

NATURAL RESOURCE TECHNICAL REPORT

**Replace Bridge No. 278 on SR 1540
Over Middle Fork South Fork New River
Watauga County, North Carolina**

**T.I.P. B-5177
Federal Aid Project No. BRZ-1540(5)
WBS Element No. 42548.1.1**



**THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Project Development and Environmental Analysis Branch
Natural Environment Unit**

March 2010

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1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge No. 278 on SR 1540 (Tweetsie Railroad Lane) over Middle Fork South Fork New River and the realign the intersection with US 221/321 in Watauga County (Figure 1). The following Natural Resource Technical Report (NRTR) has been prepared to assist in the preparation of a Categorical Exclusion (CE) for the proposed project.

2.0 METHODOLOGY AND QUALIFICATIONS

All work was conducted in accordance with the NCDOT Natural Environment Unit standard operating procedures and June 2009 NRTR template. Fieldwork was conducted on September 8, 2009. All water resources in the study are perennial; therefore no field visit with the agencies to determine jurisdictional status was necessary. The principal personnel contributing to this document were:

Principal

Investigator: Jason Dilday

Education: B.S. Marine Biology, UNC – Wilmington, 1993

Experience: Environmental Specialist, NCDOT, July 2006 – Present

Fisheries Technician, NCWRC, July 2005 – June 2006

Fisheries Biologist, NCDMF, January 1999 – April 2005

Fisheries Technician, NCDMF, December 1994 – December 1998

Additional personnel who contributed to portions of the fieldwork and/or documentation for this project were Kristoffer Dramby and Jeffrey Hemphill. Appendix C lists the qualifications of these contributors.

3.0 PHYSICAL RESOURCES

The study area lies in the northern mountain physiographic region of North Carolina (Figure 1). Topography in the project vicinity is characterized as rolling hills with moderate to steeply sloping banks along major streams. Elevations in the study area range from 3,320 to 3,360 ft. above sea level. Land use in the project vicinity consists primarily of commercial properties, with minor residential development and forested communities.

3.1 Soils

The Watauga County Soil Survey identifies four soil types within the study area (Table 1).

Table 1. Soils in the study area.

Soil Series	Mapping Unit	Drainage Class	Hydric Status
Porters loam	PuC	Well drained	Nonhydric
Saunook loam	SoC	Well drained	Nonhydric
Unaka-Porters complex	UkE	Well drained	Nonhydric
Udorthents, loamy	Ud	NA	Nonhydric

3.2 Water Resources

Water resources in the study area are part of the New River basin (U.S. Geological Survey [USGS] Hydrological Unit 05050001). Three streams were identified in the study area (Table 2). The locations of these water resources are shown in Figure 3. The characteristics of these streams are provided in Table 3.

Table 2. Water resources in the study area.

Stream Name	Map ID	DWQ Index Number	Best Usage Classification
Middle Fork South Fork New River	MF	10-1-2-(6)	WS-IV, Tr+
Greer Branch	GB	10-1-2-10	WS-IV, Tr+
Elrod Branch	EB	10-1-2-11	WS-IV, Tr+

Table 3. Physical characteristics of water resources in the study area.

Map ID	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Channel Substrate*	Velocity	Clarity
MF	2 – 4	15 – 25	12 – 18	sa,gr,co,bo	Fast	Clear
GB	2	2 – 8	6 – 24	sl,sa	Moderate	Clear
EB	2 – 4	4 – 6	2 – 18	sa,gr,co,bo,bd	Fast	Clear

*sl=silt, sa=sand, gr=gravel, co=cobble, bo=boulder, bd=bedrock

All surface waters identified within the study corridor limits have been assigned a primary water resource classification of “WS-IV,Tr+”. Middle Fork South Fork New River is designated by the North Carolina Wildlife Resource Commission (NCWRC) as Hatchery Supported Designated Public Mountain Trout Water. There are no anadromous fish waters or Primary Nursery Areas present in the study area.

There are no Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supplies (WS-I or WSII) or 303(d) streams within one mile of the project study area.

A benthic sampling station is located along US 221/321 near the confluence of Middle Fork and Goldmine Branch, approximately 0.75 mile downstream of the project area. This station was last sampled on November 4, 2003 and received a rating of Good-Fair. No fish community sampling sites are located within one mile of the study area.

4.0 BIOTIC RESOURCES

4.1 Terrestrial Communities

Two terrestrial communities were identified in the study area: maintained/disturbed and acid cove forest. Figure 3 shows the location and extent of these terrestrial communities in the study area. A brief description of these community types follows. Scientific names of all species identified are included in Appendix B.

4.1.1 Maintained/Disturbed

The maintained/disturbed community dominates the land use in the study area, where the vegetation is periodically mowed, or maintained beyond its natural state. The areas along the roadside and parking area are comprised of low growing grasses and herbs, including fescue, red clover, burdock, Joe-Pye weed, buttonweed, black locust and horse nettle. The parking area is planted in various landscaping plants including Bradford pear and red maple. Adjacent to Middle Fork South Fork New River, species included Queen Anne's lace, broadleaf plantain, elderberry, and jewelweed.

4.1.2 Acid Cove Forest

The acid cove forest community is a forested segment in the southeast quadrant of the study area. Acid cove forests are characterized by generally dense canopy layers with a fairly limited number of tree species. Canopy species observed were yellow birch, northern red oak, Canada hemlock and eastern white pine. Shrub and herb layers typically are made up of acid tolerant species. Shrubs and herbs observed included rosebay, witch hazel, Fraser magnolia, New York fern and rattlesnake plantain.

4.1.3 Terrestrial Community Impacts

Terrestrial communities in the study area may be impacted by project construction as a result of grading and paving of portions of the study area. At this time, decisions regarding the final location and design of the proposed bridge replacement have not been made. Therefore, community data are presented in the context of total coverage of each type with the study area (Table 4). Once a final alignment and preliminary design have been determined, probable impacts to each community type will be calculated.

Table 4. Coverage of terrestrial communities in the study area.

Community	Coverage (ac.)
Maintained/Disturbed	6.8
Acid cove Forest	1.4
Total	8.2

4.2 Terrestrial Wildlife

Terrestrial communities in the study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species (those species actually observed are indicated with *). Mammal species that commonly exploit disturbed area and stream corridors found within the study area include species such as the Virginia opossum, raccoon, eastern cottontail, eastern mole, white-tailed deer and groundhog. Birds that are commonly found in these areas include American goldfinch, mourning dove, gray catbird, blue jay, American robin, cedar waxwing, Carolina chickadee, Carolina wren and common crow. Reptile and amphibian species that may use terrestrial communities located in the study area include the eastern box turtle, black rat snake and eastern garter snake.

4.3 Aquatic Communities

Aquatic communities in the study area consist of a perennial mountain stream. This stream could support fish species such as the rainbow trout, brown trout, rock bass, central stoneroller, mottled sculpin, bluehead chub*, Kanawha darter, fantail darter and blacknose dace. Reptiles likely to occur in these areas consist of the northern water snake, queen snake and painted turtle.

4.4 Invasive Species

One species from the NCDOT Invasive Exotic Plant List for North Carolina was found to occur in the study area. The species identified was Bradford pear (Watch List). NCDOT will manage invasive species as appropriate.

5.0 JURISDICTIONAL ISSUES

5.1 Clean Water Act Waters of the U.S.

Three jurisdictional streams were identified in the study area (Table 5). The locations of these streams are shown in Figure 3. The physical characteristics and water quality designations of these jurisdictional streams are detailed in Section 3.2. The jurisdictional streams in the study area have been designated as a Cold water streams for the purposes of stream mitigation.

Table 5. Jurisdictional characteristics of water resources in the study area.

Map ID	Length (ft.)	Classification	Compensatory Mitigation Required	River Basin Buffer
MF	660	Perennial	Yes	Not Subject
GB	240	Perennial	Yes	Not Subject
EB	130	Perennial	Yes	Not Subject

No wetlands were identified within the study area.

5.2 Clean Water Act Permits

The proposed project has been designated as a Categorical Exclusion (CE) for the purposes of NEPA documentation. As a result, a Nationwide Permit 23 will likely be applicable. Other permits that may apply include a NWP No. 33 for temporary construction activities such as stream dewatering, work bridges or temporary causeways that are often used during bridge construction or rehabilitation. The USACE holds the final discretion as to what permit will be required to authorize project construction.

In addition to the 404 permit, other required authorizations include the corresponding Section 401 Water Quality Certification (WQC) from the NCDWQ. A NCDWQ Section 401 Water Quality General certification for a Categorical Exclusion may be required prior to the issuance of a Section 404 Permit. Other required 401 certifications may include a GC 3688 for temporary construction access and dewatering.

5.3 Construction Moratoria

Middle Fork South Fork New River is considered Hatchery Supported Designated Public Mountain Trout Water by NCWRC. A moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 to protect the egg and fry stages of trout.

5.4 N.C. River Basin Buffer Rules

Middle Fork South Fork New River, Greer Branch and Elrod Branch do not lay within any of the NCDWQ buffered river systems.

5.5 Rivers and Harbors Act Section 10 Navigable Waters

Middle Fork South Fork New River, Greer Branch and Elrod Branch are not considered a Navigable Water under Section 10 of the Rivers and Harbors Act.

5.6 Wetland and Stream Mitigation

5.6.1 Avoidance and Minimization of Impacts

The NCDOT will attempt to avoid and minimize impacts to streams and wetlands to the greatest extent practicable in choosing a preferred alternative and during project design. At this time, no final decisions have been made with regard to the location or design of the preferred alternative.

Design Standards in Sensitive Watersheds will be required due to the designation of study area waters as supporting trout.

5.6.2 Compensatory Mitigation of Impacts

The NCDOT will investigate potential on-site stream and wetland mitigation opportunities once a final decision has been rendered on the location of the preferred alternative. If on-site mitigation is not feasible, mitigation will be provided by North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP). In accordance with the “Memorandum of Agreement Among the North Carolina Department of Transportation and the U.S. Army Corps of Engineers, Wilmington District” (MOA), July 22, 2003, the EEP will be requested to provide off-site mitigation to satisfy the federal Clean Water Act compensatory mitigation requirements for this project.

5.7 Endangered Species Act Protect Species

As of January 31, 2008 the USFWS lists eight federally protected species for Watauga County (Table 6). A brief description of each species’ habitat requirements follow, along with the Biological Conclusion rendered based on survey results in the study area. Habitat requirements for each species are based on the current best available information as per referenced literature and USFWS correspondence.

Table 6. Federally protected species listed for Watauga County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Clemmys muhlenbergii</i>	Bog turtle	T (S/A)	No	Not Required
<i>Glaucomys sabrinus coloratus</i>	Carolina northern flying squirrel	E	No	No Effect
<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat	E	No	No Effect
<i>Microhexura montivaga</i>	Spruce-fir moss spider	E	No	No Effect
<i>Solidago spithamea</i>	Blue Ridge goldenrod	T	No	No Effect
<i>Liatris helleri</i>	Heller’s blazing star	T	No	No Effect
<i>Hedyotis purpurea</i> var. <i>montana</i>	Roan mountain bluet	E	No	No Effect
<i>Geum radiatum</i>	Spreading avens	E	No	No Effect

E-Endangered

T-Threatened

T(S/A)- Threatened due to similarity of appearance

Bog Turtle

USFWS optimal survey window: April 1 – October 1 (visual surveys); April – June 15 (optimal for breeding/nesting); May 1 – June 30 (trapping surveys)

Habitat Description: Bog turtle habitat consists of open, groundwater supplied (springfed), graminoid dominated wetlands along riparian corridors or on seepage slopes. These habitats are designated as mountain bogs by the NCNHP, but they are technically poor, moderate or rich fens that may be associated with wet pastures and old drainage ditches that have saturated muddy substrates with open canopies. Plants found in bog turtle habitat include sedges, rushes, marsh ferns, herbs, shrubs (tag alder, hardhack, blueberry, etc.), and wetland tree species (red maple and silky willow). These habitats often support sphagnum moss and may contain carnivorous plants (sundews and pitcherplants) and rare orchids. Potential habitat may be found in western Piedmont and Mountain counties from 700 to 4500 feet elevation in North Carolina. Soil types (poorly drained silt loams) from which bog habitats have been found include Arkaqua, Chewacla, Dellwood, Codorus complex, Hatboro, Nikwasi, Ptomac-Iotla complex, Reddies, Rosman, Tate-Cullowhee complex, Tusquitee, Watauga, and Wehadkee.

Biological Conclusion: Not Required

Species listed as threatened due to similarity of appearance do not require Section 7 consultation with the USFWS. However, this project is not expected to affect the bog turtle because no suitable habitat is present within the study area. There are no mountain bogs or fens in the study area. A review of NCNHP records indicates no known bog turtle occurrence within 5.0 miles of the study area.

Carolina northern flying squirrel

USFWS optimal survey window: Year-round

Habitat Description: Carolina northern flying squirrels are primarily found at the ecotone between coniferous and northern hardwood forests, at elevations greater than 5,000 feet. The hardwood forests are particularly important, as they are used for nesting habitat. This species frequently congregates in small family groups, and nests are generally located in tree cavities. Litters consist of 2-6 young, produced in early spring.

Biological Conclusion: No Effect

There is no suitable habitat for Carolina northern flying squirrel in the project study area. Elevation averages approximately 3,300 feet, well below the minimum elevation requirement of 5,000 feet. The project study area is dominated by maintained/disturbed areas with only a small forested area. A check of the NHP database on October 14, 2009 showed no known occurrences of Carolina northern flying squirrel within 5.0 miles of the study area.

Virginia big-eared bat

USFWS optimal survey window: May-15 through August 15; January 15-February 15 (winter)

Habitat Description: Virginia big-eared bat has been recorded in the Appalachian mountains of North Carolina. They occupy caves in the summer and winter.

Hibernating colonies are typically located in deep cave passageways that have stable temperatures and air movement, the temperature in these hibernacula may be lower than that tolerated by other bats. Roost sites are generally located in mines or caves in oak-hickory forests. They will use alternate roost sites but there is no record of long migrations. They are nocturnal and leave their roost to forage on moths, beetles, and other insects. This species feeds mostly over open pasture, corn and alfalfa fields, and around the crowns of trees.

Biological Conclusion: No Effect

A bat survey was conducted on August 26, 2009 by NCDOT biologists. Details of the survey can be found in the survey report (Appendix D).

Spruce-fir moss spider

USFWS optimal survey window: Year-round

Habitat Description: The spruce-fir moss spider is currently known from only four locations. There are three sites in North Carolina (one in Avery/Caldwell Counties and two in Swain County) and one in Tennessee (Sevier County). At this time, only the population in Avery/Caldwell Counties in North Carolina appears to be stable. The other two populations in North Carolina are very small, with only one individual found at each in recent searches (Harp 1992).

This spider is typically found in damp moss and liverwort mats growing on rocks in well shaded, mature, high elevation Fraser fir and red spruce forests (Harp 1992). This spider cannot tolerate desiccation. The spider constructs its web under the moss, at the interface with the rock. Webs are tube-shaped, thin-walled, and generally flat with short side branches.

Biological Conclusion: No Effect

No suitable habitat for spruce-fir moss spider exists within the study area, which is dominated by maintained/disturbed communities. No Fraser fir or red spruce forests are found within the study area. A check of the NHP database on October 14, 2009 showed no known occurrences of spruce-fir moss spider within 5.0 miles of the study area.

Blue Ridge goldenrod

USFWS optimal survey window: July-September

Habitat Description: Blue Ridge goldenrod, endemic to the Appalachian Mountains of North Carolina and Tennessee, occurs in the High Elevation Rocky Summit natural community at or above elevations of 4,600 feet above mean sea level along cliffs, ledges, balds, and dry rock crevices of granite outcrops of the higher mountain peaks. This early pioneer herb grows in full sun on generally acidic soils of shallow humus or clay loams that are intermittently saturated. The encroachment of woody vegetation such as ericaceous shrubs can eliminate the goldenrod through competition and shading. Roan Mountain bluet, Heller's blazing star, and spreading avens are a few of its common associate species.

Biological Conclusion: No Effect

No suitable habitat for Blue Ridge goldenrod exists within the study area, which is dominated by a maintained/disturbed community. No cliffs, ledges, balds or rock crevices are present. Elevation in the study area averages approximately

3,300 feet, well below the minimal habitat elevation of 4,600 feet. A check of the NHP database on October 14, 2009 shows no known occurrences of Blue Ridge goldenrod within one mile of the study area.

Heller's blazing star

USFWS optimal survey window: July-September

Habitat Description: Heller's blazing star, endemic to the Blue Ridge Mountains of North Carolina, occurs in the High Elevation Rocky Summit natural community on high elevation ledges, rock outcrops, cliffs, and balds at elevations of 3,500–5,999 feet above mean sea level. This early pioneer, perennial herb grows in acidic and generally shallow humus or clay loams on igneous and metasedimentary rock. Known populations are intermittently saturated and excessively to moderately poorly drained. The plant generally occurs in full sunlight with grasses, sedges, and other composites. Blue Ridge goldenrod, Roan Mountain bluet, and spreading avens are a few of its common associate species.

Biological Conclusion: No Effect

No suitable habitat for Heller's blazing star exists within the study area, which is dominated by a maintained/disturbed community. No cliffs, ledges, balds or rock crevices are present. A check of the NHP database on October 14, 2009 shows no known occurrences of Heller's blazing star within one mile of the study area.

Roan Mountain bluet

USFWS optimal survey window: June-July

Habitat Description: Roan Mountain bluet occurs on thin, gravelly talus slopes of grassy balds, cliff ledges, shallow soils in crevices of rock outcrops, and steep slopes with full sun at the summits of high elevation peaks of the southern Blue Ridge Mountains. The perennial herb is documented in Grassy Bald, High Elevation Rocky Summit, Montane Acidic Cliff, and Piedmont/Coastal Plain Acidic Cliff natural communities. The plant is found at elevations of 4,200-6,300 feet above mean sea level, and often has a north, northwest, south, or southwest aspect. Known occurrences typically grow in gravel-filled, acidic, and metamorphic-derived soil pockets between underlying mafic rock. Fraser fir and red spruce dominate the forests adjacent to known populations. Blue Ridge goldenrod, Heller's blazing star, and spreading avens are a few of its common associate species.

Biological Conclusion: No Effect

No suitable habitat for Roan mountain bluet exists within the study area, which is dominated by a maintained/disturbed community. No cliffs, ledges, balds or rock crevices are present. Elevation in the study area averages approximately 3,300 feet, well below the minimal habitat elevation of 4,200 feet. A check of the NHP database on October 14, 2009 shows no known occurrences of Roan mountain bluet within one mile of the study area.

Spreading avens

USFWS optimal survey window: June-September

Habitat Description: Spreading avens, documented in the High Elevation Rocky Summit natural community of the southern Blue Ridge Mountains, occurs in areas exposed to full sun on high-elevation cliffs, outcrops, and bases of steep talus slopes. This perennial herb is also recorded in the Heath Bald natural community in thin, gravelly soils of grassy balds near summit outcrops. The species prefers a northwest aspect, but can be found on west-southwest through north-northeast aspects. Forests surrounding known occurrences are generally dominated by either red spruce-Fraser fir, northern hardwoods with scattered spruce, or high-elevation red oaks. Spreading avens typically occurs in shallow, acidic soil (such as the Burton series) in cracks and crevices of igneous, metamorphic, or metasedimentary rocks. Soils may be well drained but almost continuously wet, with soils at some known populations subject to drying out in summer due to exposure to sun and shallow depths. Known populations occur at elevations ranging from 4,296 to 6,268 feet above mean sea level. Blue Ridge goldenrod, Heller's blazing star, and Roan Mountain bluet are a few of its common associate species.

Biological Conclusion: No Effect

No suitable habitat for spreading avens exists within the study area, which is dominated by a maintained/disturbed community. No cliffs, ledges, balds or rock crevices are present. Elevation in the study area averages approximately 3,300 feet, well below the minimal habitat elevation known for the species of 4,296 feet. A check of the NHP database on October 14, 2009 shows no known occurrences of spreading avens within one mile of the study area.

5.8 Bald and Golden Eagle Protection Act

The bald eagle has been delisted from the Endangered Species Act as of August 8, 2007. It is still protected under the Bald and Golden Eagle Protection Act. There are no large water bodies within 1 mile and 660 feet of the project study area, therefore no survey is needed.

5.9 Endangered Species Act Candidate Species

As of January 31, 2008 the USFWS lists no Candidate species for Watauga County.

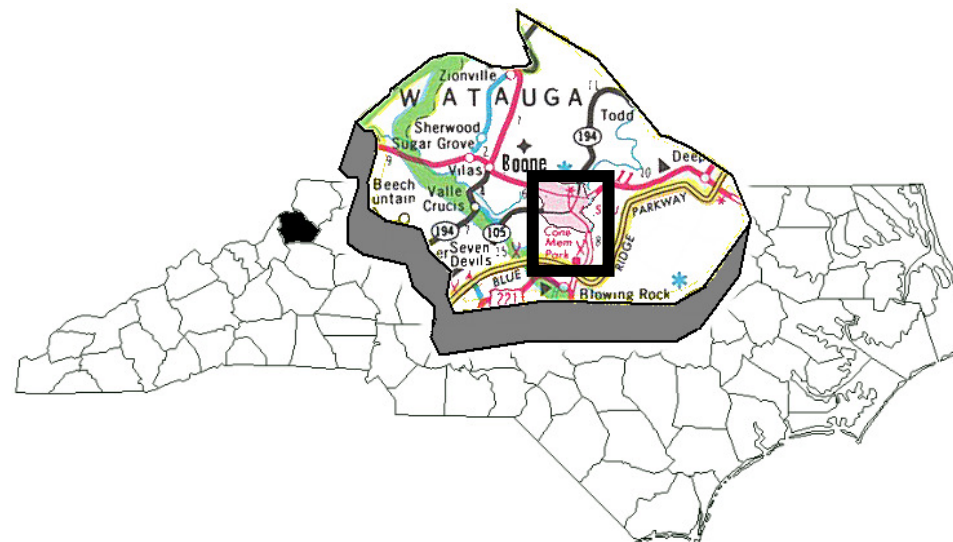
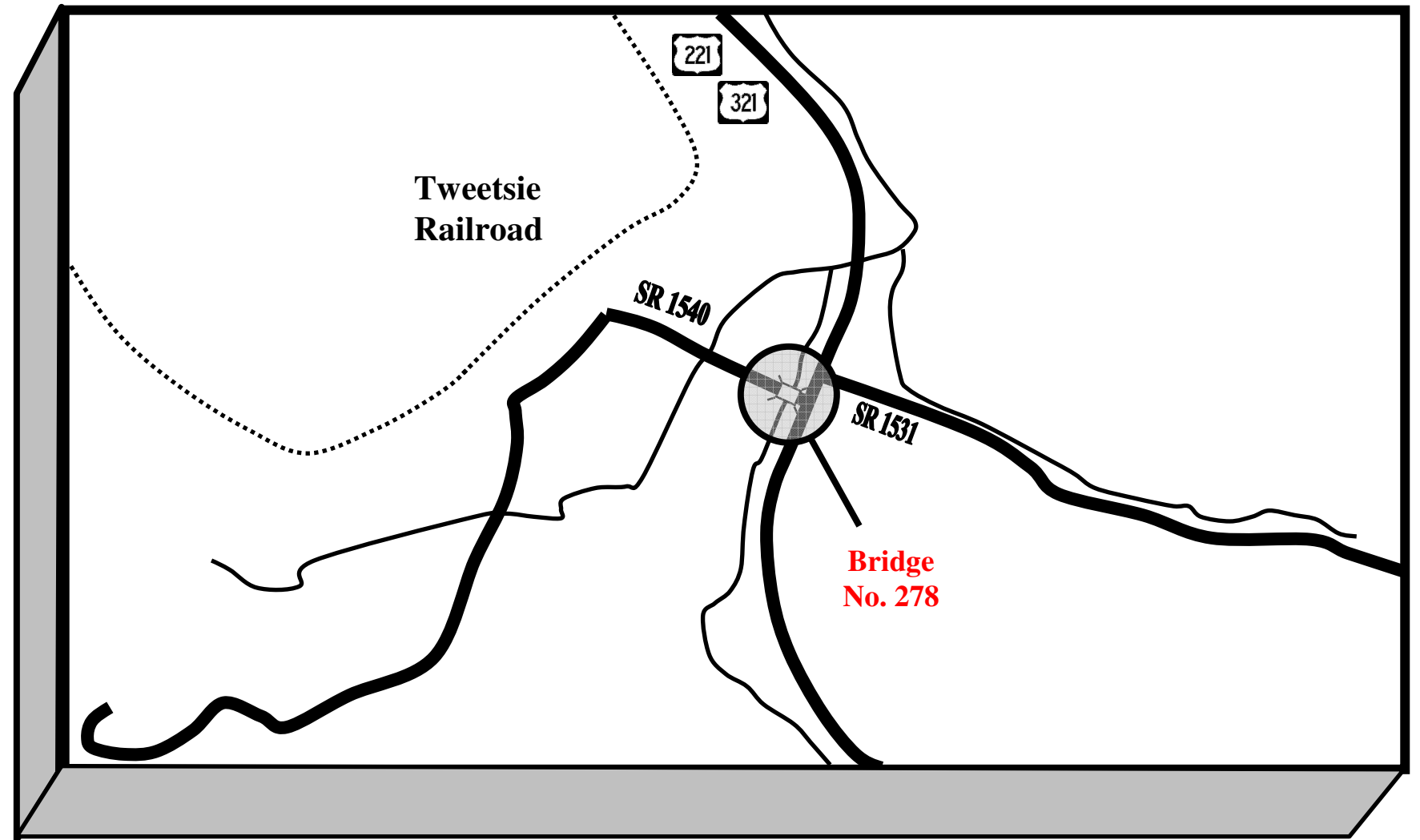
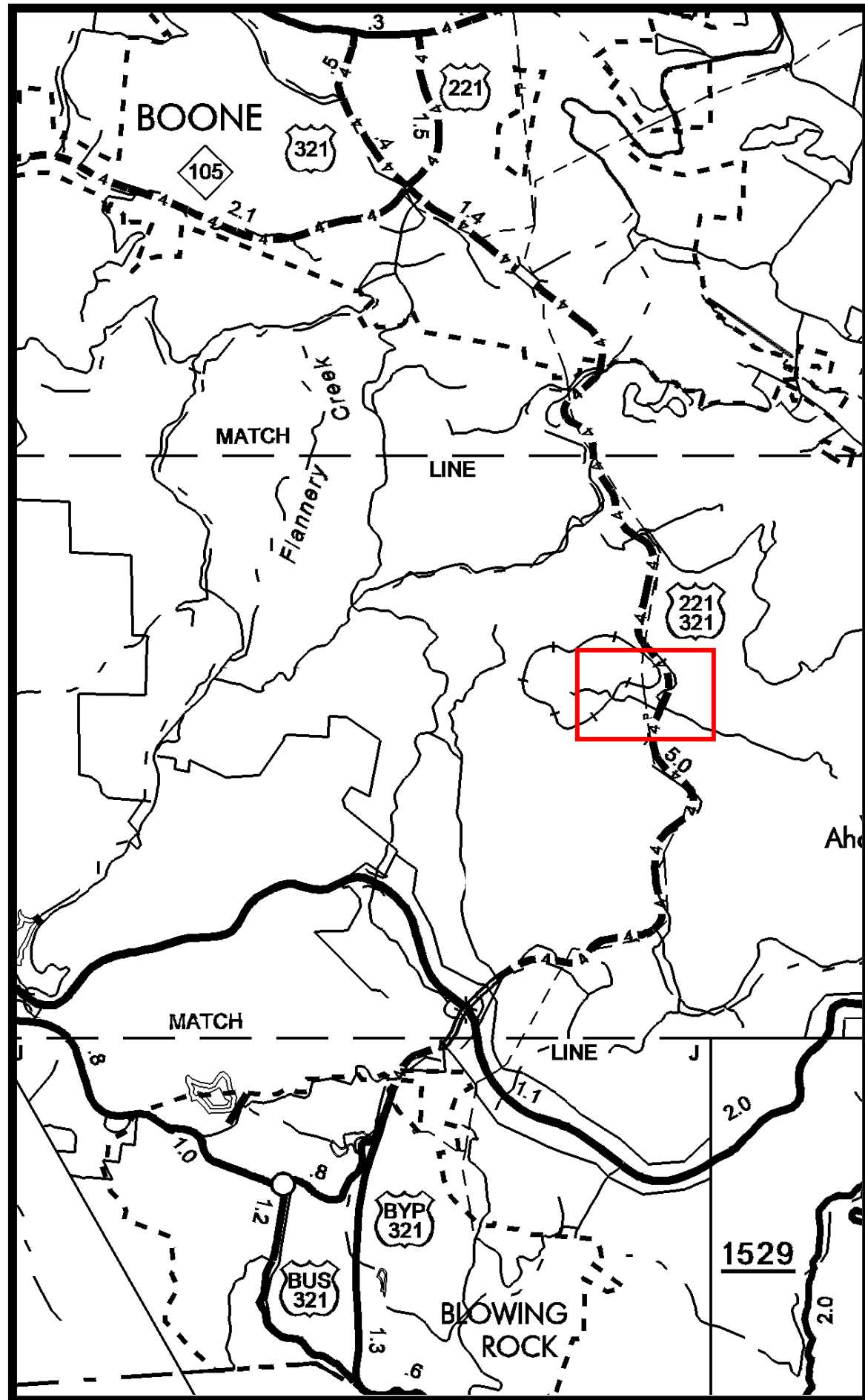
6.0 REFERENCES

- Amoroso, J.L. 2002. Natural Heritage Program List of the Rare Plant Species of North Carolina. North Carolina Natural Heritage Program. Raleigh.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. Laroe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. U.S. Government Printing Office, Washington D.C.
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report y-87-1, U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.
- Environmental Laboratory. 1992. Clarification and Interpretation of the 1987 Manual, memorandum from Major General Arthur E. Williams.
- Harp, J. M. 1992. A status survey of the spruce-fir moss spider, *Microhexura montivaga* Crosby and Bishop (Araneae, Dipluridae). North Carolina Wildlife Resources Commission, Nongame and Endangered Wildlife Program, and the U.S. Fish and Wildlife Service, Asheville, North Carolina. 30 pp.
- LeGrand Jr., H.E. and S.P. Hall. 2001. Natural Heritage Program List of the Rare Animal Species of North Carolina. North Carolina Natural Heritage Program. Raleigh.
- NatureServe. 2007. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.2. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed 02/18/08)
- N.C. Department of Environment, Health, and Natural Resources, Division of Environmental Management. 1996. A Field Guide to North Carolina Wetlands Report No. 96-01. EPA 904/B-94/001.
- N.C. Department of Environment and Natural Resources, Division of Water Quality. 1995. Guidance for Rating the Values of Wetlands in North Carolina. Fourth version.
- N.C. Department of Environment and Natural Resources, Division of Water Quality. 1999. Internal Guidance Manual- N.C., Division of Water Quality Stream Classification Method.
- N.C. Department of Environment and Natural Resources, Division of Water Quality. 2009. Basinwide Water Quality Plan, New River Basin. Raleigh, North Carolina.
http://www.esb.enr.state.nc.us/documents/NewBasinwideFinal_09.pdf

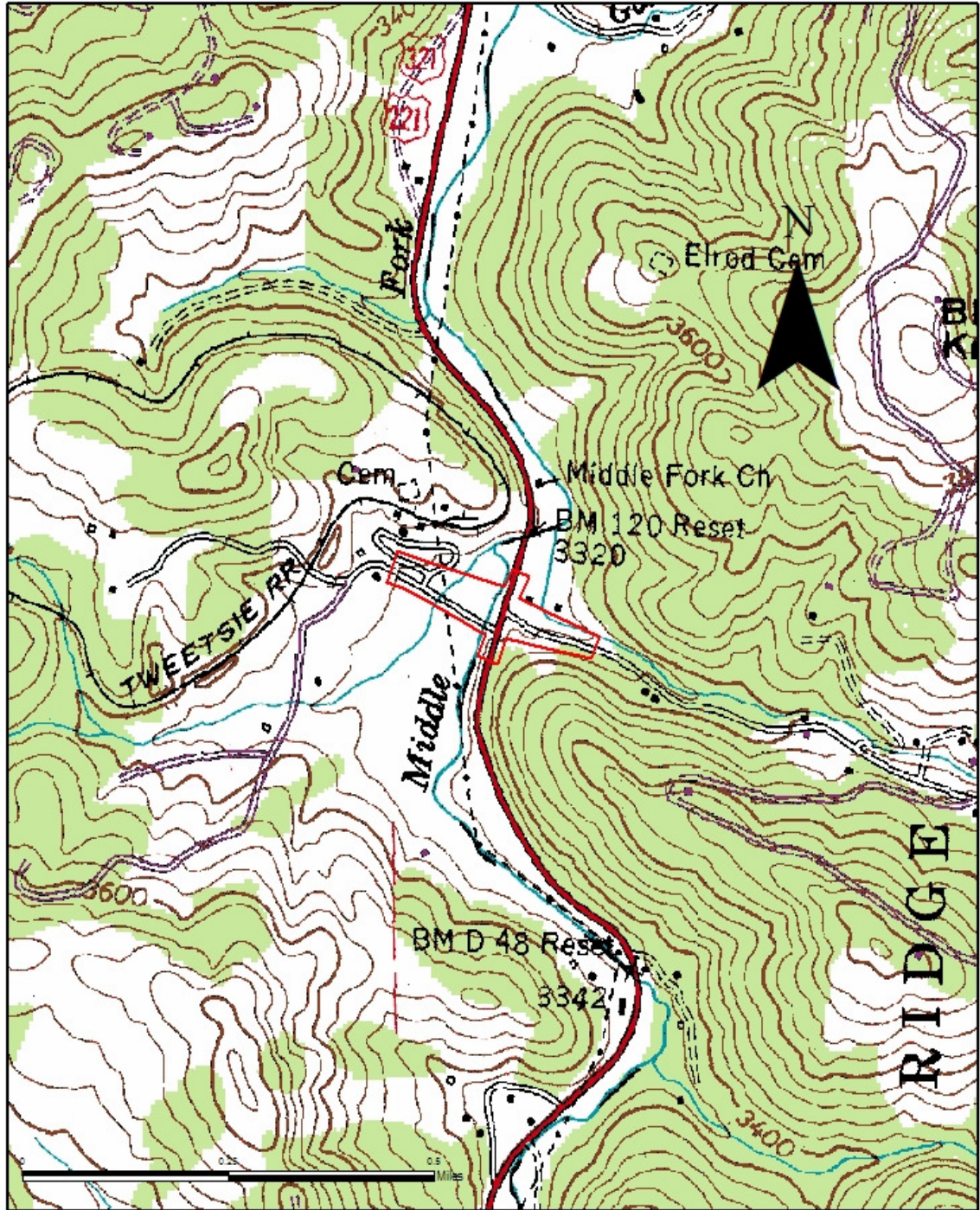
- N.C. Department of Environment and Natural Resources, Division of Water Quality.
2003a. Point Source Discharges to the Surface Waters. 15A NCAC 02H. 0100.
- N.C. Department of Environment and Natural Resources, Division of Water Quality.
2003b. Surfacewater and Wetland Standards. 15 NCAC 02B. 0100 & .0200.
- N.C. Department of Environment and Natural Resources, Division of Water Quality.
2006. Water Quality Assessment and Impaired Waters List (2006 Integrated 305(b) and 303 (d) Report).
http://h2o.enr.state.nc.us/tmdl/documents/303d_Report.pdf
- N.C. Department of Transportation. 2008. Invasive Exotic Plant List for North Carolina.
- N.C. Department of Transportation. 1997. Best Management Practices for Protection of Surface Waters.
- Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, NCDEHNR. Raleigh, North Carolina.
- United States Department of Agriculture, Natural Resources Conservation Service.
Online Soils Information and Mapper. August 2009.
<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- United States Fish and Wildlife Service. Virginia big-eared bats in North Carolina.
<http://www.fws.gov/nc-es/mammal/vbigear.html>. (Accessed 02/18/08)
- United States Fish and Wildlife Service, 1986. Boone, North Carolina, National Wetland Inventory Quadrangle (7.5-minute series). 1 sheet.
- United States Fish and Wildlife Service, Region 4: Southeast Region, North Carolina Ecological Services. 2008. Threatened and Endangered Species in North Carolina: Watauga County. Updated 31 January 2008.
<http://www.fws.gov/nc-es/es/countyfr.html>
- United States Geological Survey, 1986. Boone, North Carolina, Topographic Quadrangle (7.5-minute series). Reston: 1 sheet.

Appendix A

Figures



	North Carolina Department of Transportation Division of Highways PROJECT DEVELOPMENT & ENVIRONMENTAL ANALYSIS BRANCH
WATAUGA COUNTY REPLACE BRIDGE NO. 278 ON SR 1540 MIDDLE FORK SOUTH FORK NEW RIVER B-5177	
Figure 1 Vicinity Map	



B-5177

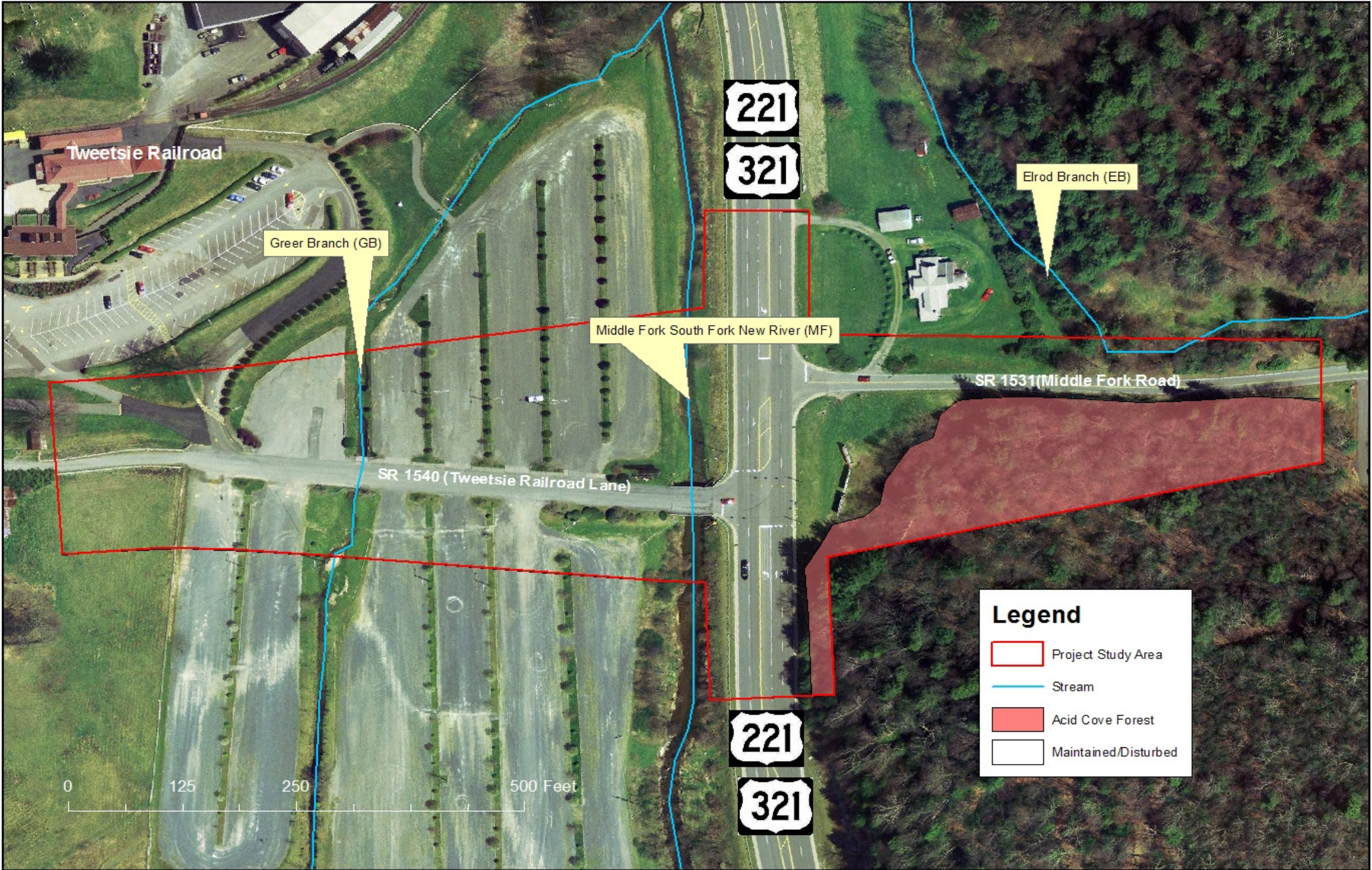
Watauga County

Project Study Area Map

FIGURE 2



Prepared by the NCDOT
Project Development &
Environmental Analysis Branch
Natural Environment Unit



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES AND
NATURAL COMMUNITIES MAP

WATAUGA COUNTY
TIP PROJECT B-5177



Div: 11 TIP# B-5177

WBS: 42548.1.1

Date: March 2010

Figure
3

Appendix B

Scientific Names of Species Identified in Report

Plants

<u>Common Name</u>	<u>Scientific Name</u>
black locust	<i>Robinia pseudoacacia</i>
blueberry	<i>Vaccinium</i> spp.
Bradford pear	<i>Pyrus calleryana</i>
broadleaf plantain	<i>Plantago major</i>
burdock	<i>Arctium</i> spp.
buttonweed	<i>Diodia teres</i>
Canada hemlock	<i>Tsuga canadensis</i>
Eastern white pine	<i>Pinus strobus</i>
elderberry	<i>Sambucus canadensis</i>
fescue	<i>Festuca</i> spp.
Fraser fir	<i>Abies fraseri</i>
Fraser magnolia	<i>Magnolia fraseri</i>
hardhack	<i>Spiraea douglasii</i>
horse nettle	<i>Solanum carolinense</i>
jewelweed	<i>Impatiens capensis</i>
Joe-Pye weed	<i>Eupatorium purpureum</i>
liverwort	<i>Hepatica</i> spp.
marsh fern	<i>Thelypteris</i> spp.
New York fern	<i>Thelypteris noveboracensis</i>
Northern red oak	<i>Quercus rubra</i>
orchid	<i>Orchidaceae</i> spp.
pitcherplant	<i>Sarracenia</i> spp.
Queen Anne's lace	<i>Daucus carota</i>
rattlesnake plantain	<i>Goodyera pubescens</i>
red clover	<i>Trifolium pratense</i>
red maple	<i>Acer rubrum</i>
red spruce	<i>Picea rubens</i>
rosebay	<i>Rhododendron</i> spp.
rush	<i>Juncus</i> spp.
sedge	<i>Carex</i> spp.
silky willow	<i>Salix sericea</i>
sphagnum moss	<i>Sphagnum</i> spp.
sun dew	<i>Drosera</i> spp.
tag alder	<i>Alnus serrulata</i>
witch hazel	<i>Hamamelis virginiana</i>
yellow birch	<i>Betula alleghaniensis</i>

Animals

Common Name

Scientific Name

American goldfinch	<i>Carduelis tristis</i>
American robin	<i>Turdus migratorius</i>
bald eagle	<i>Haliaeetus leucocephalus</i>
black rat snake	<i>Elaphe obsoleta obsoleta</i>
blacknose dace	<i>Rhinichthys altratulus</i>
bluehead chub	<i>Nocomis leptcephalus</i>
blue jay	<i>Cyanocitta cristata</i>
brown trout	<i>Salmo trutta</i>
Carolina chickadee	<i>Poecile carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
cedar waxwing	<i>Bombycilla cedrorum</i>
central stoneroller	<i>Campostoma anomalum</i>
common crow	<i>Corvus brachyrhynchos</i>
eastern box turtle	<i>Terrapene carolina</i>
eastern cottontail	<i>Sylvilagus floridanus</i>
eastern garter snake	<i>Thamnophis sirtalis</i>
eastern mole	<i>Scalopus aquaticus</i>
fantail darter	<i>Etheostoma flabellare</i>
gray catbird	<i>Dumetella carolinensis</i>
groundhog	<i>Marmota monax</i>
Kanawha darter	<i>Etheostoma kanawhae</i>
mottled sculpin	<i>Cottus bairdi</i>
mourning dove	<i>Zenaida macroura</i>
northern water snake	<i>Nerodia sipedon</i>
painted turtle	<i>Chrysemys picta</i>
queen snake	<i>Regina septemvittata</i>
raccoon	<i>Procyon lotor</i>
rainbow trout	<i>Oncorhynchus mykiss</i>
rock bass	<i>Ambloplites rupestris</i>
Virginia opossum	<i>Didelphis virginiana</i>
white-tailed deer	<i>Odocoileus virginianus</i>

Appendix C

Qualifications of Contributors

Investigator: Kristoffer J. G. Dramby, PWS, CE
Education: Graduate Certificate, Natural Resource Mgmt., Virginia Tech, 2005
B.S. Biology, Towson University, 2000
Certification: Professional Wetland Scientist (Society of Wetland Scientists)
Certified Ecologist (Ecological Society of America)
Experience: Environmental Biologist, NCDOT, 4/2006 to Present
Ecologist, Williamsburg Environmental Group, 3/2001-3/2006
Wildland Firefighter, USFS, Salmon-Challis National Forest, Salmon,
Idaho, September 2000
Wildlife Technician, USFS, Allegheny National Forest, 4/2000-9/2000
Wildlife Technician, Howard County Parks & Rec., 4/1999-8/1999

Investigator: Jeffrey Hemphill
Education: BS, Forest Resource Management, Ohio State University,
Experience: Environmental Specialist, NCDOT, March 2004 - present
Environmental Scientist, R.D. Zande & Associates, Columbus, OH, June
1991-January 2004

Appendix D
Species Survey Reports