Noise	Long-term, negligible , beneficial impact
Energy	Long-term, negligible, beneficial impact
Utilities	Temporary, minor , adverse impact
Visitor Use and Experience	
Visitation and Facilities	Long-term, minor, beneficial impact
Existing Roadways	Long-term, minor, beneficial impact
Existing Intersections	Long-term, minor, beneficial impact
Traffic Volumes	No impact
Safety	Long-term, minor, beneficial impact

5.0 Commitments and Resources

5.1 Applicability to Environmental Laws

Neither the No Action Alternative nor the Preferred Alternative would violate or contradict any of the following relevant environmental laws.

National Environmental Policy Act (NEPA)

Requires federal agencies to evaluate the environmental impacts of their actions and to integrate such evaluations into their decision making process.

Clean Water Act (CWA)

Controls and regulates nonpoint source pollutants such as pesticide runoff, forestry operations, and parking lots/roads as well as point source pollutants such as placement of fill material.

Clean Air Act (CAA)

Establishes standards for air quality in regard to the pollutants generated by internal combustion engines. The National Ambient Air Quality Standards (NAAQS) define the concentration of these pollutants that are allowable in air to which the general public is exposed (“ambient air”).

Endangered Species Act (ESA)

Prohibits the harming of any species listed by the USFWS as being either Threatened or Endangered. Harming such species includes not only directly injuring or killing them, but also disrupting the habitat on which they depend.

Archaeological Resources Protection Act (ARPA)

Ensures the protection and preservation of archaeological resources on federal lands.

National Historic Preservation Act (NHPA)

Provides protection of cultural resources, and ensures that they are considered during federal project planning and execution.

Executive Order 12898: Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs all federal agencies to determine whether a proposed action would have an adverse or disproportionate impact on minority and/or low-income populations. It also

directs agencies to ensure that representatives of an affected community have every opportunity to provide input regarding the impact of the proposed project.

Executive Order 11988: Floodplain Management

Reduces the risk of property damage and loss of life due to flooding and preserves the natural benefits floodplain areas have on the environment. Requires all federal agencies to avoid construction within 100-year floodplains unless no other practical alternative exists

Executive Order 11990: Protection of Wetlands

Requires federal agencies to minimize the loss, destruction, or degradation of wetlands and to enhance their natural and beneficial values.

Department of Transportation Act of 1966: Section 4(f)

Provides protection of significant publicly owned lands, including parks, recreation areas, wildlife and waterfowl refuges, and significant historic sites.

6.0 Public Involvement and Coordination

6.1 Agency Involvement

Coordination and public involvement in the planning and preliminary design of the proposed action was initiated early in the process. It is the Forest Service's objective to work with state, federal, and local governments to ensure that the Forest Service and its programs are coordinated with theirs, are supportive of their objectives, and that their programs are similarly supportive of Forest Service programs. The FHWA would coordinate with the State Historic Preservation Officer (SHPO) if further coordination is needed.

An agency scoping letter was mailed in March 2006 to agencies listed below. A copy of the scoping letter is included in **Appendix E**; agency response letters are included in **Appendix B**. (Agencies marked with an asterisk provided a response):

- *NC Department of Administration (State Clearinghouse)
- *NC Division of Archives and History (State Historic Preservation Officer, or SHPO)
- NC Department of Transportation
- *US Fish and Wildlife Service
- US Army Corps of Engineers

An interagency kickoff meeting was held on March 22, 2006 in Troy, North Carolina. At the meeting, the project was described and agency concerns were identified. The following agencies were represented at the meeting:

- Federal Highway Administration
- US Forest Service – Uwharrie National Forest
- US Army Corps of Engineers
- NC Department of Transportation
- NC Wildlife Resources Commission
- NC Department of Environment and Natural Resources, Division of Water Quality

6.2 Public Involvement

A letter was sent to 54 area homeowners and tenants in August 2006. The letter explained the project and urged recipients to contact the USFS with any questions or concerns. The comments that the USFS received were supportive of the proposed project. **Appendix F** includes a copy of the letter.

A newsletter will be sent to area homeowners and tenants, the Town of Troy, and Montgomery County when the EA is available for public comment. In addition to general information about the project, the newsletter will contain a figure showing the study area. The newsletter also will contain information about the broader NEPA process as well as an update on the project status and schedule, and it will provide information on how to provide comments regarding the project.

6.3 Interested Agencies and Other Parties

Consultation and coordination have occurred with numerous agencies for the preparation of the EA. The following organizations and agencies have jurisdictional approval authority relative to the recommendations developed as part of this study or are anticipated to have a vested interest in the study results. These agencies will receive a copy of the EA for review.

- U.S. Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division
- U.S. Department of Transportation, Federal Highway Administration, North Carolina Division
- U.S. Department of Agriculture, Forest Service, Southern Region
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- North Carolina Department of Transportation
- North Carolina Wildlife Resource Commission
- North Carolina Department of Cultural Resources, State Historic Preservation Office
- North Carolina Department of Environment and Natural Resources
- Montgomery County

The individuals and organizations listed below are anticipated to have either an interest in the study area and/or safety improvement recommendations developed. In addition to the above-

listed recipients, the individuals and organizations listed below will receive a newsletter announcing the completion of the EA.

- Honorable Kay Hagan, U.S. Senate
- Honorable Richard Burr, U.S. Senate
- Honorable Beverly Perdue, Governor of North Carolina
- Montgomery County Chamber of Commerce
- Wood Land Estates Homeowners Association
- Skiers Cove Homeowners Association
- Alcoa, Inc.

6.4 Public Notice/Public Comment Period

Members of the public and all interested parties will have 30 days in which to submit comments on the proposed project. The comment period will be announced via newspaper ads and information on the FHWA website. During this 30 day period, copies of the EA will be available for review at the US Forest Service offices in Troy (located at 789 NC Hwy 24/27) and in Asheville (located at 160A Zillicoa Street), as well as at the Montgomery County Public Library in Troy (215 West Main Street). An electronic copy will be available on the Eastern Federal Lands Highway Division of the FHWA website (www.efl.fhwa.dot.gov) and on the US Forest Service website (www.cs.unca.edu/nfsnc/recreation/uwharrie).

Comments may be submitted to:

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All comments received will be reviewed and addressed.

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