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Environmental Assessment

Land Bridge Road
Bridge Relocation Project

Andrew Pickens Ranger District
Sumter National Forest
Oconee County
South Carolina

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Contact Person:	Victor Wyant Silviculturist / TMA USDA Forest Service 112 Andrew Pickens Circle Mountain Rest, SC 29664 Phone: 864-638-9568

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Table of Contents

Chapter 1 – Purpose and Need for Action 4

1.1 Introduction 4
1.2 Background 4
1.3 Purpose and Need 4
1.4 Proposed Action 5
1.5 Forest Plan Direction 5
1.6 Scoping 7
1.7 Decision to Be Made 7
1.8 Issues 8

Chapter 2 – Alternatives 9

2.1 Alternative 1: No Action 9
2.2 Alternative 2: Proposed Action 9
2.3 Alternatives Considered but Not Developed 13
2.4 Design Criteria 13
2.5 Comparison of Alternatives 16

Chapter 3 – Affected Environment and Environmental Consequences 17

3.1 Physical Environment *17*
3.1.1 Soils 17
3.1.2 Water and Riparian Resources 20
3.1.2.1 Free-Flowing Condition 23
3.1.3 Air 23
3.1.4 Climate Change and Carbon Storage 25
3.1.5 Geology 26

3.2 Biological Environment *27*
3.2.1 Vegetation 27
3.2.2 Wildlife 32
3.2.3 Neotropical Migratory Birds 36
3.2.4 Proposed, Endangered, Threatened and Sensitive Species (PETS) 41
3.2.5 Aquatic Communities 45

3.3 Social Environment *49*
3.3.1 Recreation and Scenery 49
3.3.2 Heritage 55
3.3.3 Economics 56
3.3.4 Human Health and Safety 57
3.3.5 Environmental Justice and the Protection of Children 58
3.3.6 Civil Rights 60
3.3.7 Irreversible and Irretrievable Commitment of Resources 60

Chapter 4 – Consultation 62

Chapter 1 – Purpose and Need for Action

1.1 Introduction

This Environmental Assessment (EA) documents the results of the potential environmental impacts of actions proposed by the United States Department of Agriculture (USDA), Forest Service (USFS) for a bridge relocation and road realignment on the Andrew Pickens Ranger District (Andrew Pickens RD) of the Sumter National Forest. The proposed project occurs along Land Bridge Road at the crossing of the Chauga River (Figures 1 and 2). Land Bridge Road is a county-maintained road that crosses different ownership jurisdictions. The area where proposed project activities would occur is on national forest system (NFS) Lands.

The primary objectives of the project are to improve public safety and water quality by building a new bridge that would be at a higher elevation to allow floodwaters to safely pass beneath it. The bridge would also support two-lane traffic and heavier-weighted vehicles (including emergency vehicles), and by changing the road alignment, would improve visibility, traffic flow and water drainage. A secondary objective of the project is to provide recreational access to the Chauga River in the form of small parking areas located on either side of the new bridge and a foot trail connecting on of the parking areas to the river.

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 [42 United States Code (USC) 4321 et seq.], which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the human environment; the Council on Environmental Quality (CEQ) Regulations [40 Code of Federal Regulations (CFR) 1500 through 1508] for implementing NEPA; USDA's NEPA Policies and Procedures (7 CFR Part 1b); Forest Service Manual (FSM) 1950; and Forest Service Handbook (FSH) 1909.15.

1.2 Background

In South Carolina, a Resource Advisory Committee (RAC) consisting of county officials and community leaders from Oconee, Newberry, Berkeley and Union counties and the Forest Service meet each year to determine how to use Title II funds under the Secure Rural Schools Act. In February 2012, the Francis Marion and Sumter RAC recommended $109,000 for the Land Bridge Road Bridge Replacement Project for survey and geo-tech inventory. In September, 2012 the RAC added $50,700 for the design of the bridge. The geo-tech inventory, completed in December, 2012, concluded that the proposed location for the new bridge and road were feasible.

1.3 Purpose and Need

The current bridge is structurally obsolete; it is impacted by river flooding, restricts traffic to a single lane on the bridge, and is weight-restricted. The section of road that approaches the bridge is poorly aligned. It does not provide good visibility and is situated on steep slopes. The road surface is graveled, which when combined with the steep approaches impacts water quality in the Chauga River. The existing road alignment and approaches to the bridge pass through entrenched roadway sections preventing proper road maintenance, particularly drainage from the roadway. The steep approaches impact water quality and road stability.

The purpose of the new bridge is to meet South Carolina Department of Transportation (SC DOT) standards for structure, traffic safety, and weight limits to allow the passage of heavier vehicles, in particular emergency response vehicles. Relocation of the bridge to a higher elevation would meet SC DOT design standards for a 100-year storm event and to allow floodwaters to pass safely beneath it.

The purpose of changing the road alignment and paving the surface at river crossing approaches is to improve visibility, traffic flow and water quality.

1.4 Proposed Action

The project would include construction of a new bridge and road segment, dismantling and removal of the old bridge, obliteration of the existing road segment that would no longer be used, and construction of two gravel parking areas and connector trail for recreation access. Existing easements would be revised to support the new location of the county road and bridge on NFS lands. Other connected actions would include soil stabilization and clearing of vegetation for the new road segment. Design criteria would be incorporated in construction and reloaction of the new bridge to reduce adverse impacts to water quality in the Chauga River.

1.5 Forest Plan Direction

This decision is consistent with the *Revised Land and Resource Management Plan, Sumter National Forest* (Forest Plan) and tiers to the Final Environmental Impact Statement for the Sumter National Forest.

Forest Plan direction that is specific to this project includes:

Goal 6 - Cooperate with landowners and other partners to address watershed needs and participate in efforts to identify stream problems, watershed planning, BMP and Total Mean Daily Load (TMDL) implementation with the South Carolina Department of Health and Environmental Control, South Carolina Forestry Commission and other agencies.

Goal 29 - Wild and Scenic Eligible rivers (which includes the Chauga River) would be managed to protect free-flow, protect and to the extent possible enhance outstandingly remarkable values, and maintain the identified wild, scenic, or recreational classification. The following standards apply to ¼ mile on each side of the eligible rivers:

FW-83 No new road construction in wild sections.
FW-84 No motorized boats or crafts are allowed on the wild sections.
FW-85 No motorized trails are allowed.
FW-86 No federal mineral leasing or mineral material authorization is permitted.
FW-87 New utility corridors or communications/electronic sites would be discouraged.
FW-88 Protect the outstandingly remarkable values and maintain the identified wild, scenic or recreational classification.

Goal 34 - Provide a minimum transportation system that supplies safe and efficient access for

forest users while protecting forest resources.

Goal 35 - Improve conditions of needed roads that are adversely affecting soil and water resources.

Management Prescriptions –

Management Prescription 8.A.1 – Mix of Successional Forests

Emphasis: This area provides habitat for plants and animals associated with mid- to lates successional forest habitats. Management activities are designed to: (1) maintain a Minimum of 50 percent of the forested acres in mid- to late-successional habitat, (2) maintain or enhance hard and soft mast production, (3) increase vegetative diversity (structural and spatial), and (4) limit motorized access across the prescription area.

Management Prescription 11 - Riparian Corridors

Emphasis: Riparian corridors would be managed to retain, restore and/or enhance the inherent ecological processes and functions of the associated aquatic, riparian, and upland components within the corridor.

Applicable Management Prescription 11 Standards for this Project

11.-7 Motorized and non-motorized trail reconstruction and relocation within the riparian corridor are allowed to reduce impacts to riparian and aquatic resources.

11.-8 New stream crossings would be evaluated and where necessary constructed so that they do not adversely impact the passage of aquatic organisms. Exceptions may be allowed to prevent the upstream migration of undesired species.

11.-16 Tree removals may only take place if needed to enhance the recovery of the health, diversity and/or complexity of vegetation, rehabilitate both natural and human-caused disturbances, provide habitat improvements for PETS or riparian-dependent species, suppress pest insect populations, reduce hazardous fuel buildup, provide for visitor safety, and for approved facility construction/renovation.

11.-21 Where risks of resource damage are high, each road segment would be constructed and stabilized before starting another segment. High risk areas include landslide prone areas such as certain colluvial slopes, steep slopes and highly erosive soils. High-risk streams include streams containing sensitive aquatic species such as trout and mussels, or any threatened or endangered species, Wild and Scenic Rivers, Outstanding Resource Waters, those listed with sediment, turbidity or aquatic habitat problems on state 303d or 305b water quality reports.

11.-22 To minimize the length of streamside disturbance, ensure that approach sections are aligned with the stream channel at as near a right angle as possible. Locate riparian

corridor crossings to minimize the amount of fill material needed and minimize channel impacts.

11.-23 If culverts are removed, stream banks and channels must be restored to a natural size and shape. All disturbed soil must be removed from the active channel and floodplain, and stabilized.

1.6 Scoping

On May 21, 2013, a scoping letter was sent to interested agencies, groups, and individuals asking for input on the proposed action. This proposal was also listed in the "Schedule of Proposed Actions," for the Francis Marion and Sumter National Forests. All public comments received during scoping were considered by the interdisciplinary team (IDT).

One comment letter was received. The letter was from the US Fish and Wildlife Service (USFWS). The USFWS recommends a survey be completed for "At Risk" plant species prior to project implementation, specifically small whorled pogonia (*Isotria medeoloides*), and smooth coneflower (*Echinacea laevigata*). A survey was conducted by the Forest Service. The survey results are documented in Chapter 3 of this EA. All public input is contained in the project record.

1.7 Decision to Be Made

The Responsible Official (Andrew Pickens District Ranger) will make a decision based on a review of the EA. The Responsible Official will decide:

1. Whether to proceed with the proposed action or the "No Action" alternative.

2. Whether the decision that is selected would have a significant impact on the quality of the human environment or not. If the determination is made that the impact is not significant, then a "Finding of No Significant Impact" (FONSI) would be prepared. Significant impacts on the quality of the human environment would require the preparation of an Environmental Impact Statement [NEPA, 1501.4 (c) and (e)].

The decision of the Responsible Official will be documented in a Decision Notice (FSH, 1909.15, 43.2).

1.8 Issues

No other comments were received except for the USFWS letter. The recommendations from the USFWS are addressed in the EA and in the Biological Assessment/Biological Evaluation. There were no key issues identified by the public during the scoping period.

Chapter 2 – Alternatives

This section describes alternatives.

2.1 Alternative 1: No Action

The existing bridge and existing road alignment would remain unchanged.

2.2 Alternative 2: Proposed Action

Treatments would include construction of a the new bridge and road segment, dismantling and removal of the old bridge, obliteration of the existing road segment that would no longer be used, and construction of two gravel parking areas and a connector trail for recreation access. Existing easements would be revised to support the new location of the county road and bridge on NFS lands. Other connected actions would include soil stabilization and clearing of vegetation for the new road segment.

The bridge would span the entire width of the Chauga River (approximately 70 feet), and rest on support structures located on each side of the river banks. No piers or support structures would be located in the river. The bridge would be located at an elevation that would allow floodwaters to safetly pass beneath the bridge.

The newly aligned roadway section would replace approximately 300 feet of existing roadway. The new section would be centered in a 50-foot wide cleared and grubbed strip. The actual roadway would be 20 feet wide. The roadway would be graded to alignment and sloped as shown on the plans (Figures 1 and 2). The subgrade would be shaped and compacted with suitable material. The road section would consist of a minimum of five inches compacted stones and where asphalt is used, the road section would consist of an additional minimum two inches of compacted surface Type C asphalt.

Two small gravel parking areas would be constructed on each side of the river for recreational users of the river. The size of the parking area on the east side of the river would be approximately 30 feet x 120 feet. The size of the parking area on the west side of the river would be approxiamtely 30 feet x 60 feet (Figures 1 and 2). A short connector trail would be constructed on the eastern side of the river leading from the parking area to the river. The trail would be constructed according to Forest Service standards.

Ground and soil disturbance would occur during several phases of the project. Design criteria in section 2.5 include erosion and sediment control measures.

Connected actions associated with this proposal include the following activities:

- Removing trees and other vegetation along the newly proposed route. Cleared vegetation would be removed or broken down on-site (i.e. – chipped, scattered, masticated, etc). Merchantable wood products from the cleared strip would be sold commercially or by personal use firewood permits.

- Revising the county's existing easements to reflect the new location of the road and bridge. The Forest Service would issue an easement to Oconee County under the Forest Roads and Trails Act (FRTA, 16 USC 533) for construction and maintenance of the new right-of-way.
- Dismantling and removal of the old bridge
- Obliterating the existing road to stabilize exposed soils within the riparian corridor and reduce impacts to water quality
- Stabilizing / rehabilitating disturbed soil areas of the site, including disking, fertilizing, seeding, and mulching. Seeding would be with native and/or non-invasive non-native species.

The estimated project cost is $516,000. Funding would come from Title II Secure Rural Schools grants and Oconee County appropriated funds.

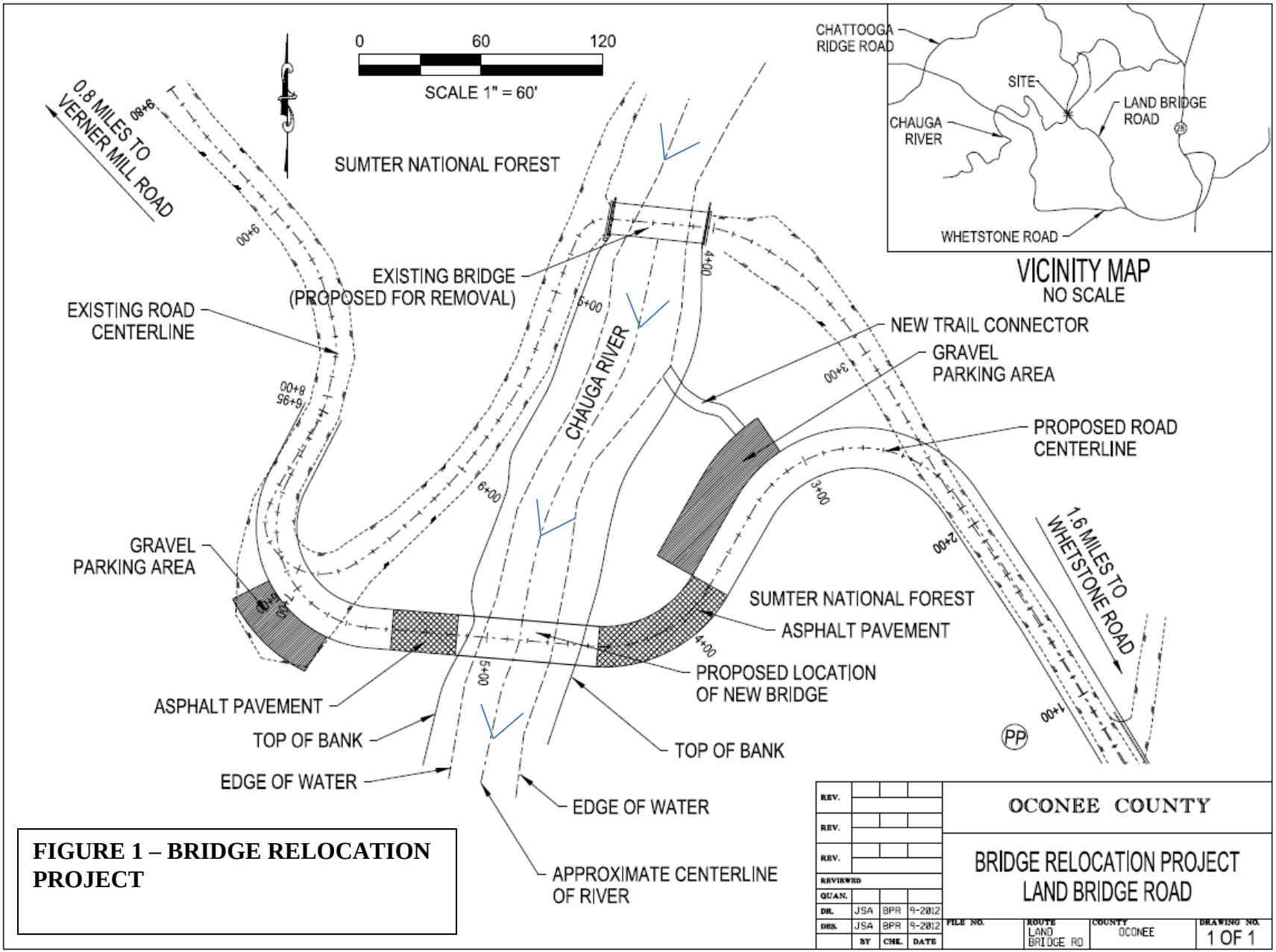
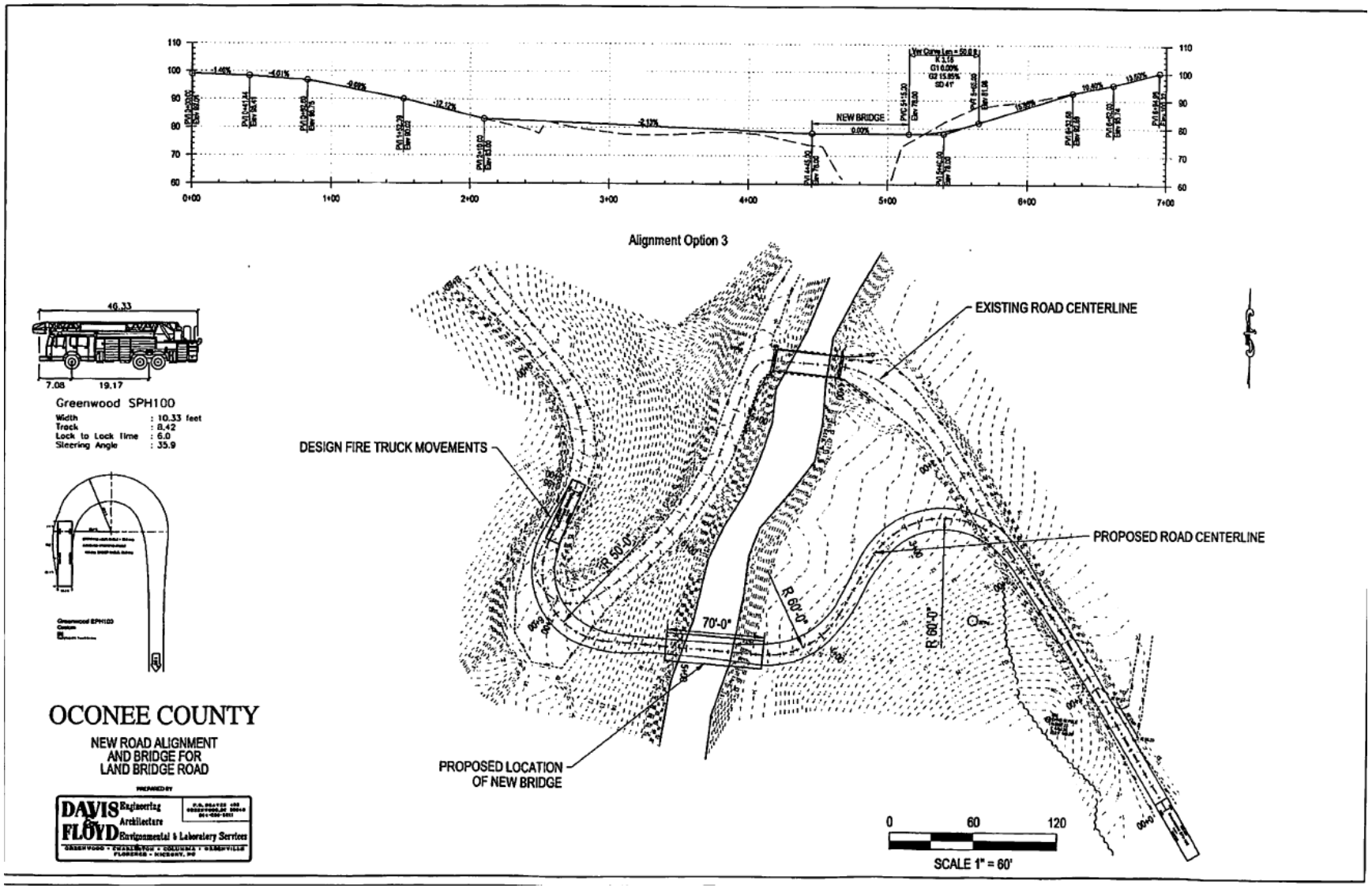


FIGURE 1 – BRIDGE RELOCATION PROJECT

FIGURE 2 – LAND BRIDGE NEW ROAD ALIGNMENT



Monitoring

Activities and effects would be monitored to ensure compliance with the Forest Plan and *South Carolina Best Management Practices for Forestry* and *South Carolina Department of Transportation Best Management Practices* (BMPs) and other specific design criteria specified below. Monitoring is done through project plan reviews and periodic on-site evaluations. Timber harvest activities, if needed, would be supervised by a Forest Service timber sale administrator. The project area would also be monitored for the introduction and spread of non-native invasive plant species.

2.3 Alternatives Considered but Not Developed

No other action alternatives were considered.

2.4 Design Criteria

Forest Plan standards, *South Carolina Best Management Practices for Forestry* and *South Carolina Department of Transportation Best Management Practices* (BMPs) would be followed. Where design criteria from one source differ from those of another, the more conservative criterion would be applied.

The following design criteria apply to the action alternative.

1. SC DOT Standard Specification Section 815 Erosion Control would be followed (located in project file).

2. SC DOT Supplemental Technical Specifications SC-M-815-11 would be followed (located in project file).

3. Davis & Floyd Engineering specifications for the project have been developed and would be followed for :
    a. Silt Fence Construction
    b. Stone Construction Entrance Detail
    c. Sediment Tube Detail
    d. Concrete Washout Area Detail
    e. Type “A” Inlet Protection Detail
    f. Type “E” Inlet Protection Detail

4. Specific Erosion Control Measures include the following (additional measures in BMP and other technical specification documents also apply):

    a. TEMPORARY SEDIMENT AND EROSION CONTROL
    Erosion Control for this project shall be as per SCDOT Standard Specifications for Highway Construction-2007, Section 815-Erosion Control. During construction, temporary BMPs would be installed to minimize erosion and remove sediment by capturing and filtering runoff before it leaves the project limits. The intent is for the

BMPs to be installed with a phased approach where perimeter controls are installed prior to clearing and earthwork activities and additional measures are introduced throughout varying stages of the construction process.

b. TEMPORARY PERIMETER CONTROLS

During the actual construction of the project, several BMPs would be installed to control sediment deposition from the project site. These measures would include:

1) Silt Fence installation for several applications including:
   a) Perimeter of soil stockpiles.
   b) Along downslope side of the access roads to the bridge.
   c) Beyond proposed embankment toes of slope with a double row of silt fence spaced a minimum of five feet apart along the top of bank of the river on both sides of the river.
   d) Delineation of work limits as required.

2) Gravel Construction Entrances.
   a) Ditch checks within the access road ditch section.
   b) Stabilized contractor and material staging area(s).
   c) Tree barricades.

c. TEMPORARY BEST MANAGEMENT PRACTICES

In addition, other erosion control measures would be installed as applicable to the type of construction:

1) Concrete washout area(s).
2) Soil Tracking.
3) Dust Control.
4) Surface roughening, temporary seeding and mulching.
5) Type “A” and “E” inlet protection filters at catch basins and drop inlets as construction sequencing dictates.
6) Within the limits of this project along the downstream edge of the bridge construction limit, silt turbidity curtains will be installed if and when construction activities generate excessive turbidity.

d. PERMANENT BEST MANAGEMENT PRACTICES

The following measures are permanent water quality structures which may be incorporated as part of a bridge project:

1) Manufactured Treatment Devices and Inlet Filters
2) Hydraulic Erosion Control Products (Type 4).
3) Stabilized protection at stormwater outfalls.
4) Vegetative swales.
5) Trash and recycling containers.

As each of the BMPs has its own varying degree of erosion prevention and trapping efficiency, calculations would be performed on the perimeter silt fencing as it is both the most prominent BMP during construction as well as the last line of defense prior to permanent stabilization. Calculations would be performed against a 100 foot sample section of the worst case scenario where a single row of silt fence would receive the most contributory area against the steepest back-slope. In addition, the fence is assumed to be installed at the toe of the steepest slope such that the proposed maintenance shelf would only improve the calculated results. Furthermore, the calculation would assume the upper-end of the runoff coefficient for bare soil as well as eliminating the contributory effects of other downstream BMPs. The resulting trapping efficiency of the worst case condition would be calculated and detailed in the contract documents.

5. Identified heritage sites would be avoided during site disturbing activities.

6. Identified PETS species location would be avoided during site disturbing activities.

7. The spread of nonnative invasive plant species would be minimized by ensuring equipment cleaning provisions are met, that no non-native invasive species are planted and that invasive plant species are treated that have the potential to impact resource management objectives in the project area.

8. Road surface approaches to the new bridge would be paved to reduce annual road maintenance disturbance within the riparian corridor and improve water quality.

9. A sediment pond (also known as a plunge pool) would be constructed near the parking area on the west side of the river to function as a sediment trap and prevent erosion due to the steep slope adjacent to the proposed parking area on the west side of the river.

10. Prior to dismantling the existing bridge, Forest Service biological staff must carefully examine the underside of the bridge for the presence of bats. If any bats are found roosting under the bridge, then all dismantling activities must be suspended. Forest Service biological staff will contact USFWS's Charleston Field Office.

2.5 Comparison of Alternatives

This section compares aspects of the alternatives to one another. Analysis of the effects can be found in the next section, Environmental Consequences.

Table 2.5-1 Comparison of Alternatives

Treatment	Alternative 1 No Action	Alternative 2 Proposed Action
Clear vegetation for new roadway	None	300 x 50 foot strip
Construct new roadway	None	300 x 50 foot strip
Obliterate existing roadway	None	300 x 50 foot strip
Construct new bridge	None	1 bridge (70-foot span)
Remove existing bridge	None	1 bridge
Construct new foot trail	None	1 trail approx. 80 feet length
Construct recreation use parking areas	None	Two parking areas

Chapter 3 – Affected Environment and Environmental Consequences

3.1 Physical Environment

3.1.1 Soils

Affected Environment

The Land Bridge Road project is located within the Southern Blue Ridge Mountains Subsection (M221Dc) ecologically with geomorphology of low mountains, typical of the area at higher elevations above the adjacent Piedmont subsection. The project area is on the Chauga River, in the headwaters portion of the basin. The topography and terrain at the project location is steep on the slopes to the west and less sloping on the east side of the River.

Soil types at the two bridge locations are as follows:

- Existing bridge site – Evard fine sandy loam (6E), 25 to 50% slope on the west side of the bridge and river; Toccoa fine sandy loam (12), 0 to 2% slope in the riparian area on either side of the river; and Hayesville very fine sandy loam (21D), 15 to 25% slope on the east side of the river outside the riparian area.

- Proposed bridge site – Brevard fine sandy loam (7C), 7 to 10% slope on the west side of the proposed location; Toccoa fine sandy loam (12), 0 to 2% slope in the riparian area on either side of the river; and Hayesville very fine sandy loam (21D), 15 to 25% slope on the east side of the river outside of the riparian area.

Soil information is from the Soil Survey of Sumter National Forest Area, Oconee County, South Carolina. The soils are derived from high-grade metamorphic geology, e.g. granite, gneiss, schist. Brevard, Evard and Hayesville soils are on upland positions, have sandy surface horizons and clay loam or clay subsoils to depths of greater than 60 inches. Toccoa soils are located on floodplain or stream terrace positions, developed from alluvium, and have loam surface horizons and loam subsoil horizons to more than 60 inches deep. The landform position creates flooding conditions on Toccoa soils that may experience occasional flooding with brief duration during winter and spring months. There are no wetlands or hydric soils within the project area. Toccoa soils can be classified as prime farmland soils if protected from flooding.

Soil impacts of concern for the Land Bridge Road bridge replacement project include exposure of soils resulting in erosion. Soils mapped in the Evard and Hayesville series are rated severe for erosion hazard, primarily due to the steep slopes. Brevard soils are rated moderate and Toccoa soils slight. The ratings indicate the hazard of soil loss from unsurfaced roads and trails. Erosion hazard can be mitigated or minimized by application and maintenance of best management practices to control erosion.

Existing site conditions that impact soils and create the potential for erosion include the entrenched road segments (road surface below soil surface limiting proper drainage), and exposed road surfaces and cut slopes above the road. The close proximity of the road segment

parallel to the Chauga River on the west side also presents a sediment source due to the ditch line and berm forcing storm water to the ditch rather than spreading and filtering in vegetation.

Direct and Indirect Effects of Alternative 1

The existing bridge, road alignment and site conditions would remain unchanged under this alternative.

There would be no new soil disturbing activities initiated in the Project Area, resulting in the least amount of direct erosion. Only undisturbed natural erosion and accelerated erosion along the road corridor would be expected to continue within the project area. Under this scenario, the No Action Alternative would represent the most damaging situation as existing erosion from the road would continue in close proximity to the Chauga River channel impacting water quality and aquatic habitat.

Cumulative Effects of Alternative 1

Alternative 1 would not implement any new activities that would directly or indirectly disturb soils. Soil erosion may occur as a result of existing conditions or activities; however cumulative effects would be minimal. Activities may occur on adjacent private lands that disturb soils, but effects would be primarily on those lands.

Direct and Indirect Effects of Alternative 2

The proposed treatments under this Alternative are described in Chapter 2 including the construction of a new bridge, associated new roadway, parking lots and user trail; and the obliteration of the existing bridge and existing roadway. Soil disturbance would occur as a result of the treatments listed below:

- clearing, grubbing, excavating and shaping to a road prism on approximately 300 feet of new roadway
- construction and installation of a 70 foot bridge spanning the Chauga River
- construction of two small parking areas and a recreation user trail
- obliteration of 300 feet of existing roadway and the existing bridge spanning the Chauga River

The primary impact of concern for soils from the treatments is erosion from soil exposure, reducing soil productivity and creating potential sediment movement to the River. Soil disturbance is not unexpected, or avoidable, during road construction projects. Disturbance can be minimized and controlled through project planning to avoid high risk soils, timing project actions for optimum operation conditions, and protecting soils during construction. Each of these can be addressed through project design, installation of controls, and timely stabilization.

Estimated acreage of exposed soils related to the proposed action includes about 0.5 to 0.75 acres for creation of the new roadway and bridge location, 0.5 to 0.75 acres for the obliteration of the old roadway and bridge, and less than 0.2 acres for the two parking lots and user trail. There is also an old road on the west side of the existing bridge that extends up river that would be

obliterated. Thus a total of 1 to 3 acres of exposed soils in the project area would be expected from the proposed action. Erosion on exposed soils without mitigation or controls could be expected to cause creation of shallow gullies, rills or channels and produce sediment to the adjacent streams and Chauga River.

It is imperative that areas of bare soil created by construction activities be evaluated for appropriate best management practices (BMPs) to be implemented to minimize erosion and sediment to the Chauga River. BMPs have been identified in the design criteria of this EA, and included in project plans. These BMPs would be a requirement of construction operations. The intent is to install temporary sediment and erosion controls with a phased approach to minimize erosion and remove sediment by capturing and filtering runoff before it leaves the project limits. A phased approach would be used, installing perimeter controls prior to clearing and excavating and introducing additional measures throughout the various stages of the construction process.

Examples of perimeter controls include silt fence around soil stockpiles, along downslope side of access roads to the bridge site, and beyond proposed embankment toes of slopes with a double row along the top of the bank along both sides of the river. Additional controls include gravel construction entrances, ditch checks within access road ditch sections, stabilized contractor and material staging areas, and maintenance of existing vegetated areas to the extent possible to provide buffer zones.

Permanent BMPs would be installed when the roadway and bridge installation are complete to stabilize the exposed soils and minimize impacts from the road surface. These BMPs include paving the roadway segments for a distance of 50 feet on either side of the bridge to reduce the need for periodic road maintenance and improve water quality. Slopes at the bridge footers and headwalls would be armored with stone to protect soils from runoff and flooding. Exposed soils would be vegetated, mulched and stabilized to provide permanent cover.

The existing roadway would be obliterated on both sides of the existing bridge with an emphasis on shaping the road surface to provide drainage for storm water runoff and minimize ditch drainage into the River. The roadway on the west side is between a steep slope and the river channel, with a berm on the side towards the river.

Cumulative Effects of Alternative 2

Past existing conditions in the project area would have been generally the same as the present condition as few treatments or actions have occurred in the area, other than periodic road maintenance. Actions on private lands upstream of the project area are unknown at this time. The effects of the replacement of the bridge and construction of the new roadway alignment related to erosion would be a short-term increase in erosion through the period of soil exposure related to construction activities. Research has demonstrated that erosion levels on exposed soils that are revegetated and stabilized return to normal levels within one to three years as vegetation becomes established and provides cover. The cumulative effects should be evident in a reduction of erosion and sediment from the project area and improved water quality in the immediate Chauga River segment.

3.1.2 Water and Riparian Resources

The Wild and Scenic Rivers Act (WSRA) requires that the managing agency preserve the water quality of designated rivers. This section analyzes the effects of all alternatives on the river's water quality.

Affected Environment

The Andrew Picken Ranger District is within the Blue Ridge Region of South Carolina. The Chauga River, just below the forest boundary, the community of Westminster, SC, uses the river as its municipal water supply, with the Ramsey Creek tributary as its backup water source. Most of the watershed is presently in good condition and many of the streams listed as Outstanding Resource Waters by South Carolina. There are some concerns about the existing and potential impacts to aquatic life from nonpoint pollutant sources such as roads, timber harvest, rural development, poultry producers and agriculture uses including pastureland. A rare crayfish, *Cambarus chaugaensis*, is found within the Chauga watershed. A variety of rare plants are found, especially within the calcareous soil area associated with the Brevard fault zone.

Watershed

The project area (PRA) is in the Blue Ridge Ecoregion in the hydrologic boundaries of the Chauga River, HUC 0306010203. The upper two thirds of the watershed reside within the Sumter National Forest. Land use/land cover in the watershed includes: 82.9% forested land, 12.2% agricultural land, 0.5% forested wetland (swamp), 0.5% water, 3.8% urban land, and 0.1% barren land (SCDHEC). The sub watershed Upper Chauga River, HUC 030601020301 is 16,514 acres of which 4,865 acres are forest service.

Federal and State laws regulate the quality of surface waters in South Carolina, including the Federal Clean Water Act (CWA) South Carolina Pollution Control Act (48-1-10, et seq., S.C. Code of Laws, 1976). South Carolina water quality standards provide for the protection and maintenance of the existing and classified uses of the waters of the State. Waters in South Carolina are classified for a variety of designated uses, which include: aquatic life, recreation, drinking water and agriculture. A watershed quality assessment of the Savannah River Basin was prepared in 2010 by the South Carolina Department of Health and Environmental Control (SCDHEC) and presents a general assessment of the water quality conditions and water pollution control programs in South Carolina. There are no water quality monitoring sites up stream of PRA and no site within five miles downstream.

Riparian Areas

The riparian areas, lakes, wetlands, perennial, intermittent, ephemeral drainages, and most bottomland hardwood forest managed by the US Forest Service are included in Management Prescription 11 – Riparian Corridors of the Revised Land and Resource Management Plan for Sumter National Forest (2004). Riparian corridor includes floodplain, wetlands, springs, seeps, perennial and intermittent streams. Plan standards FW-1 and FW-2 indicate that Best Management Practives (BMPs) including Streamside Management Zones (SMZs) would be

employed for forest management activities (USDA 2004). When properly implemented, BMPs have been effective at protecting water quality and associated resources (Adams and Hook, 1993; Adams, 1994, 1998; and Jones, 2000). The riparian corridor prescription in the Revised Land and Resource Management Plan, Sumter National Forest (Forest Plan) maximizes protection of the streams and creeks and is not specifically mapped as other management areas. The Riparian Corridors prescription (management prescription 11) is imbedded into mapped management prescriptions to ensure good water quality and aquatic and riparian habitat throughout the forest. The management prescription that is most protective, state BMP or Riparian Corridors would be applied to ensure resources are conserved and protected as needed. There are no known wetlands within the project area.

Direct and Indirect Effects of Alternative 1

Impacts on water resources under alternative 1 would include mass wasting along cut road banks and erosion due to poor water control and poorly designed road access. Invasive species control, southern pine beetle control, management activities on private lands and climate change also impact water quality in addition to routine road maintenance. Road maintenance issues that would be repaired or improved with the action alternatives would not be fixed. Impacts of runoff, sediment, and nutrients are anticipated to continue under this alternative.

Cumulative Effects of Alternative 1

No substantial impacts to riparian areas, perennial, intermittent or ephemeral streams would occur under this alternative since BMPs apply to private land forestry practices as well. Soil loss and sediment yields would be associated with existing roads and ongoing land management activities. Other pollutants to streams or water bodies may occur associated with activities in the subwatersheds including oil or petroleum based leaks along motorized areas including roads, parking lots; herbicide and pesticide uses associated with undesired plants, insects, disease; litter and garbage dumping or recycling; pets and farm animals; septic tanks, waste treatment facilities, etc. On private land, sediment and water quality (including fecal) impacts are primarily associated with communities, roads and timber harvesting.

Direct and Indirect Effects of Alternative 2

The potential for water resource impacts is primarily temporary in duration and minor to moderate on site, with elevated sediment concentrations only during the construction period within the PRA. Elevated runoff and sediment would be short term, during ground disturbance. These impacts are not expected to occur downstream in the Chauga River. Clearing for the proposed alignment would involve timber harvest. Ursic (1986) concluded from data across the south that timber harvesting did not significantly increase sediment levels within any of the South's physiological regions. He observed that any increase in sediment normalized the first year after treatment operations were completed. Impacts on water resources from moderate increases in runoff, sediment, and nutrients would be minimal based on forest-wide standards and BMP's along with site-specific design criteria implemented during timber harvest, project construction and road obliteration/rehabilitation work. There would be minimal short term impacts from the two small gravel parking areas and from the proposed trail construction with

adherence to Forest Plan standards and BMP's. Changes in water yields would occur in response to activities on a miniscule level. The concentrated water, if left uncontrolled can result in stream sedimentation. Other erosion and sediment preventative or reduction measures would include the installation of water diversion structures along the construction area.

Nutrients, including nitrogen and phosphorous can enter water bodies attached to sediment, dissolved in water runoff, or through the air. Nutrient losses from a site and into a waterbody tend to increase proportionately with sediment movement (Schultz, 1997). Increased nutrient runoff to streams can have either adverse effects (Lemly, 2000) or beneficial effects, depending on the level of nutrient runoff, and the current nutrient content of the streams (Tank and Webster, 1998). Many aquatic systems are nutrient poor, and therefore, small increases in nutrients can improve their productivity (USFS, 1989b). Surface water runoff and erosion impacts during timber harvests, bridge construction, road obliteration/rehabilitation and construction of the two parking areas and connector trail to the river are typically short-term. Effects would decrease as the new roadbed is hardened in the affected area.

The potential increase in sediment yields to the PRA watersheds would be negligible overall but may have temporary effects in the immediate area; impacts that would diminish substantially further downstream.

Road reconstruction and maintenance benefits nearby water resources by minimizing soil movement, ensuring that drainage culverts are functioning properly and that road banks maintain adequate vegetative cover. Although maintaining roads would contribute to sediment movement because it involves disturbing the soil, design criteria would minimize any negative impacts. Long term benefits such as reduction of erosion, sediment and concentrated flow occur when roads get proper and regular maintenance. Maintenance and reconstruction of roads and culverts would benefit hydrology and stream water quality by ensuring that drainage culverts function properly and that the road bank maintains an adequate vegetative cover.
Construction of the sediment pond and managing runoff with culverts on the west side road alignment would slow and divert storm water flow, decreasing erosion and sedimentation. Construction of the proposed bridge would cause short term sedimentation of the adjacent area. This action would be controlled with appropriate devices on land and in water. The bridge would not alter the natural flow of the Chauga River. The road surface would limit sedimentation and asphalt would further prevent erosion on sections near the river. Dismantling the old bridge and obliteration of the old road would reduce future sediment but cause temporary increase in sedimentation until soils are covered with mulch or vegetation. There would be short term sediment effects from the construction of the parking areas and connector trail until vegetation stabilizes. In the long term, the new bridge and connected actions would reduce sediment to the Chauga River when compared to the current condition.

Cumulative Effects of Alternative 2

Past, present and reasonably foreseeable projects in the area include prescribed burning, road maintenance, vegetation management (timber harvesting) on both national forest system lands and private lands. Private lands also continue to be managed as homesites, agriculture and pastures. The majority of the PRA watersheds, including interspersed private lands, consist of

closed canopy evergreen forest/woodland. Timber harvest activities on private lands are expected to contribute to both short-term and long-term adverse impacts to water resources in the PRA watersheds and would interact cumulatively with the proposed vegetation management activities. Overall, these adverse impacts are not expected to be substantial since the majority of the watershed is forested, providing protective buffers along streams and wetlands. The implementation of BMP is relatively well accepted as a standard practice on private land and aids in the protection of water quality. Loggers are often trained in BMP implementation. The potential for bridge construction and connected activities including any timber harvesting under Alternative 2 to cumulatively contribute to adverse impacts on water resources would be minimal over the short-term.

3.1.2.1 Free-Flowing Condition

The Wild and Scenic Rivers Act (WSRA) requires that the managing agency preserve the free flowing condition and protect the water quality of eligible and designated rivers. This section analyzes the effects of all alternatives on the river's free flowing condition and water quality. Section 16 (a) of the WSRA defines "free-flowing" as "existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway." As required by the WSRA, at the time of designation, the Chauga River was flowing in its natural condition without impoundment from confluence south to Tugaloo Lake.

Affected Environment

There are currently no impacts to the natural flows of the Chauga River for its entire length. The free-flowing condition of the Chauga River is unchanged.

All Alternatives - Direct, Indirect, and Cumulative Effects

Section 7 of the Wild and Scenic Rivers Act is applied if a project requires construction within the bed or banks of the designated river. Examples of water resource projects include dams, fish habitat structures or boat ramps. No water resources projects are proposed in any alternative; therefore, none would affect the free-flowing condition of the Chauga River. All alternatives and past, present and foreseeable projects are not water resources projects; therefore, the free-flowing conditions of the Chauga River would be preserved. No further analysis is required under Section 7 of the Wild and Scenic Rivers Act.

3.1.3 Air

Affected Environment

The amendments to the Clean Air Act establish class I, II and III areas, where emissions of particulate matter and ozone are to be restricted. The restrictions are most severe in class I areas and are progressively more lenient in class II and III areas. The Land Bridge Project is in an area designated as class II and currently meets class II air standards per the Clean Air Act. Air quality monitoring sites are located throughout the county and results are reported on an annual basis. The pollutants of most concern are fine particulate matter and ozone. Particulate matter is a

mixture of extremely small particles made up of soil, dust, organic chemicals, metals, and sulfate and nitrate acids. The smallest sized particles are the ones that are linked to health effects and are usually referred to as $PM_{2.5.}$ The $PM_{2.5}$ monitoring sites are operated by the state of South Carolina. Data for the sites closest to the Sumter National Forest indicate that Environmental Protection Agency (EPA) standards for $PM_{2.5}$ are being met. Ozone, the other pollutant of concern, is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NOx and VOC. Several monitoring sites collect data on ozone close to the Andrew Pickens Ranger District. Data for the sites indicate that EPA standards for ozone are being met.

Direct, Indirect, and Cumulative Effects of Alternative 1

The project would not be implemented under this alternative and no additional adverse impacts on air quality would be anticipated.

Direct and Indirect Effects of Alternative 2

Dust and emissions from heavy equipment and trucks would occur during the construction and rehabilitation work. The amount of dust and vehicle emissions would be localized and minimal because it would not occur on a persistent basis. No significant impacts to air quality are expected either in the short or long term from construction operations and connected actions. EPA air quality standards are expected to be met with implementation of this alternative. Monitoring would continue to assess air quality and would determine if air quality standards are being met.

Cumulative Effects of Alternative 2

Past, present and reasonably foreseeable projects that contribute to emissions include prescribed burning, road maintenance and other timber harvesting activities both on national forest system lands and private lands. These activities would have temporary impacts to local air quality.

The 2012 “Monitoring and Evaluation Annual Report, Revised Land and Resource Management Plan Sumter National Forest” (Sumter Monitoring Report, September 2013) summarizes information related to air quality on the Sumter National Forest and gives detailed information on air quality on the Andrew Pickens Ranger District. Currently, all areas of the Sumter National Forest meet National Ambient Air Quality Standards (NAAQS) for fine particulate matter and for ozone. Air quality would continue to be monitored on the Forest following current protocols and reporting would be on a yearly basis. This would provide information on impacts and trends in air quality from management activities. The cumulative effects to air quality are not significant.

3.1.4 Climate Change and Carbon Storage

Affected Environment

The affected environment is considered at both the project and global scale. Global climate change may affect water resources in the project area. This project would have no affect on global climate change.

The U.S. Global Changes Research Program published a 2009 report on climate changes on different regions in the United States. Predictions for the Southeast include: air temperature increases; sea level rise; changes in the timing, location and quantity of precipitation; and increased frequency of extreme weather events such as hurricanes, heat waves, droughts and floods. These predicted changes would affect renewable resources, aquatic and terrestrial ecosystems, and agriculture, with implications for human health.

Direct and Indirect Effects of Alternative 1

There would be no effects on carbon storage or release in the project area from this alternative Therefore, the alternative would have no measureable impact on global climate change.

Increased precipitation from a changing climate could result in more flooding activity in the Chauga River which could adversely impact the current inadequate bridge structure causing it to fail.

Cumulative Effects of Alternative 1

Past, present and reasonably foreseeable projects in the area include prescribed burning, road maintenance, vegetation management (timber harvesting) and agricultural activities on both national forest system lands and private lands.

There would be no measureable cumulative effects on carbon storage or release in the project area from this alternative when added to other management activities on federal and private lands. Therefore, the alternative would have no measureable cumulative impact on global climate change.

Increased precipitation from a changing climate could result in more extremes in weather such as droughts and flooding. No cumulative measureable impacts are expected to existing land management activities on national forest system lands and private lands. Active timber management and prescribed burning would keep forests healthy and increase resilience to any long term changes in climate.

Direct and Indirect Effects of Alternative 2

There would be no measureable effects on carbon storage or release in the project area from the alternative given its small size. Therefore, the alternative would have no measureable impact on global climate change.

Increased precipitation from a changing climate could result in more flooding activity in the Chauga River. The new bridge would better be able to withstand effects of flooding.

Cumulative Effects of Alternative 2

Past, present and reasonably foreseeable projects in the area include prescribed burning, road maintenance, vegetation management (timber harvesting) and agricultural activities on both national forest system lands and private lands.

There would be no measureable cumulative effects on carbon storage or release in the project area from the alternative given its small size when added to other management activities on federal and private lands. Therefore, the alternative would have no measureable cumulative impact on global climate change.

Increased precipitation from a changing climate could result in more extremes in weather such as droughts and floods. No cumulative measureable impacts are expected to existing land management activities on national forest system lands and private lands. Active timber management and prescribed burning would keep forests healthy and increase resilience to any long term changes in climate. The proposed bridge would be able to withstand increased and more frequent flooding events.

3.1.5 Geology

Geologic Outstandingly Remarkable (OR) Value

Affected Environment

The Chauga River occurs within the Brevard fault zone, generally accepted as the boundary between the Blue Ridge Mountains and the Southern Appalachian Piedmont. The Brevard fault zone has a complex geological history, significant in that it is newer geologically than much of the surrounding areas due to faulting and thrusting. The Brevard fault is 1 to 2 kilometers wide, extending from Alabama almost to the NC/VA border. The sedimentary rocks originating during the late Precambrian or early Paleozoic underwent extreme geologic forces that produced the gneisses, schistose and phyllitic rocks that make the lithology of the Chauga River gorge the most diverse and distinct within the zone. The river corridor falls steeply in elevation from 426.7m to 243.8m between Blackwell Creek and the boundary of the Andrew Pickens Ranger District. The river bends and changes from a southwestern to an eastern direction into a complex section of cataracts. Curiously, the floodplains were once well above the river, as indicated by the polished stones from soil samples in the area. The sequence of rocks (stratigraphy) exposed here is not found anywhere else in the Blue Ridge, hence the name Chauga River Formation. A unique rock type is found here called Knox dolomite (named from Knox County Tennessee) which was transported from the ridge and valley province. There are rocks exposures which normally occur 6-7 kilometers below ground in most other areas.

Direct, Indirect and Cumulative Effects of All the Alternatives

Geologic ORV

There would be no impact to the geologic OR value under any of the alternatives. The geologic OR value would continue to be protected under any of the alternatives.

3.2 Biological Environment

3.2.1 Vegetation

Affected Environment

The project area lies within the Blue Ridge Foothills Management Area (Management Area 3) of the Forest Plan. The 59,975-acre management area is located in the mountains and upper piedmont of South Carolina within Oconee County. The existing dominant forest cover types in upland areas are Virginia and shortleaf pine (*Pinus virginiana and P. echinata*) and chestnut and scarlet oak species, (*Quercus prinus* and *Q. coccinea*) while eastern hemlock (*Tsuga canadensis*), yellow-poplar (*Liriodendron tulipfera*) and white pine (*P. strobus*) often dominate moist areas such as coves and stream sides with dense understories of rhododendron (*Rhododendron sp*.) and mountain laurel (*Kalmia latifolia*). The elevation for the project area ranges from approximately 1,300 to 1,500 feet.

Forest Vegetation Characteristics - Existing and Potential Natural Vegetation

The District vegetation inventory contains information on existing vegetation and potential natural vegetation (PNV). Existing vegetation inventories describe the current species composition, structure, and disturbance. PNV describes species composition and structure that would exist with disturbance regimes in place similar to those that occurred historically, and without non-native species. PNV estimates are based on environmental and physical factors such as temperature, moisture, sun exposure, soil type, elevation, topographic aspect, and disturbance patterns. These factors set the limits for what can grow on the site. Existing vegetation may or may not match the potential vegetation for a site. PNV inventory for the Andrew Pickens is based on ecological zone modeling. (Simon et al, 2005; Simon, 2011).

Primarily two ecological zones are within the project area: Shortleaf pine-oak and Dry oak-evergreen heath. There are very small amounts of floodplain (riparian) right along portions of the river bank, but for the most part the vegetation at the river's edge is the same forest vegetation as that moving up slope away from the river (there isn't a distinct belt of riparian vegetation along this portion of the river). The characteristics of each zone are described below. For the project area of this EA, the existing vegetation is consistent with the potential natural vegetation described for each zone.

SHORTLEAF PINE-OAK ECOLOGICAL ZONE
The shortleaf pine-oak zone occurs on a variety of topographic and landscape positions, mostly on ridge tops and upper to mid-slopes. Bedrock may be a variety of types, but is limited to acidic substrates (NatureServe 2013). This zone occurs at the low end of the moisture and soil fertility gradient. It is most common on the drier west and southern aspects, but may occur on all aspects.

Most of the native plant communities for this zone are fire-adapted. Vegetation consists of closed to open forest, dominated by native yellow pines (shortleaf, pitch, Table Mountain pine). Virginia pine can be dominant in a limited context (discussed later in this narrative. Hardwoods are sometimes abundant, especially dry-site oaks such as southern red oak, post oak, blackjack oak, chestnut oak, scarlet oak, but also pignut and other hickories. Associated species that are less fire tolerant include red maple, blackgum, persimmon, and American holly.

Understory tree species include sourwood, flowering dogwood, redbud, and sassafras. The shrub layer is typically well-developed, and includes ericaceous (acid-loving) deciduous "heath" species, including hillside blueberry and dwarf deerberry and black and dwarf huckleberry (*Gaylussacia baccata, dumosa*). The herbaceous layer can be sparse, including goat's rue (*Tephrosia* sp.), narrowleaf silkgrass (*Pityopsis graminifolia*), and rosinweed (*Silphium compositum*), but sometimes may have a more grassy component, dominated by little bluestem (*Schizachyrium scoparium*) with oatgrass (*Danthonia sp*.), and with other forb species, particularly when exposed to frequent prescribed fire, or mowing. These understory and shrub layers are better developed in woodlands settings.

Fire has been a disturbance agent in forests of the shortleaf pine-oak ecological zone for millennia (Van Lear, 1989). It has exerted considerable influence on the silvics of the vegetation species and the development of forests in this zone (Van Lear, 1989).

DESIRED CONDITION FOR THE SHORTLEAF PINE-OAK ZONE:
Shortleaf pine, oak, and hickory are the dominant upper canopy species, with several other species (enumerated in the zone description) in the lower canopy levels. Fire or other disturbance with similar effects periodically create new growing space for shade intolerant species

DRY OAK EVERGREEN HEATH
This zone comprises 8% of the project area. It occurs on dry to xeric mixed oak forests on predominantly nutrient-poor or acidic substrates, often on steeper south-facing aspects. This zone is a transition between dry-mesic oak and shortleaf pine-oak zones. Landfire PNV references are one source used in this report, however, the Landfire reference (Landfire, 2010) for this ecological zone (Allegheny-Cumberland Dry Oak Forest and Woodland), is not applicable to the Andrew Pickens District in some respects. For example, white oak is listed as common dominant species in the zone, but this has not been observed for dry oak-evergreen heath zones on this District. Also, yellow-poplar and American beech are not known to be late seral dominant species in this zone as listed in the Landfire reference.

Dominant tree species for this zone are chestnut oak and scarlet oak. Associate tree species include red maple, black oak, sourwood, and hickory. Red maple can be dominant in late seral stages. Shortleaf pine and Virginia pine can sometimes be associated species. Under natural conditions, shortleaf and Virginia pine would be confined to small inclusions where they establish following fire in small areas of higher fire intensity. A mixed pine component may occur on ridge tops (Landfire, 2010). American chestnut was once dominant, and sprouts are still common. Evergreen heaths are common to abundant in this zone, primarily comprised of

mountain laurel and rhododendron. The abundance of the heaths ranges from dense to open, depending on the influence of fire (Landfire, 2010).

Stand dynamics for this zone is in between the dynamics for shortleaf pine-oak and dry-mesic oak zones, with a mix of even and uneven-aged forest patches. The fire regime is type I (frequent, low-intensity). In stands where the fire return interval is between 3 and 9 years, woodlands develop. Where fire return intervals stretch longer than 15 years, closed-canopy deciduous forests develop (Landfire, 2010).

DESIRED CONDITION FOR THE DRY OAK-EVERGREEN HEATH ZONE:
Oaks dominate the overstory, and evergreen heaths remain common to abundant in the understory. Associated species such as hickory, red maple, black oak, and sourwood are common. New growing space is periodically created by fire or similar disturbance to facilitate regeneration of intolerant species and more structural diversity.

Old growth

The old growth stage of stand development usually has the greatest amount of species and structural diversity that the site is capable of producing. It is distinguished by old, large trees and related structural attributes. Old growth is not necessarily virgin or primeval. It can develop over time following human disturbances, just as it does following natural disturbances (US Forest Service EIS, 2004).

In June of 1997 the Southern Region of the Forest Service completed a report entitled *Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests in the Southern Region*, hereafter called the "old growth report" (Forest Service 1997). The old growth report contains direction for providing conditions for old growth to develop, in conjunction with Forest plan revision (old growth report, pp. 8-22), including direction for conducting a preliminary inventory for old growth, to be used as a tool in Forest planning, definitions for several old growth community types, and direction for providing for a network of small, medium, and large-sized patches of old growth on the National Forests based on social, biological, ecological, and spiritual issues and concerns. The Sumter National Forest is committed to implementing the old growth report as described in the Forest Plan. (US Forest Service EIS, 2004)

Based on the preliminary inventories, very little old growth exists on the District. The Forest Plan sets goals and objectives for increasing the amount of old growth to 20% of the area covered by each forest community type, and identifies stands that are most likely the best "candidates" for growing into an old growth stage more quickly than other stands. In other words, those stands are the best ones to choose to designate as future old growth. (US Forest Service EIS, 2004)

None of the project area contains candidate stands for old growth because they are far-removed from the age and/or structural characteristics of old growth conditions. Old growth would not be considered further in analysis.

Shrub and herbaceous layers

The majority of the soils on the District are acidic, and support ericaceous shrubs such as hillside blueberry and dwarf deerberry (*Vaccineum pallidum, stamineum,* scattered to dense mountain laurel (*Kalmia latifolia*), and Appalachian cane (*Arundinaria appalachiana),* particularly on mesic sites. Common grasses include needle grass (*Piptochaetium avenaceum*), oatgrass (*Danthonia* sp.), bluestems (*Andropogon* sp.), or gamma grass (*Tripsacum dactyloides*). Forbs include Southern Appalachian and small-headed sunflowers (*Helianthus atrorubens, microcephalus*), blazing stars (*Liatris squarrosa, virgata*), and woodland coreopsis (*Coreopsis major*).

Along the Brevard or Chauga belt, which supports mafic geology and soils higher in magnesium and calcium, the understory is more diverse than on other soil types. Along roadsides or areas exposed to prescribed burning, there is yucca-leaved snakeroot *(Eryngium yuccifolium),* wild quinine *(Parthenium integrifolium),* Blue Ridge bindweed *(Calystegia catesbiana),* and silky aster (*Aster concolor*) in the uplands, and yellow ladies' slipper (*Cypripedium calceolus*), acute-leaved hepatica (*Hepatic acutiloba*), whorled horsebalm (*Collinsonia verticillata*), faded trillium (*Trillium discolor*), and piedmont strawberry (*Waldsteinia lobata*) on lower slopes and in rich hardwood coves.

Disturbance

Disturbance agents common to forest surrounding the project area include forest pathogens (insects, disease), fire, wind, and ice. Human-induced disturbance is also common, such as land clearing or timber harvest. Specific to the project area, there have been no recent disturbances that have contributed significantly to the character of the vegetation in the area.

Rare Communities or other Plant Species of Concern

Rare communities are assemblages of plants and animals that occupy a small portion of the landscape, but contribute significantly to plant and animal diversity. They are addressed in the Forest Plan and the Southern Appalachian Assessment (SAMAB 1996), and have been cross-walked to Natureserve's ecological community classification system. On the District, notable rare communities include Appalachian bogs and seepage wetlands, rich coves, Southern Appalachian cliffs, bluffs, and rocky summits, waterfall spray cliffs, forested canebrakes, Table Mountain pine woodlands, and mafic glades and barrens.

The Chauga River corridor is home for at least 23 populations and 15 species of rare plants. Of the 15 species, five are considered regionally rare. A regionally rare moss called gorge moss (C2; *Plagiomnium carolinianum*) occurs here. The Chauga River provides habitat for a mixture of sub-tropical flora and Southern Appalachian endemics. Plant communities are diverse and include rich coves, white pine-hemlock-hardwood forest, mesic oak-hickory, and waterfall spray zone. The corridor contains older forests, which is patchily distributed among 11-30 year old and 30-60 year old age classes, creating some fragmentation.

Direct and Indirect Effects of Alternative 1

There would be no effect on forest vegetation from Alternative 1. The existing species composition would remain the same, as would the forest structure. The dynamics of how the forest changes over time would be uninterrupted.

There would be no impact to the botanical outstandingly remarkable value from this alternative. The botanical and ecological outstandingly remarkable value would continue to be protected.

Direct and Indirect Effects of Alternative 2

Alternative 2 would have no significant effect on forest vegetation. Activities in alternative 2 would remove vegetation along the corridor for the new road route and parking areas, and selected trees for the access trail. The total amount of disturbance would be on the order of one to three acres. In the context of forest management, this is considered a very small-scale disturbance, often referred to as a gap. Such small-scale disturbances are of no consequence to the overall health and function of the forest, unless the gaps are repeated across an area. However, in the case of this project, only one gap is being created. Unlike gaps created by other disturbances, this gap would not provide growing space for regeneration, because the road would occupy that space. New growing space would be created as a result of obliterating the existing road corridor. Because this space would be narrow surrounded by a mature forest, the tree species that regenerate in it would most likely be shade tolerant species such as red maple or sourwood.

There would be no impact to the botanical outstandingly remarkable value from this alternative. The botanical outstandingly remarkable value would continue to be protected.

Cumulative Effects of the Alternatives

Past, present and reasonably foreseeable projects in the area include prescribed burning, road maintenance, vegetation management (timber harvesting) on both national forest system lands and private lands. Private lands also continue to be managed as homesites, agriculture and pastures.

Alternative 1 would have no contributing cumulative effects because no management activities are proposed. Due to the small scale of disturbance caused by Alternative 2, it would have no measureable contributing cumulative effects on forest vegetation when considered with other past, present, and future projects in the area.

3.2.2 Wildlife

Affected Environment

Management Indicator Species (MIS)[1] are representative of the diversity of species and associated habitats. MIS can be used as a tool for identifying specialized habitats and creating habitat objectives, standards, and guidelines. The MIS concept is to identify a few species that are representative of many other species and to evaluate management direction by the effects of management on MIS habitats. Both population and habitat data are used to monitor MIS on National Forests. The 2004 *Sumter National Forest Revised Land and Resource Management Plan* (Forest Plan) lists 13 species as MIS; 12 are avian species and one is a mammal.

Trends in MIS populations are normally assessed relative to trends in their respective habitat. This section focuses on terrestrial MIS. Aquatic species are addressed in the Aquatic Communities section of this EA. Sumter National Forest MIS are listed in Table 3.2.2-1, along with general comments regarding their habitats. General discussions of these species and their relationship to monitoring can be found in the Forest Plan.

Table 3.2.2-1. Management Indicator Species for the Sumter National Forest

Species	General Comments
Hooded Warbler *Setophaga citrina*	Uses mesic deciduous forest with a shrubby understory; frequents dense thickets; fairly common in upland and bottomland woodlands
Scarlet Tanager *Piranga olivacea*	Uses mature deciduous forest and some mixed conifer-hardwood forests; requires large areas of forest for breeding
Pine Warbler *Setophaga pinus*	Uses middle-aged to mature open pine forest; seldom in hardwoods; overwinters throughout much of its breeding range
Acadian Flycatcher *Empidonax virescens*	Uses mesic sites with a diverse canopy structure; found in heavily wooded deciduous bottomlands, swamps, riparian thickets, and in the wooded ravines of drier uplands
Brown-headed Nuthatch *Sitta pusilla*	Uses open, mid- to late-successional pine (age classes over 20 years); not common in dense stands of pines; will overwinter
Prairie Warbler *Setophaga discolor*	Frequents brushy old fields, open pine stands, and other early successional habitats
Field Sparrow *Spizella pusilla*	Uses woodland, grassland, and savanna habitats; fairly common in old fields, open brushy woodlands, and forest edge habitats
American Woodcock *Scolopax minor*	Often found in shrub- and seedling-dominated regeneration areas in association with riparian areas; requires moist soil conditions for feeding
Pileated Woodpecker *Dryocopus pileatus*	Uses mature and extensive forests, primarily in deciduous forests; occurs in both deep woods and swamps as well as in rather open and upland forests; excavates nesting and roosting cavities
Northern Bobwhite *Colinus virginianus*	Uses fields, grasslands, brushy habitats, and open woodlands; significantly declining over most of its range due to habitat loss and changes in farming practices
Swainson's Warbler *Limnothlypis swainsonii*	Uses canebrakes and other early-successional riparian habitats
Black Bear *Ursus americanus*	Trends in population indices and harvest levels would be used to help evaluate the results of management activities on this high profile species

[1] Management Indicator Species (MIS): A species whose presence in a certain location or situation at a given population indicates a particular environmental condition. Their population changes are believed to indicate effects of management activities on a number of other species or water quality.

Species	General Comments
Eastern Wild Turkey *Meleagris gallopavo*	Most common in extensive bottomland forests where the understory is moderate; also occurs in extensive upland hardwood or mixed forests, less so in pine forests

Based on habitat within the project area and the biological requirements of the species, eight MIS are considered and analyzed in this EA. The remaining five species are not discussed in detail. Listed in Table 3.2.2-2 are the species that are excluded from analysis and the reason why they are not addressed for this project.

Table 3.2.2-2. Management Indicator Species excluded from analysis in the Land Bridge Road project, Andrew Pickens Ranger District, Sumter National Forest

Species	Reason for Exclusion from Analysis
Pine Warbler *Setophaga pinus*	This species is an indicator for trends and frequency of occurrence in open middle-aged to mature pine forest habitats. Proposed management activities would not occur in this habitat so this species is excluded from analysis.
Brown-headed Nuthatch *Sitta pusilla*	This species is an indicator for trends and frequency of occurrence in open mature pine forest habitats. Proposed management activities would not occur in this habitat so this species is excluded from analysis.
Prairie Warbler *Setophaga discolor*	This species in an indicator for trends and frequency of occurrence in brushy old fields, open pine stands, and other early successional habitats. Proposed management activities would not occur in this habitat so this species is excluded from analysis.
Field Sparrow *Spizella pusilla*	This species in an indicator for trends and frequency of occurrence in woodlands, grasslands, and savannas. Proposed management activities would not occur in this habitat so this species is excluded from analysis.
Northern Bobwhite *Colinus virginianus*	This species in an indicator for trends and frequency of occurrence in fields, grasslands, brushy habitats, ans open woodlands. Proposed management activities would not occur in this habitat so this species is excluded from analysis.

Table 3.2.2-3 lists the MIS that occur or have habitat within the proposed project area. These are the species that are analyzed in this EA. Following the table are effects to these MIS by alternative.

Table 3.2.2-3. Habitat associations of Management Indicator Species that occur or have habitat within the Land Bridge Road project, Andrew Pickens Ranger District, Sumter National Forest

Habitat Association	Species
Mesic Forests, Thickets	Hooded Warbler
Riparian Areas	Acadian Flycatcher, American Woodcock, Swainson's Warbler
Mature Forests	Scarlet Tanager, Piliated Woodpecker, Black Bear, Eastern Wild Turkey

Effects Analysis

The following effects analysis takes into account not only the knowledge of species distribution from previous field surveys, but also the adequacy of those surveys. The best available science (including species' habitat requirements, reasons for species' decline, limiting factors, project area habitat conditions and the biological effects of the intensity of the proposed action) is also considered in the effects analysis. The effects of a proposed action on a species can be direct, indirect or cumulative.

Direct and Indirect, and Cumulative Effects of Alternative 1

Under this alternative, the existing bridge and road alignment would remain unchanged. There would be no new bridge and road segment; the old bridge would not be dismantled and removed; the old road would not be obliterated; two gravel parking areas and connector trail for recreation access would not be constructed; trees and other vegetation would not be removed along a newly proposed route; and Oconee County's existing easements would not be revised.

Direct Effects

Direct effects are effects to the species known or assumed to occur in the proposed project area. They occur at the same time and place as the project activity.

There would be no direct effects to any of the MIS under the no action alternative because no activities would take place.

Indirect Effects

Indirect effects include the consequences of management activities that result in the modifications of habitat and ecological conditions that affect food, water, shelter and other life requirements for a species. Indirect effects could occur during or after project implementation.

Under the no action alternative, habitat for MIS would not be modified in any way. There would be no indirect effects.

Cumulative Effects

Cumulative effects are those resulting from incremental impacts of the proposed action added to other past, present, and future actions. Cumulative effects can result from individually minor but collectively significant actions that take place over a period of time.

Typical ongoing activities on the Andrew Pickens Ranger District include timber harvesting, storm-damaged timber salvage, prescribed burning, wildlife habitat improvements and management activities, trail construction and maintenance, herbicide control of non-desirable species (including non-native invasive species), road maintenance (including culvert repair and replacement), and erosion control practices. In the future, all activities are expected to continue at about the same levels, except timber salvage which is difficult to predict. On privately owned lands, the primary land uses are timber management, farming, and livestock production. Private lands are also used for residential areas and recreation such as hunting.

There would be no cumulative effects to any MIS under the no action alternative because no activities would take place.

Direct, Indirect, and Cumulative Effects of Alternative 2

Under the proposed action, treatments would include construction of a new bridge and road segment, dismantling and removal of the old bridge, obliteration of the existing road segment that would no longer be used, and construction of two gravel parking areas and connector trail for recreation access. Connected actions include removal of trees and other vegetation along the newly proposed route, dismantling and removal of the old bridge, obliteration of the existing trail, stabilization and rehabilitation of disturbed areas of the site, and revising Oconee County's existing easements.

Direct Effects

Significant direct effects are not expected to occur to MIS with the implementation of the proposed action. Although project activities would disturb and displace all of the MIS, all are highly mobile and would simply relocate to adjacent suitable habitats. It is possible that nests and nestlings of avian species could be lost during project implementation. Impacts to nests and nestlings would not affect species viability considering the relatively small footprint of the project area compared with the amount of available habitat located across the District. In addition, project activities and connected actions would have to occur at the exact time when nests and nestlings are most vulnerable. Additionally, avian species re-nest multiple times throughout the nesting season, so no significant decrease in MIS reproductive success is expected.

Indirect Effects

Habitat for MIS would be adversely affected by road and bridge relocation activities. Considering the relatively small size of the project area and the availability of potential habitat across the District, the indirect effects of project activities on MIS are not significant. Once the existing road is obliterated and rehabilitated, then suitable habitat is expected to be reestablished within the project area.

Cumulative Effects

As stated in the indirect effects analysis, habitat for MIS would be adversely affected by road and bridge relocation activities. However, considering the relatively small size of the project area and the availability of potential habitat across the District, this project is not expected to have a significant adverse cumulative effect on MIS populations. While the implementation of this project may affect these species on a very local scale, road and bridge relocation activities are not expected to affect their range-wide population trends. Additionally, once the existing road is obliterated and rehabilitated, then suitable habitat is expected to be reestablished within the project area.

3.2.3 Neotropical Migratory Birds

Affected Environment

The Forest Service is recognized as a national and international conservation leader and plays a pivotal role in the conservation of migratory bird populations and their habitats. Within the National Forest System, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for other land management activities.

The Andrew Pickens Ranger District occurs within the physiographic region known as the Blue Ridge Province in South Carolina. This area is associated with Bird Conservation Region (BCR) 28 – Appalachian Mountains. The 105 million-acre BCR 28 is a forest-dominated area that provides habitat for 234 breeding, migratory, and wintering bird species, many of which have experienced steep population declines in recent decades.

The following sources, along with an analysis of species' range, life history, and available habitat information, were reviewed to identify priority migratory birds that are likely to occur in the project area: (1) Partners in Flight (PIF) Species of Continental Importance in the Eastern Avifaunal Biome (Rich et al. 2004); (2) US Fish and Wildlife Service Birds of Conservation Concern for BCR 28 (2008); (3) South Carolina Breeding Bird Atlas; and (4) *The Land Manager's Guide to the Birds of the South* (Hamel 1992). The results of this analysis produced the following table of priority migratory birds that are associated with and potentially affected by the Land Bridge Road project.

Table 3.2.2-4. Priority Migratory Birds associated with the Land Bridge Road project, Andrew Pickens Ranger District, Sumter National Forest

Species	Habitat Association
Acadian Flycatcher *Empidonax virescens*	Deciduous forest, riparian area
Bald Eagle *Haliaeetus leucocephalus*	Near a large body of water
Carolina Wren *Thryothorus ludovicianus*	Deciduous forest
Chuck-will's-widow *Caprimulgus carolinensis*	Mixed forest
Eastern Whip-poor-will *Caprimulgus vociferus*	Mixed forest
Hooded Warbler *Setophaga citrina*	Deciduous forest
Kentucky Warbler *Geothlypis formosa*	Deciduous forest
Louisiana Waterthrush *Parkesia motacilla*	Deciduous forest
Red-bellied Woodpecker *Melanerpes carolinus*	Deciduous forest
Red-headed Woodpecker *Melanerpes erythrocephalus*	Mixed forest
Red-shouldered Hawk *Buteo lineatus*	Deciduous forest
Swainson's Warbler *Limnothlypis swainsonii*	Deciduous forest, riparian area
Wood Thrush *Hylocichla mustelina*	Deciduous forest
Worm-eating Warbler *Helmitheros vermivora*	Deciduous forest
Yellow-throated Vireo *Vireo flavifrons*	Deciduous forest

All other migratory bird species that occur in BCR 28 were excluded from analysis because they were not identified as PIF species of continental importance or USFWS birds of conservation concern, the project area occurs outside of their known breeding, wintering, or migratory range, and/or suitable habitat does not exist within the project area.

Effects Analysis

The following effects analysis takes into account not only the knowledge of species distribution from previous field surveys, but also the adequacy of those surveys. The best available science (including species' habitat requirements, reasons for species' decline, limiting factors, project area habitat conditions and the biological effects of the intensity of the proposed action) is also considered in the effects analysis. The effects of a proposed action on a species can be direct, indirect, or cumulative.

Direct, Indirect, and Cumulative Effects of Alternative 1

Under this alternative, the existing bridge and road alignment would remain unchanged. There would be no new bridge and road segment; the old bridge would not be dismantled and removed; the old road would not be obliterated; two gravel parking areas and connector trail for recreation access would not be constructed; trees and other vegetation would not be removed along a newly proposed route; and Oconee County's existing easements would not be revised.

Direct Effects

Direct effects are effects to the species known or assumed to occur in the proposed project area. They occur at the same time and place as the project activity.

There would be no direct effects to any of the priority migratory birds under the no action alternative because no activities would take place.

Indirect Effects

Indirect effects include the consequences of management activities that result in the modifications of habitat and ecological conditions that affect food, water, shelter and other life requirements for a species. Indirect effects could occur during or after project implementation.

Under the no action alternative, habitat for priority migratory birds would not be modified in any way. There would be no indirect effects.

Cumulative Effects

Cumulative effects are effects to the species and their habitats over time, and consider past, present, and future actions. Typical ongoing activities on the Andrew Pickens Ranger District include timber harvesting, storm-damaged timber salvage, prescribed burning, wildlife habitat improvements and management activities, trail construction and maintenance, herbicide control of non-desirable species (including non-native invasive species), road maintenance (including culvert repair and replacement), and erosion control practices. In the future, all activities are expected to continue at about the same levels, except timber salvage which is difficult to predict. On privately owned lands, the primary land uses are timber management, farming, and livestock production. Private lands are also used for residential areas and recreation such as hunting.

There would be no cumulative effects to any of the priority migratory birds under the no action alternative because no activities would take place.

Direct, Indirect, and Cumulative Effects of Alternative 2

Under the proposed action, treatments would include construction of a new bridge and road segment, dismantling and removal of the old bridge, obliteration of the existing road segment that would no longer be used, and construction of two gravel parking areas and connector trail for recreation access. Connected actions include removal of trees and other vegetation along the

newly proposed route, dismantling and removal of the old bridge, obliteration of the existing trail, stabilization and rehabilitation of disturbed areas of the site, and revising Oconee County's existing easements.

Direct Effects

Significant direct effects are not expected to occur to priority migratory birds with the implementation of the proposed action. Although project activities would disturb and displace all of the priority migratory birds, all are highly mobile and would simply relocate to adjacent suitable habitats. It is possible that nests and nestlings of these species could be lost during project implementation. Impacts to nests and nestlings would not affect species viability considering the relatively small footprint of the project area compared with the amount of available habitat located across the District. In addition, project activities and connected actions would have to occur at the exact same time when nests and nestlings are most vulnerable. Additionally, avian species re-nest multiple times throughout the nesting season, so no significant decrease in reproductive success is expected.

Indirect Effects

Habitat for priority migratory birds would be adversely affected by road and bridge relocation activities. Considering the relatively small size of the project area and the availability of potential habitat across the District, the indirect effects of project activities are not significant. Once the existing road is obliterated and rehabilitated, then suitable habitat is expected to be reestablished within the project area.

Cumulative Effects

Bird monitoring is done on an annual basis to assess the presence/absence and frequency of occurrence of bird species in different habitat types across the Andrew Pickens Ranger District. According to available Forest Service monitoring data from 1992-2004, the majority of priority migratory bird species have experienced population declines within the Southern Blue Ridge Physiographic Region and on the Francis Marion and Sumter National Forest (La Sorte et al. 2007). North American Breeding Bird Survey data also suggest that many priority migratory bird species within BCR 28 have been declining (Sauer et al. 2012). Table 3.2.3-2 lists the population trends for priority migratory bird species that are associated with Land Bridge Road project; these data include range-wide (Southern Blue Ridge Physiographic Region and BCR 28) population trends, as well as trends for the Francis Marion and Sumter National Forests.

Table 3.2.3-2. Population trends for priority migratory birds that are associated with the Land Bridge Road project, Andrew Pickens Ranger District, Sumter National Forest

Species	Percent Annual Change in Number of Observations		
	National Forest Bird Monitoring[1]		North American Breeding Bird Survey Percent Annual Change in the Appalachian Mountains (BCR 28) 1966-2011[2]
	Southern Blue Ridge Physiographic Region 1992-2004	Francis Marion & Sumter National Forests 1992-2004	
Acadian Flycatcher *Empidonax virescens*	-1.3	-1.2	-1.0
Bald Eagle *Haliaeetus leucocephalus*	ND[3]	ND	12.9
Carolina Wren *Thryothorus ludovicianus*	ND	ND	1.4
Chuck-will's-widow *Caprimulgus carolinensis*	ND	ND	-4.1
Eastern Whip-poor-will *Caprimulgus vociferus*	ND	ND	-3.9
Hooded Warbler *Setophaga citrina*	-1.5	-0.6	2.5
Kentucky Warbler *Geothlypis formosa*	-12.7	-2.5	-1.6
Louisiana Waterthrush *Parkesia motacilla*	-7.1	8.8	-0.3
Red-bellied Woodpecker *Melanerpes carolinus*	ND	ND	3.0
Red-headed Woodpecker *Melanerpes erythrocephalus*	-14.7	-7.1	0.5
Red-shouldered Hawk *Buteo lineatus*	ND	ND	4.5
Swainson's Warbler *Limnothlypis swainsonii*	-4.3	8.2	-1.0
Wood Thrush *Hylocichla mustelina*	1.3	-9.9	-1.8
Worm-eating Warbler *Helmitheros vermivora*	4.0	7.7	0.5
Yellow-throated Vireo *Vireo flavifrons*	-6.4	-4.4	-0.2

[1] La Sorte et al. (2007)
[2] Sauer et al. (2012)
[3] No data

In general, the declining population trends for those species listed in Table 3.2.3-2 reflect the long-term population declines of songbirds across the eastern United States. For decades, avian researchers have documented decreasing population trends among migratory and resident song birds (Faaborg and Arendt 1992, Gauthreaux 1992, Sauer and Droege 1992, Robbins et al. 1989). Most population declines are attributed to loss and fragmentation of breeding, migratory stop-over, and wintering habitats.

As stated in the indirect effects analysis, habitat for priority migratory birds would be adversely affected by road and bridge relocation activities. However, considering the relatively small size

of the project area and the availability of potential habitat across the District, this project is not expected to have a significant adverse cumulative effect on priority migratory bird populations. While the implementation of this project may affect these species on a very local scale, road and bridge relocation activities are not expected to affect their range-wide population trends. Additionally, once the existing road is obliterated and rehabilitated, then suitable habitat is expected to be reestablished within the project area.

3.2.4 Proposed, Endangered, Threatened and Sensitive Species (PETS)

Affected Environment

Several proposed, endangered, threatened, and sensitive (PETS) plant and animal species occur throughout the Andrew Pickens Ranger District of the Sumter National Forest. Four general habitat types occur within the Land Bridge Road Bridge Relocation Project area: road/forest edge, stream bank, alluvial flat/bottomland forest, and dry-mesic slope forest (more specifically, dry-mesic oak-hickory-pine forest). On the east side of the Chauga River there is a relatively small section of an alluvial terrace or bottomland forest as well as a section of dry-mesic oak-pine forest, dominated by white oak (*Quercus alba*), eastern white pine (*Pinus strobus*), shortleaf pine (*P. echinata*), and other hardwoods. The lower slope of that area includes part of the proposed road and parking area. The proposed road construction would eliminate some relatively large eastern white pine and shortleaf pine. On the west side of the Chauga River there is a dry-mesic lower slope forest with a mix of mesic hardwoods and dry-mesic oak-pine, including a few large shortleaf pines. Two or three of these large pines are in the area of the proposed road and parking area. Mountain laurel (*Kalmia latifolia*) and rhododendron (*Rhododendron maximum*) are extensive throughout the project area. Doghobble (*Leucothoe fontanesiana*) is also abundant along the stream bank edges.

For additional information and descriptions of affected environment for PETS species and associated habitats see the Environmental Impact Statement for the 2004 *Sumter National Forest Revised Land and Resource Management Plan* (Forest Plan).

A Biological Assessment/Biological Evaluation (BA/BE) was prepared to determine whether the Land Bridge Road Bridge Relocation Project is likely to affect any PETS species or their habitats. This BA/BE is included in this EA as an appendix item and includes the list of PETS species for the Sumter National Forest. All species on this list were considered for this BA/BE. Using a step-down process, species and potential habitat in the project area were identified by:

1) Evaluating the location and nature of the proposed project;
2) Considering the species' range, life history, and available habitat information;
3) Reviewing records of known PETS species occurrences, which includes data from the South Carolina Heritage Trust Geographic Database of Rare, Threatened, and Endangered Species; and
4) Reviewing the US Fish and Wildlife Service Distribution Records of Endangered, Threatened, Candidate and Species of Concern (2013).

Botanical surveys indicate that there are no botanical PETS species that occur within the project area, including small whorled pogonia (*Isotria medeoloides*) and smooth coneflower

(*Echinacea laevigata*). These federally listed species are eliminated from further analysis because they are not known to occur within the project area. However, sweet pinesap (*Monotropsis odorata*) is assumed to occur because it is often difficult to detect during botanical surveys.

Bald eagle (*Haliaeetus leucoocephalus*), Chauga crayfish (*Cambarus chaugaensis*), Diana fritillary (*Speyeria diana*), eastern small-footed bat (*Myotis leibii*), Edmund's snaketail (*Ophiomphus edmundo*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), and southern Appalachian salamander (*Plethodon teyahalee*) are also assumed to occur because potential habitat exists and inventory data are not sufficient or available to determine presence/absence or number and location of individuals.

Northern long-eared bat (*Myotis septentrionalis*) was recently proposed to be listed as an endangered species under the ESA throughout its range (Federal Register 2013). This species occurs on the Andrew Pickens Ranger District. Northern long-eared bat is assumed to occur within the project area because potential habitat exists and inventory data are not sufficient or available to determine presence/absence or number and location of individuals.

The species listed above are addressed in the BA/BE. All other species on the Sumter National Forest PETS list were eliminated from further analysis because they lack habitat in the project area.

Effects Analysis

The following effects analysis takes into account not only the knowledge of species distribution from previous field surveys, but also the adequacy of those surveys. The best available science (including species' habitat requirements, reasons for species' decline, limiting factors, project area habitat conditions and the biological effects of the intensity of the proposed action) is also considered in the effects analysis. The effects of a proposed action on a species can be direct, indirect or cumulative.

Direct, Indirect, and Cumulative Effects of Alternative 1

Under this alternative, the existing bridge and road alignment would remain unchanged. There would be no new bridge and road segment; the old bridge would not be dismantled and removed; the old road would not be obliterated; two gravel parking areas and connector trail for recreation access would not be constructed; trees and other vegetation would not be removed along a newly proposed route; and Oconee County's existing easements would not be revised.

Direct Effects

Direct effects are effects to the species known or assumed to occur in the proposed project area. They occur at the same time and place as the project activity.

There would be no direct effects to any of the PETS species under the no action alternative because no activities would take place.

Indirect Effects

Indirect effects include the consequences of management activities that result in the modifications of habitat and ecological conditions that affect food, water, shelter and other life requirements for a species. Indirect effects could occur during or after project implementation.

Under the no action alternative, habitat for PETS species would not be modified in any way. There would be no indirect effects. However, because the current bridge is structurally obsolete and is subject to flooding and the existing road surface is not paved at river crossing approaches, there would continue to be water quality issues that potentially affect aquatic habitats.

Cumulative Effects

Cumulative effects are those resulting from incremental impacts of the proposed action added to other past, present, and future actions. Cumulative effects can result from individually minor but collectively significant actions that take place over a period of time.

Typical ongoing activities on the Andrew Pickens Ranger District include timber harvesting, storm-damaged timber salvage, prescribed burning, wildlife habitat improvements and management activities, trail construction and maintenance, herbicide control of non-desirable species (including non-native invasive species), road maintenance (including culvert repair and replacement), and erosion control practices. In the future, all activities are expected to continue at about the same levels, except timber salvage which is difficult to predict. On privately owned lands, the primary land uses are timber management, farming, and livestock production. Private lands are also used for residential areas and recreation such as hunting.

There would be no cumulative effects to any of the PETS species or their habitats under the no action alternative because no activities would take place.

Direct, Indirect, and Cumulative Effects of Alternative 2

See the attached BA/BE for the analysis of direct, indirect, and cumulative effects of the proposed action on PETS species and their habitats. Following is a summary of the determinations of effect for all evaluated PETS species based on the effects analysis in the BA/BE.

Bald eagle. Direct effects are not expected since any disturbance would cause bald eagles to temporary relocate to undisturbed areas. Potential nesting and roosting habitat could be adversely affected; however, considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, effects of project activities on bald eagle habitat are not significant. The proposed action may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.

Chauga crayfish and Edmund’s Snaketail. Project activities could cause a short-term increase of sedimentation in the Chauga River, resulting in direct and indirect effects.

However, several design measures would be implemented to reduce or eliminate sediment deposition or the introduction of wet concrete into the river. Road realignment and new bridge construction are expected to increase long-term habitat quality for these species. The proposed action may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.

Diana fritillary. Road and bridge relocation activities could cause direct effects to pupae or larvae within the project area. The proposed action could also alter habitat conditions, causing indirect effects. Considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of this project on Diana fritillary are not significant. The proposed action may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.

Eastern small-footed bat and Rafinesque's big-eared bat. Tree and bridge removal could cause direct effects to bats if an occupied roost site were disturbed. Project activities could also alter habitat conditions, causing indirect effects. Considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of this project on eastern small-footed bats and Rafinesque's big-eared bats are not significant. The proposed action may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.

Northern long-eared bat. Two proposed activities could result in direct and indirect effects to northern long-eared bats: 1) removal of trees and other vegetation along the newly proposed route and 2) dismantling and removal of the old bridge. All other project activities (e.g., obliteration of the existing road segment, construction of parking areas and hiking trail, construction of a new bridge, and stabilization/rehabilitation of disturbed areas of the site) would have "no effect" on northern long-eared bat because they would occur after the removal of trees and other vegetation.

Following are effects determinations based on the proposed activities that could result in direct and indirect effects relative to the timing of USFWS's listing of the northern long-eared bat as federally endangered. The timing of listing is important because it affects the type of determination and the requirement to consult with USFWS.

Removal of trees and other vegetation could cause direct effects to bats if an occupied roost tree were removed. Tree removal could also alter habitat conditions, causing indirect effects. Considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of tree removal are not significant. Removal of trees and other vegetation along the newly proposed route is not likely to jeopardize proposed species or modify proposed critical habitat.

The above effects determination for tree removal is based on the assumption that this activity would occur prior to the listing of northern long-eared bat as federally endangered. According to ESA Section 7(a)(4), the above effects determination does not require conference with USFWS.

Dismantling and removal of the old bridge could result in direct effects to northern long-eared bat. In order to avoid direct effects, design criterion #10 would be followed. Removal of the old bridge could affect the availability of potential roost sites, however the new bridge is likely to provide similar roosting opportunities. With this conservation measure in place, this activity is not likely to adversely affect northern long-eared bats or their habitat.

The above effects determination for dismantling and removal of the old bridge is based on the assumption that this activity would occur after the species is listed as federally endangered. Under ESA Section 7(a)(2), consultation with USFWS is required for this determination.

Southern Appalachian salamander. Project activities could result in harm or mortality to individuals, assuming they were present. Potential habitat could be adversely affected; however, considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of project activities on southern Appalachian salamander habitat are not significant. The proposed action may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.

Sweet pinesap. Individual plants could be harmed or destroyed by project activities. Potential habitat could be adversely affected; however, considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of project activities on sweet pinesap habitat are not significant. The proposed action may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.

3.2.5 Aquatic Communities

Affected Environment

The proposed project is located in the Chauga River watershed. The Chauga River is a tributary to the Tugaloo River in the Savannah River Basin. District watersheds contain cold and warm water aquatic communities that include fish, crayfish, aquatic insects and mollusks. These aquatic communities serve as a management indicator that is monitored to indicate the effects of management on riparian resources. Aquatic species that may occur in the project area watershed are listed in the following tables.

Table 3.2.5-1 Fish species known to occur in the Chauga River watershed (SCDNR & USFS 2001, 2002).

Scientific Name	Common Name	Scientific Name	Common Name
Catostomidae	**Suckers**	**Percidae**	**Perches**
Hypentelium nigricans	Northern hog sucker	*Perca flavescens*	Yellow perch
Moxostoma rupiscartes	Striped jumprock	*Percina nigrofasciata*	Blackbanded Darter
Centrarchidae	**Sunfishes**	**Trout**	**Salmonidae**
Lepomis auritus	Redbreast sunfish	*Oncorhynchus mykiss*	Rainbow trout
Lepomis cyanellus	Green sunfish	*Salmo trutta*	Brown trout
Micropterus coosae	Redeye Bass	*Salvelinus fontinalis*	Brook trout
Micropterus punctulatus	Spotted Bass		

Cyprinidae	**Carps and Minnows**		
Luxilus coccogenis	Warpaint shiner		
Nocomis leptocephalus	Bluehead chub		
Notropis lutipinnis	Yellowfin shiner		
Semotilus atromaculatus	Creek chub		
Ictaluridae	**Bullhead Catfishes**		
Ameiurus brunneus	Snail bullhead		
Ameiurus platycephalus	Flat bullhead		

The snail bullhead and flat bullhead are listed as vulnerable by the American Fisheries Society. This indicates that the species may become endangered or threatened by relatively minor disturbances to its habitat or that it deserves careful monitoring of its distribution and abundance in continental waters of the United States to determine its status. The SC Comprehensive Wildlife Conservation Strategy (Kohlsaat et. al. 2005) includes the South Carolina Department of Natural Resources Priority Species List. These species warrant conservation concern to maintain diversity in South Carolina waters. The species are ranked in priority as moderate, high and highest. The Redeye Bass are ranked with highest priority. The snail bullhead, flat bullhead,

Warpaint Shiner and Eastern Brook Trout are all ranked with a moderate priority.

Table 3.2.5-2. Crayfish species known to occur on the Andrew Pickens Ranger District (Eversole and Jones 2004)

Scientific Name	Common Name	Conservation Status			
		NatureServe	State	AFS	State priority
Cambaridae					
Cambarus acuminatus	Acuminate crayfish	G4	S4	+CS	
Cambarus asperimanus	Mitten crayfish	G4	S1	CS	
Cambarus bartonii	Common crayfish	G5	S5	CS	
Cambarus carolinus	Red burrowing crayfish	G4	S2?	CS	Highest
Cambarus chaugaensis	Chauga crayfish	G2	S2S3	T	Highest
Cambarus howardi	Chattahochee crayfish	G3	SNR	CS	
Cambarus latimanus	Variable crayfish	G5	S4?	CS	
Cambarus nodosus	Knotty burrowing crayfish	G4	SNR	CS	
Cambarus striatus	Ambiguous crayfish	G5	SNR	CS	
Procambarus raneyi	Disjunct crayfish	G4	S2	CS	
Procambarus spiculifer	White tuberculed crayfish	G5	SNR	+CS	

The Chauga crayfish is ranked as G2 and the Chattahoochee crayfish is ranked G3 (NatureServe 2009). The G2 ranking indicates that the species is at high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines or other factors. The G3 ranking indicates that a species is at moderate risk of extinction due to a very restricted range, very few populations (often 80 or fewer), steep declines or other factors. The red burrowing crayfish and Chauga crayfish and are rated as S2? and S2S3 respectively by the SC Natural Heritage Program. American Fisheries Society status ranks (Taylor et al 2007) include CS (currently stable), V (vulnerable), T (threatened), E (endangered) and E* (endangered, possibly

extinct). The T rank indicates that a species is likely to become endangered throughout all or a significant portion of its range. The SC Comprehensive Wildlife Conservation Strategy (Kohlsaat et. al. 2005) ranks the red burrowing crayfish and Chauga crayfish as highest priority.

Crayfish that occur in the Chauga River watershed include Cambarus asperimanus, Cambarus bartonii, Cambarus chaugaensis, and Procambarus spiculifer (Eversole and Welch, 2001). Cambarus chaugaensis is listed as a Forest Sensitive species. Eversole and Welch also found Goniobasis proxima, a freshwater snail, and Corbicula, a non-native clam species.

Direct and Indirect Effects of Alternative 1

There would be no direct or indirect impacts to aquatic communities under this alternative. The aquatic community would remain in its present state and any current population trends would continue.

Cumulative Effects of Alternative 1

There would be no cumulative impacts to aquatic communities from the no action alternative.

Direct and Indirect Effects of Alternative 2

Soil disturbance associated with new road and bridge construction, existing road and bridge obliteration and connected actions such as soil stabilization, clearing of vegetation for the new road segment, construction of new parking lots and connector trail would have direct and indirect impacts on aquatic resources. Sedimentation can cause direct mortality in the egg and larval stages of aquatic species reproduction. Indirectly, sediments can fill in and destroy habitat niches within a stream. Initial vegetation removal and ground-disturbing activities would create short-term impacts. Soil disturbing activities within riparian corridors as defined within the *Revised Land and Resource Management Plan, Sumter National Forest* (RLRMP; Errata #1 page 1 Table 3-9) could create long-term impacts following initial activities.

Project specific design critera (section 2.5) designate appropriate measures to control sediment and stream impacts. Sediment impacts to the Chauga River during periodic river flooding would be reduced by the bridge not altering natural flow and the asphalt paving of the roadway adjacent to the bridge along the river. From the Water Quality section 3.1.2 of this EA,

> The potential for water resource impacts is primarily temporary in duration and minor to moderate on site, with elevated sediment concentrations only during the construction period within the project area." Elevated runoff and sediment would be short term, during ground disturbance. These impacts are not expected to occur downstream in the Chauga River.

In addtion, existing road ditchlines on the west side of the river would be diverted into a sediment pond to capture sediment that is generated from road runoff before it can enter the Chauga River. The road ditchlines on the eastern side of the river are not as steep and utilize storm water outfalls which are hardened to reduce soil ersoion. The longer steeper portion of the

road that access the current brideg location on the eastern side would be obliterated with the new bridge construction. It would be water-barred and revegetated to reduce concentrated surface water flow and provide increased water absorption. Roots of vegetation would help hold soil thus reducing erosion and woody shrubs and trees would eventually further add stability to the site. There would be a long-term reduction in sediment to the Chauga River with this project when compared to the no action alternative and would improve aquatic habitat.

Determination of Effect

This project is unlikely to have direct impacts on individuals of the aquatic community and is not likely to impact aquatic community diversity. This project may have indirect impacts on the aquatic habitat from sediment input through road maintenance and reconstruction but is not likely to impact aquatic community diversity. The implementation of RLRMP standards, project design criteria and SC Best Management Practices would minimize impacts to the aquatic community.

Cumulative Effects of Alternative 2

Under the 2004 Sumter RLRMP, a Watershed Condition Rank was assigned to 5th level watersheds across the forest. The Chauga River watershed received a rank of Average in comparison to other watersheds on the forest, which denotes potential to adversely affect aquatic resources as moderate on a scale of low, moderate and high. Forest objectives in moderate-ranked watersheds include maintaining and improving aquatic health through the implementation of the Riparian Corridor Prescription, conducting watershed assessments at the proposed project level, pre-project monitoring efforts to determine biota health. Sediment was determined to be a risk factor for aquatic species viability in the Chauga River watershed.

The 2004 FEIS for the Sumter National Forest LRMP also addresses Watersheds and Aquatic Habitats. This section of the FEIS recognizes that while direct and indirect adverse effects to aquatic communities are minimized by the Riparian Corridor Prescription and the Forest Wide Direction standards, these effects are not eliminated from the entire watershed. The LRMP FEIS analysis of Aquatic Viability is based on present LRMP standards. The Aquatic Viability Outcome for the aquatic Region 8 Sensitive species is that they are potentially at risk from sediment in the Chauga River watershed; however, the U.S. Forest Service may influence conditions in the watershed to keep the species well distributed. Therefore, the likelihood of maintaining viability is moderate. Forest objectives listed above associated with the Watershed Condition Rank were designed to eliminate this risk.

Past, present and reasonably foreseeable projects in the area include prescribed burning, road maintenance, vegetation management (timber harvesting) on both national forest system lands and private lands. Private lands also continue to be managed as homesites, agriculture and pastures. All reasonably foreseeable activities have been or would be analyzed for impacts to aquatic resources and design criteria would be implemented to minimize impacts where needed. The Riparian Corridor Management Prescription addressing perennial and intermittent streams and the Forestwide Standards specific to ephemeral channels would be implemented for all these projects. In addition to Forest activities, private land activities occur within the watershed.

3.3 Social Environment

3.3.1 Recreation and Scenery

Affected Environment

The Upper Chauga River in the vicinity of the proposed bridge replacement on Land Bridge Road has high quality scenic and recreation values. The river passes through both forested and rural agricultural settings, providing opportunities for fishing, boating, sightseeing, and dispersed camping.

The USFS has recognized these resources in the 2004 Revised Land and Resource Management Plan, Sumter National Forest (Forest Plan), identifying eligible segments that could be included in the National Wild and Scenic River system. Using information from the Nationwide Rivers Inventory, the 1983 South Carolina Statewide River Assessment, and public involvement, Forest Service staff found the Chauga was one of eight streams on the Forest (out of 17 reviewed) that was free-flowing and had one or more outstandingly remarkable (OR) values. In the Chauga River's case, four OR values were identified: scenery, recreation, geologic, and botanical/ecological.

The river's scenic resources were also protected in the Forest Plan (Management Prescription 11. - Riparian Corridor,embedded in the management prescriptin for the area 8.A.1.- Mix of Successional Forest Habitats). This section ov the river received the more restrictive "high" Scenic Integrity Objective (SIO). The Forest Plan appendices and other information sources provide further detail about the river's values and setting related to scenic and recreation OR values, as described below:

- The entire river is 17.5 miles long and runs south from the confluence of Taylor Creek and Village Creek (near Mountain Rest, SC) to the Chattooga arm of Lake Tugaloo.

- The Forest Service has identified three segments of the river eligible for WSR status:

    - The Upper Chauga (Segment I) runs 7.9 miles from the Taylor/Village Creek confluence to Cassidy Bridge. This includes the Chauga Narrows below Whetstone Road and the area just upstream near Land Bridge Road (SR 196), which is the focus of this EA. It is classified as a "Scenic" segment – with "shorelines or watersheds still largely primitive and undeveloped, but accessible in places by roads" (1982 WSR Secretarial Guidelines).

    - The Middle Chauga (Segment II) runs 4.1 miles from Cassidy Bridge to North Horseshoe Bridge Road (SR 34). This includes the Chauga Gorge, a well known whitewater boating reach. This reach was classified as "Wild"—sections of rivers that are generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted; they are vestiges of primitive America" (1982 WSR Secretarial guidelines).

    - The Lower Chauga (Segment III) runs 4.0 miles from North Horseshoe Bridge Road to Toccoa Highway (Route 123) and Lake Tugaloo. This reach was classified as "Scenic."

- Sumter NF lands in the vicinity of the Upper Chauga River provide a largely Semi-primitive Non-motorized recreation opportunity on the Recreation Opportunity Spectrum. This classification is characterized by natural or natural appearing environments, low interaction between users, self-reliant recreation activities such as hiking, fishing, hunting, and boating, with a minimum of visitor restrictions or controls, and non-mechanized or motorized use (USFS, 1982).

- Road crossings on the Chauga might be better characterized as Roaded Natural areas on the Recreation Opportunity Spectrum. These corridors have roads that provide for scenic driving and car-based camping activities, moderate evidence of the sights and sounds of humans from road activity, low to moderate interaction with other users, and a lesser focus on self-reliant recreation.

- Sumter NF lands have been inventoried for their scenic quality using the FS Scenery Management System, which integrates scenic evaluations with ecological and Recreation Opportunity Spectrum decisions in the plan. The section of the river near Land Bridge has been rated as a "high" Scenic Integrity Objective with management prescriptions to "retain, restore and/or enhance the inherent ecological processes and functions of the associated aquatic, riparian, and upland components within the corridor" (USFS, 2004, p. 3-39). However, this prescription allows management activities to provide terrestrial or aquatic habitat improvement, favor recovery of native vegetation, control insect infestation and disease, comply with legal requirements (e.g., Endangered Species Act, Clean Water Act), provide for recreation and public safety, and meet other riparian functions and values.

- The Upper Chauga is 7.9 miles long, with 7.6 miles on the Sumter Forest and 0.3 miles of mixed ownership lands (all upstream of Land Bridge Road).

- The Upper Chauga starts in rural/agricultural lands near Mountain Rest, but becomes forested downstream (essentially where Land Bridge Road crosses the river). Even in the rural areas, there is typically heavy riparian vegetation next to the river.

- Foothills in the area rise 80 to 120 feet above the valley floor, while the incised banks of the river itself has slopes in excess of 50% gradient and typically rise 20 to 80 feet from the river.

- The river is about 20 to 25 feet wide near Verner Mill Road Bridge at the top of the reach and widens to 25 to 30 feet wide by Cassidy Bridge.

- There are few rocky outcroppings until the river enters the 5.5 mile long Chauga Narrows below Whetstone Road Bridge.

- In the roughly five-mile long Chauga Narrows, some canyon walls can approach 300 feet, and there are at least four distinct rapids/falls (most in a mile-long reach about 0.5 miles downstream from Whetstone Road Bridge).

- The forested slopes of the river is largely a mature forest with mixed hardwoods and conifers, some of which are large for the region. Mountain laurel and rhododendron are common on the river's slopes, with seasonal blooming.

- The river is notably clear through low and medium flow levels, but becomes more turbid at high water. Clear water is an attraction for anglers.

- The river has several riffles and small cascades, with more larger rapids in Chauga Narrows and Chauga Gorge.

- Road access along the Upper Chauga includes:

    - Verner Mill Road Bridge. Roadside shoulder parking.
    - Land Bridge Road. Roadside shoulder parking.
    - Whetstone Road (Route 193). Roadside shoulder parking.
    - Cassidy Bridge (Route 37 / 290). Small parking lot with space for 8 to 10 vehicles.

- There is little development along the river, even in the non-forested rural areas near Mountain Rest. The most conspicuous human-built structures visible from the river are bridges (nine total on the river, four on the Upper River).

- No dams or channelization.

Fishing Opportunties

- The Chauga has a well known southern Appalachian freestone trout fishery with some natural reproduction, but depends on seasonal stocking to provide good fishing. The river's tributaries also appear to have small populations of native Brook trout.

- SCDNR stocks the river with hatchery rainbow, brook and brown trout from trucks at bridge crossings throughout the year, and from helicopters in more remote areas in the fall entirely from Cedar Creek confluence up river to Jerry Creek confluence.

- Stocking reports note that temperatures may be a limiting factor that prevents larger natural reproduction.

- Fishing regulations allow anglers to fish with bait, spinners, and flies from May 15 through Oct 31. They are allowed to harvest up to 5 trout per day (with no more than 5 in possession). This is a typical "put-and-take" fishery.

- Between November 1 and May 14, the Upper River (Cassidy Bridge to Bone Camp Creek) operates under "delayed harvest" regulations. The delayed harvest regulations went into effect in 2013. These require anglers to fish with single hook artificial lures and flies, and to release all fish that are landed. Delayed harvest regulations are designed to encourage natural reproduction and produce larger fish the following spring.

- The river can be fished year-round, but conventional advice suggests that mid-summer high temperatures and mid-winter cold temperatures can be less productive. The river is most popular in spring.

- Fishing reports on internet forums suggest skilled anglers have caught as many as 30 fish in a day, but more typical catch rates are a 2- 4 fish per hour of effort.

- The most common landed species appears to be hatchery rainbow and brown trout that typically range from 8 to 10 inches, with a few that reach 12 to 14 inches. A few anglers report catching larger "holdover" brown trout, especially near cold water tributaries.

- Best fishing access reported on internet forums occurs from Land Bridge south to Riley Moore Shoals Access (all on USFS lands).

- There are no designated trails along the length of the river, but there are likely to be informal user-created trails at most bridges that anglers have used for access to the channel.

- Some fishing advice encourages anglers to travel farther into Chauga Gorge or Narrows to fish waters that have less fishing pressure and larger fish. Anglers may travel on informal trails, "bushwack" through the forest, or walk in the channel (during low flows) to access these areas.

- There are no commerical fishing guide permits specific to the Chauga, but at least one fly shop includes the Chauga on a list of regional streams where they offer guided trips (Chattooga River Fly Shops, 2013).

Boating Opportunities

- Boating in canoes, kayaks, or small rafts is possible and may occur from as far upstream as Verner Mill Road when flows are sufficient, but few boaters apparently use the river until Whetstone Road, downstream of Land Bridge Road and the Project area (American Whitewater, 2013). The roughly three mile reach from Verner Mill Road to Blackwell Bridge/Whetstone Road is described as "a gentle valley stream" with "small interspersed drops" between "long flowing sections." Most rapids are Class II/III, but one is rated Class IV. Based on the AW description, flows are available on this "small creek" several times during a normal water year.
- Higher boating use occurs downstream of the project area in the Chauga Narrows and in Chauga Gorge.

- The Chauga Narrows between Whetstone Road Bridge and Cassidy Bridge is used by whitewater boaters in kayaks, inflatable kayaks, canoes, or small rafts. This segment is also largely Class II-III, with one drop rated Class V (at normal flows). Use is lower on this reach than in Chauga Gorge downstream.

- The Chauga Gorge is the most renown boating trip on the river, and is 9.8 miles from Cassidy Bridge to Cobbs Bridge Road. This is a Class IV segment, with at least six named

rapids ranging from Class III+ to IV+ (First slide, Super Soc Em Dog, Second Slide, Blackhole, Edge of the World, and Riley Moore Falls).

- The river does not have boatable flows year-round; most whitewater boaters find greater whitewater challenge during winter and spring, or after summer storm events. The river is relatively "flashy," and requires boaters to get on the river relatively soon after storm events even in winter and spring.

- Typical boatable flows on both the Chauga Narrows and Chauga Gorge runs range from -0.3 to +2.0 feet on a painted gage on Cassidy Bridge, although comments suggest this range is "speculative" (BoatingBeta.com, 2013). Based on one trip report, near-minimum flows on the Cassidy Bridge painted gage correspond to relatively high flows (over 1,000 cfs) on the nearby Chattooga USGS gage at Highway 76. In gneral, this suggests the Chauga is boatable for consderably fewer days per year than the commonly boated sections on the Chattooga (Sections 3 and 4).

- There are no commerical whitewater trips on the river.

Other Recreation Opportunities

- The river provides good photography and scenic viewing opportunities for visitors on roads, and especailly those willing to hike along the river into the steeper parts of the Narrows or Gorge. The nine bridges provide some views of the river, but long views are typically blocked by heavy riparian vegetation and river meanders.

- The views from Land Bridge Road cover a relatively short reach of river, and have no notable riffles, beaches, or rock outcroppings that make it particularly scenic compared to the surrounding setting.

Direct, Indirect and Cumulative Effects of Alternative 1

There are few direct effects from the existing road alignment and bridge on recreation. The bridge provides short views of the river corridor, as well as informal access for anglers to fish at the bridge or travel along the river to other locations. There are some wider shoulders / turnouts for recreation users to park their vehicles without blocking traffic, as well as rough user-created and partially eroding trails down to the river.

The bridge itself is relatively low and short, with some riprap along its abutments. This may have created some scour in the river's channel immediately downstream, which could affect localized fishing success, but this is speculative. At normal low-medium flows, there appear to be several pools and runs to fish in the vicinity of the bridge.

The bridge area has no obvious boat access trail, but kayakers would have little difficulty scrambling down the informal trails from either side of the road to gain access to the channel. At higher flows, an eddy (slower water) appears on river left just downstream of the existing bridge,

which would make an acceptable boat access point. Without some consideration for trail design, such a trail down the steep bank through thick riparian vegetation may be susceptible to erosion.

The existing bridge does not have a detrimental effect on the scenic values of the area, which fits into a general Roaded Natural ROS classification and the "Scenic Classification" under the Wild and Scenic Rivers Act. It is also consistent with the "high" SIO rating for management prescription 11.

The cumulative effects of the existing bridge, taken together with other similar bridge crossings, largely enhance access to the Chauga River. The nine bridge crossings cumulatively provide access to many miles of river without breaking-up the longer reaches (Chauga Narrows and Chauga Gorge that have more primitive recreation opportunities.

Direct and Indirect Effects of the Action Alternatives

Developing a new bridge (with accompanying road re-alignment) would also have few direct effects on recreation. The bridge would continue to provide short views of the river corridor, as well as informal access for anglers to fish at the bridge or travel along the river to other locations.

The more carefully planned parking spaces would enhance recreation access at the site by identifying places to park and producing less erosion into the river. The planned formally designed trail from parking to the river would also enhance recreation access, directing users down a less erodible trail over a less steep route. This trail would also improve boating access (even though boating use at this site is likely to be low), because it provides access to the likely put-in location in the slower water/eddy on river left that is present at higher flows.

The new bridge would be slightly wider and higher above the river, and would not require any rip rap around the abutments to prevent erosion or potentially constrain the channel. This would reduce any unnatural channel scour from the bridge structure, and obviates the need to conduct a WSRA Section 7 assessment.

Sections of the existing road would no longer be needed and they would be re-contoured and allowed to grow back to native trees and understory vegetation. This would reduce road sediment from entering the river and improve scenic quality. The sediment pond would also trap road sediment before it goes into the Chauga, further reducing sediment from the existing road. Taken together, this would return the old bridge site to a natural-appearing river bank.
There may be short term adverse impacts to visitors during construction and other associated activities. During construction, anglers and boaters would probably not be able to access the river in the vicinity of either the old or new bridge, and parking would be limited in the area. Similarly, noise and activity from construction are unlikely to provide a contemplative atmosphere for fishing. If construction were limited to time periods outside the delayed harvest season, such adverse impacts would be minimized.

The "high" SIO rating of high would also be affected for a short period during construction of the proposed action. Exposed soils and vegetation disturbance are likely to be evident at both

bridges during construction, and construction activity and equipment are further likely to diminish scenic quality while they are present. However, activity and equipment-related impacts would cease as soon as construction is finished, and restoration and re-vegetation are expected to repair any exposed or disturbed areas within one growing season, which would return the scenery to its high quality.

The proposed bridge would not have a detrimental effect on the scenic values of the area, which would still provide a Roaded Natural opportunity under the ROS classification system and a "Scenic Classification" under the Wild and Scenic Rivers Act.

Cumulative Effects of the Action Alternatives

The cumulative effects of the existing bridge, taken together with other similar bridge crossings, would continue to enhance access to the Chauga River. The nine bridge crossings cumulatively provide access to many miles of river without breaking-up the longer reaches (Chauga Narrows and Chauga Gorge) that have more primitive recreation opportunities.

3.3.2 Heritage

Affected Environment

A cultural resources inventory was completed for the Area of Potential Effects (APE) for historic properties in the Land Bridge Road Bridge Relocation Project analysis area. The purpose of the inventory was to identify and document any cultural resources and evaluate their eligibility for listing in the National Register of Historic Places (NRHP) using the criteria established under 36 CFR 60 and 38 CFR 800.

No cultural resources were identified through archival research and during an intensive cultural resource survey of the proposed APE for all alternatives. The survey consisted of a literature review of archival cultural resources information for the APE and an intensive field survey by a Forest Service archeologist. The South Carolina State Historic Preservation Office (SHPO) and Tribal Historic Preservation Office (THPO) of the Eastern Band of Cherokee Indians were consulted on historic property eligibility and effects. The inventory identified no archeological sites. The existing bridge is not historically significant and is not eligible for the NHRP.

Direct, Indirect and Cumulative Effects of Alternative 1 ("No Action")

There would be no effect on historic properties. There would be no potential for cumulative effects to known historic properties or unevaluated sites as a result of the no-action alternative.

Direct and Indirect Effects of Alternative 2

The action alternative would have no effect on historic properties or archeological sites. Cultural resource surveys identified no historic properties in the APE for this alternative. In accordance with the signed MOU with the SHPO, if any additional cultural resource sites are encountered during any project related activity, they would be treated as an unanticipated discovery. The District Archeologist would be notified and activities suspended at that location until the location is evaluated using unanticipated discovery protocols in accordance with 36 CFR 60 and 43 CFR 10.

The SHPO and THPO have been consulted on the methods and results of the cultural resource survey. Letters concurring with Forest Service opinion that there would be no effects to historic properties were received.

Cumulative Effects of Alternative 2

The proposed action would have no cumulative adverse effects to cultural resources. Ground disturbances would be in a limited area and would not impact any known archeological sites. In addition, the Sumter National Forest has completed a cultural resources overview of the Sumter National Forest (Benson 2006). The overview establishes a context for heritage resources on the Andrew Pickens Ranger District and provides a basis for evaluating cumulative effects to cultural resources.

3.3.3 Economics

Affected Environment

The following factors have created suitable social and economic conditions for the bridge relocation project:

- Public concern for emergency vehicle access
- Additional funding sources beyond appropriated Oconee County funds, such as the Title II Secure Rural Schools grant

Direct and Indirect Effects of Alternative 1

No costs or revenues would be generated under Alternative 1.

Direct and Indirect Effects of Alternative 2

Costs for the project are listed in Table 3.3.3-1. There are no direct economic benefits generated by this alternative. Benefits are in the form of improved public service and are described in detail in Chapters 1 and 2 (i.e. – improved emergency vehicle access for public safety).

Table 3.3.3-1 Project Costs

Item	Federal Agency Appropriated Contribution	Requested Title II Contribution	Other Contributions	Totals
Field Recon & Site Surveys		$3000		$3000
NEPA CEQA	$2000	$1600		$3600
ESA Consultation		$1600		$1600
Permit Acquisition		$1800		$1800
Project Design and Engineering		$50,000		$50,000
Contract / Grant Preparation	$2000		$1500	$3500
Contract / Grant Administration			$1500	$1500
Contract / Grant Cost			$2500	$2500
Salaries	$10000	$234,500		$244,500
Materials and Supplies		$200,000		$200,000
Monitoring	$2000		$2000	$4000
Totals	$16,000	$492,500	$7,500	$516,000

Cumulative Effects
There are no cumulative economic effects.

3.3.4 Human Health and Safety

Affected Environment

The Forest Service Handbook (FSH) and the Forest Service Manual (FSM) provide guidance and establish required measures to protect human health and safety during forest management activities. The Sumter National Forest also has a spill response program in place to contain and remove contaminants from management activities.

Direct, Indirect and Cumulative Effects from Alternative 1

There would be no direct, indirect or cumulative effects to human health and safety from currently approved projects because Forest Plan standards and Occupational Safety and Health Administration (OSHA) regulations would be followed during management activities. No additional road maintenance would occur under this alternative and at the current bridge site which may result in increased safety risks.

Direct and Indirect Effects of Alternative 2

Bridge construction and the associated connected actions would require the use of heavy equipment (such as but not limited to dozers, cranes, tractor-trailers, cement trucks, skidders, loaders, log trucks). The use of heavy equipment present the highest potential for safety risks during construction activities. There is a risk of injury to both workers, local residents and recreational visitors.

In accordance with Forest Service Health and Safety Code Handbook (FSH 6709.11),

equipment operators must demonstrate proficiency with the equipment and be licensed to operate it. In addition, a helper must direct the operator where safety is compromised by terrain or limited sight distances (USDA Forest Service 1989b).

Construction operations and connected actions would adhere to OSHA regulations safety specifications. These requirements include:

- Installation of temporary traffic controls on roads and trails open to public travel to warn users of hazardous or potentially hazardous conditions;
- Development of a specific traffic control plan; and
- Use of appropriate devices, such as barricades, where necessary, to control entry to the site (USDA Forest Service 2000a).

Monitoring and inspections to protect human health and safety may be done during project activities to ensure that proper procedures are followed. Any risks to workers or the public would be minor and temporary. Adherence to the safety measures, Forest plan standards and OSHA regulations described above would minimize or eliminate adverse human health and safety effects.

Cumulative Effects of Alternative 2

Other Forest activities that may affect human health and safety include road maintenance, logging traffic from private operations, invasive species control and prescribed burning. Road maintenance is designed in part to improve safety conditions for Forest personnel and public users. Road maintenance activities in combination with the bridge replacement would cumulatively lead to improved safety conditions for the public while on this road. All planned work would be required to comply with established standards in the Forest Plan and with OSHA regulations. Cumulative adverse impacts on human health and safety would not occur with adherence to required safety procedures.

3.3.5 Environmental Justice and the Protection of Children

Affected Environment

Executive Order 12898 focuses the attention of Federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse impacts to these target populations from proposed Federal actions and to identify alternatives that might mitigate these impacts. The region of influence for this action is Oconee County, South Carolina.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, directs Federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and ensure that policies, programs, activities and standards address disproportionate risks to children.

Data use for this analysis comes from the Economic Profile System-Human Dimensions Toolkit (EPS-HDT). This program produces detailed socioeconomic reports of counties, states, and regions, including custom aggregations. In addition to these geographies, the demographics report can be run for county subdivisions, cities and towns, American Indian areas, and congressional districts. The report for this project is contained in the project file.

There are no county schools within the project area. There are school bus routes in the area that would travel some of the same state and county roads during construction activities for the bridge. However, there is no identified disproportionate risk to children on these roads as compared to other rural roads in adjacent areas. Most roads provide access to private lands, residences and communities and are frequently used for a variety of agricultural and other commercial uses.

3.3.5-1 lists the percentage of minorities and persons living below the poverty level within Oconee County as compared to the State of South Carolina as a whole.

Table 3.3.5-1 Percentage of minorities and persons living below the poverty level in Oconee County as compared to the State of South Carolina

Location	Minority Persons (% of entire population)	Persons Below Poverty Level (% of entire population)
Oconee County	9.3	18.1
South Carolina	36.9	17.0

Direct, Indirect and Cumulative Effects of Alternative 1

This alternative would not adversely affect minority and low-income communities or cause disproportionate environmental health risks or increase safety risks to children.

There would be no measurable cumulative disproportionate impacts to minorities and people living below the poverty level from this alternative when added to other past, present, and reasonably foreseeable projects on federal and private lands in Oconee County. No additional environmental justice analysis is required.

There would be no adverse impacts to children from this alternative when added to other past, present, and reasonably foreseeable projects on federal and private lands in Oconee County.

Direct, Indirect and Cumulative Effects of Alternative 2

There would be increased traffic and construction activity at the site and on the local roads to and from the area. This would have a short term adverse impacts to local residents that live in the area. Construction of the new bridge would make it more accessible and safer for private vehicles, fire trucks, school busses, and other emergency equipment for all residents in the area and would improve their transportation infra-structure for their homes and businesses.

The area within and surrounding the project area does not contain a disproportionate number of minority persons or persons living below the poverty level when compared to the State of South Carolina. Therefore, additional environmental justice analysis is not required.

Children would not be disproportionately adversely affected by the action alternative. All members of the public including children and minority groups and people living below the poverty level would benefit from the new bridge construction from a safety perspective.

There would be no measurable cumulative disproportionate impacts to minorities and people living below the poverty level from this alternative when added to other past, present, and reasonably foreseeable projects on federal and private lands in Oconee County.

3.3.6 Civil Rights

Affected Environment

The Forest Service participates in special programs to enhance opportunities for equal participation of women, minorities and people with disabilities (FSM 1761 and 1762).

Direct and Indirect Effects of the Alternatives

Review of human health and safety and environmental justice information presented, indicates that individual civil rights and the rights of minority groups would not be affected directly or indirectly by the alternatives considered. Women, Native Americans and minority groups would not be impacted by any of the alternatives any differently than any other groups. Disabled people would not be adversely impacted by the project.There are no barriers for the potential participation as contractors or subcontractors by small business, minority-owned business, small disadvantaged business, and women-owned business concerns in contracts, grants, and cooperative agreements generated by the action alternatives.

Cumulative Effects of the Alternatives

There have been no identified or documented instances of management actions adversely affecting civil rights from past, present or future activities on either federal or private lands. There are no barriers to equal access by minorities and handicapped people in the project area or as a result of past, present or future activities management actions. There are no past or present evidence of discriminatory practices in the locale or with any of the alternatives developed.

3.3.7 Irreversible and Irretrievable Commitment of Resources

Affected Environment

An irreversible commitment of resources refers to an action that could affect resources that are renewable only after a long period of time (such as soil productivity) or are non-renewable resources (such as cultural resources or mineral extraction). An irretrievable commitment of

resources refers to losses of productivity or the use of renewable resources. This represents opportunities foregone for the period of time that the resource cannot be used.

Direct, Indirect and Cumulative Effects of Alternative 1

Not replacing the bridge would not affect resource management on the District and would have no irreversible or irretrievable commitment of resources under this alternative.

Direct, Indirect and Cumulative Effects of Alternative 2

There would be no irreversible commitment of resources. Impacts to soil productivity through erosion would be reduced, when adhering to Forest Plan standards and with the addition of site-specific design criteria. These design criteria limit surface disturbance associated with soil compaction and displacement. There would be no effect to heritage resources as known sites and potential sites eligible for the National Register of Historic Places were not found during a site evaluation by a professional archaeologist.

Past, present, and future activities in the area on both Federal and private lands have included timber harvesting, grazing, farming and maintenance of home sites. Activities have change little in the past and land uses are expected to remain the same in the future. The productivity of the land is being maintained and significant irreversible commitment of resources is not expected.

Chapter 4 – Consultation

Federal, State, local agencies were contacted during the development of this environmental assessment. In addition, individuals were contacted based on the District-wide mailing list. This list is located in the project file.

Interdisciplinary Team (IDT)

Core IDT

Victor Wyant	IDT Leader
Jeff Magniez	Wildlife Biologist
LaRue Bryant	Forest Engineer

Extended IDT

Doug Whittaker	Recreation/Scenery
Robin Mackie	NNIS/Unique Communities
Jim Bates	Heritage Resources
Dick Rightmyer	Soil Scientist
Thomas Scott	Aquatics and hydrology
James Knibbs	Forest Environmental Coordinator

Other Agencies Consulted

Oconee County Roads Department
South Carolina History and Archives
South Carolina State Historic Preservation Office

Contacts during Scoping/30Day Notice and Comment Periods

United States Fish and Wildlife Service

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Appendix A – Biological Assessment/Biological Evaluation

BIOLOGICAL ASSESSMENT / BIOLOGICAL EVALUATION

Land Bridge Road
Bridge Relocation Project

US Forest Service
Sumter National Forest
Andrew Pickens Ranger District
Oconee County, South Carolina

February 2014

I. INTRODUCTION

The purpose of this Biological Assessment/Biological Evaluation (BA/BE) is to determine whether the proposed action is likely to affect any proposed, endangered, threatened, or sensitive (PETS) species.

Proposed, endangered, and threatened species are designated by the US Fish and Wildlife Service (USFWS) and are managed under the authority of the Endangered Species Act (ESA) (Public Law [PL] 93-205, as amended) and the National Forest Management Act (PL 94-588). The ESA requires Federal agencies to ensure that no actions that they "authorize, fund or carry out" are likely to jeopardize the continued existence of any proposed, endangered, or threatened species or their habitat.

Sensitive species are managed under the authority of the National Forest Management Act requiring that National Forests manage for "viable populations of all native and desirable non-native species" both across the range of the species and within the planning area. Sensitive species designation occurs on a periodic basis through the recommendation of Forest Biologists who consult with local State Heritage Programs, The Nature Conservancy, and local species experts. The Regional Forester administratively designates sensitive species.

The objectives of this BA/BE are:

- To ensure that Forest Service actions do not contribute to the loss of viability of any PETS species;
- To comply with the requirements of the ESA; and
- To provide a process and standard to ensure PETS species receive full consideration in the decision-making process.

II. PROPOSED ACTION

The Oconee County Road Department has identified a need to relocate the bridge over the Chauga River on Land Bridge Road (CH-29), a county-maintained road on National Forest System lands. See attached map in Appendix A.

Treatments would include construction of a new bridge and road segment, dismantling and removal of the old bridge, obliteration of the existing road segment that would no longer be used, and construction of two gravel parking areas and connector trail for recreation access. The area of impact for the realignment of Land Bridge Road, including the two parking areas, a plunge pool, and the hiking trail, is estimated to be 0.4 acre; the decommissioning of the existing road would occur on 0.2 acre (D. Mack Kelly, Oconee County engineer, personal communication, January 13, 2014). Existing easements would be revised to support the new location of the county road and bridge on National Forest System lands. Other connected actions would include soil stabilization and clearing of vegetation for the new road segment.

The bridge would span the entire width of the Chauga River (approximately 70 feet), and rest on support structures located on each side of the river banks. No piers or support structures would be located in the river. The bridge would be located at an elevation that would allow floodwaters to safetly pass beneath it. The existing bridge structure would be dismantled and removed.

The newly aligned roadway section would replace approximately 300 feet of existing roadway. The new section would be centered in a 50-foot wide cleared and grubbed strip. The actual roadway would be 20 feet wide. The roadway would be graded to alignment and sloped as shown on engineering plans. The subgrade would be shaped and compacted with suitable material. The road section would consist of a minimum of five inches compacted stones and where asphalt is used the road section would consist of an additional minimum two inches of compacted surface Type C asphalt.

Two small gravel parking areas would be constructed on each side of the river for recreational users of the river. The size of the parking area on the east side of the river would be approximately 30 feet x 120 feet. The size of the parking area on the west side of the river would be approxiamtely 30 feet x 60 feet. A short connector trail would be constructed on the eastern side of the river leading from the parking area to the river. The trail would be constructed according to Forest Service standards.

Ground and soil disturbance would occur during several phases of the project. Project design criteria include erosion and sediment control measures.

Connected actions associated with this proposal include the following activities:

- Removal of trees and other vegetation along the newly proposed route. Cleared vegetation would be removed or broken down on-site (i.e., chipped, scattered, masticated, etc.). Merchantable wood products from the cleared strip would be sold commercially or by personal use firewood permits.
- Revising the County's existing easements to reflect the new location of the road and bridge. The Forest Service would issue an easement to Oconee County under the Forest Roads and Trails Act (FRTA, 16 USC 533) for construction and maintenance of the new right-of-way.
- Dismantling and removal of the old bridge.
- Obliteration of the existing road to stabilize exposed soils within the riparian corridor and reduce impacts to water quality.

- Stabilization/rehabilitation of disturbed areas of the site, including disking, fertilizing, seeding, and mulching. Seeding would be with non native and/or non-invasive non-native species.

III. CONSULTATION HISTORY

This BA/BE tiers to the Biological Assessment for the *Sumter National Forest Revised Land and Resource Management Plan* (Forest Plan, 2004). The USFWS was consulted informally on the Forest Plan BA and concurred with a determination of "not likely to adversely affect."

USFWS's Charleston Field Office responded to public scoping in a letter dated June 26, 2013, wherein they recommended surveys be conducted for small whorled pogonia (*Isotria medeoloides*) and smooth coneflower (*Echinacea laevigata*), species that occur in close proximity to the project area.

During January and February 2014, the Forest Service worked with USFWS's Charleston Field Office (Morgan Wolf, biologist) to develop a conservation measure for northern long-eared bat (*Myotis septentrionalis*). This conservation measure would be incorporated into the project to ensure that the proposed action is not likely adversely affect the species once it becomes listed as federally endangered.

IV. SPECIES CONSIDERED AND EVALUATED

The complete list of PETS species for the Sumter National Forest is attached in Appendix B. All species on this list were considered for this BA/BE. Using a step-down process, species and potential habitat in the project area were identified by:

1) Evaluating the location and nature of the proposed project;
2) Considering the species' range, life history, and available habitat information;
3) Reviewing records of known PETS species occurrences, which includes data from the South Carolina Heritage Trust Geographic Database of Rare, Threatened and Endangered Species; and
4) Reviewing the USFWS Distribution Records of Endangered, Threatened, Candidate and Species of Concern (2013).

Botanical surveys indicate that there are no botanical PETS species that occur within the project area, including small whorled pogonia and smooth coneflower. These federally listed species are eliminated from further analysis because they are not known to occur within the project area. However, sweet pinesap (*Monotropsis odorata*) is assumed to occur because it is often difficult to detect during botanical surveys.

Bald eagle (*Haliaeetus leucoocephalus*), Chauga crayfish (*Cambarus chaugaensis*), Diana fritillary (*Speyeria diana*), eastern small-footed bat (*Myotis leibii*), Edmund's snaketail (*Ophiomphus edmundo*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), and southern Appalachian salamander (*Plethodon teyahalee*) are also assumed to occur because potential

habitat exists and inventory data are not sufficient or available to determine presence/absence or number and location of individuals.

Northern long-eared bat was recently proposed to be listed as an endangered species under the ESA throughout its range (Federal Register 2013). This species occurs on the Andrew Pickens Ranger District. Northern long-eared bat is assumed to occur within the project area because potential habitat exists and inventory data are not sufficient or available to determine presence/absence or number and location of individuals.

The species listed above will be addressed in this BA/BE. All other species on the Sumter National Forest PETS list are eliminated from further analysis because they are not known to occur in the project area.

V. EVALUATED SPECIES SURVEY INFORMATION

The procedure used to decide when to inventory for PETS species is consistent with Forest Service Manual 2672.43. Botanical surveys were conducted within the project area on October 31, 2012, by Chris Holcomb, Andrew Pickens Ranger District biological technician; on May 23, 2013, by Jeffrey Magniez, Sumter National Forest zone wildlife biologist; and on July 26, 2013, by David White, US Forest Service contract botanist.

Surveys have also been conducted for freshwater mussels (Adkins 1995; Alderman 2004; Krause and Roghair 2013), crayfish (Eversole et al. 2002), and bats (Bunch et al. 1998; Menzel et al. 2003; Loeb 2004a; Loeb 2004b; Loeb and O'Keefe 2006; Loeb 2013) on the Andrew Pickens Ranger District.

VI. ENVIRONMENTAL BASELINE FOR THE SPECIES EVALUATED IN THIS BA/BE

The Andrew Pickens Ranger District is located in the Blue Ridge physiographic province where variations in elevation lead to differences in vegetation community types. Pitch pine (*Pinus rigida*) and Table Mountain pine (*P. pungens*) are found on high ridges, there is a mixture of shortleaf pine (*P. echinata*) and various hardwoods on low elevation ridges and south-facing slopes, mesic oak-hickory forests are found on lower and north-facing slopes, and mixed mesophytic and white pine-hemlock forests are located in forested coves.

Four general habitat types occur within the project area: road/forest edge, stream bank, alluvial flat/bottomland forest, and dry-mesic slope forest (more specifically, dry-mesic oak-hickory-pine forest). On the east side of the Chauga River there is a relatively small section of an alluvial terrace or bottomland forest as well as a section of dry-mesic oak-pine forest dominated by white oak (*Quercus alba*), eastern white pine (*P. strobus*), shortleaf pine, and other hardwoods. The lower slope of that area includes part of the proposed road and parking area. The proposed road construction would eliminate some relatively large eastern white pine and shortleaf pine. On the west side of the Chauga River there is a dry-mesic lower slope forest with a mix of mesic hardwoods and dry-mesic oak-pine, including a few large shortleaf pines. Two or three of these large pines are in the area of the proposed road and parking area.

Mountain laurel (*Kalmia latifolia*) and rhododendron (*Rhododendron maximum*) are extensive throughout the project area. Doghobble (*Leucothoe fontanesiana*) is also abundant along the stream bank edges. Herbaceous diversity within these acidic forests on both sides of the Chauga River is low, whereas botanical diversity is greatest along the road/forest edge.

See the Forest Plan Final BA and BE and the *Fiscal Year 2012 Monitoring and Evaluation Annual Report* (US Forest Service 2013) for information on the status and environmental baseline for PETS species on the Sumter National Forest.

Bald eagles nest in tall, usually living trees near an open body of water. This species almost always forages near estuaries, lakes, ponds, rivers, open marshes, and shorelines. Bald eagles will soar over a body of water and swoop to the surface for fish. They also scavenge for dead fish and other carrion along shores and occasionally consume small birds and mammals. Although nationwide recovery efforts led to the removal of bald eagles from the Threatened and Endangered Species List on August 9, 2007, this species is still protected under the Bald and Golden Eagle Protection Act (16 USC 668-668c) and the Migratory Bird Treaty Act (16 USC 703-712). There are no known nests on the Andrew Pickens Ranger Distinct; however, the Chattooga and Chauga Rivers and several large water bodies (e.g., Lake Cherokee, Lake Cheohee, and Chattooga Lake) provide suitable foraging habitat for this species. There are potential nest and roost sites within and immediately adjacent to the project area.

In South Carolina, Chauga crayfish is restricted to the upper Savannah River basin, particularly the Chauga and Chattooga River basins in Oconee County. This species was found at nine sites on the Andrew Pickens Ranger District (Eversole et al. 2002). Although it was found in both high- and low-order streams, Chauga crayfish appears to be more abundant at higher order stream sites. This species occurs at sites with a substrate of cobble, large stones, and/or boulders with very little sediment accumulation. Because it seems particularly sensitive to sedimentation, bank stability is probably necessary for the survival of this species. Potential habitat for Chauga crayfish exists within and downstream of the project area.

Diana fritillary is a butterfly that occurs in deciduous and pine forests near streams and along roadsides. Of four originally known regional population centers, only two remain (Appalachian and Ozark Mountains). The caterpillar feeds on violets (*Viola* spp.), whereas adults feed on the nectar of a variety of plants such as milkweed (*Asclepias* spp.), buttonbush (*Cephalanthus occidentalis*), coneflower (*Echinacea* spp.), compassplant (*Silphium laciniatum*), and common mint (*Pycnanthemum incanum*). While there are no occurrence records of Diana fritillary within the project area, potential habitat exists within the project area.

Eastern small-footed bat. At the southern terminus of its range on the Andrew Pickens Ranger District, this species has been detected near Lake Cherokee and at the Chattooga River near Highway 28. In winter, eastern small-footed bats hibernate in caves and abandoned mines. They may also overwinter in non-cave and non-mine features such as rock outcrops and stone highway culverts, especially during mild portions of winters. During the summer, eastern small-footed bats roost in talus fields and slopes, rock outcrops, cliff crevices, buildings, bridges, and other manmade structures. Summer foraging habitat includes riparian areas, upland forests, and ridge tops. Following a petition to list the eastern small-footed bat as

threatened or endangered, the USFWS announced on October 2, 2013, that listing this species was not warranted (Federal Register 2013). There are no occurrence records of eastern small-footed bat within the project area, but potential habitat exists.

Edmund's snaketail is one of the least known dragonfly species in North America and has one of the most restricted ranges. It is known to occur in just a few counties in Georgia, South Carolina, North Carolina, and Tennessee. Edmund's snaketail was thought to be extinct in the 1970s and 1980s, but was rediscovered in North Carolina in 1994. This species was documented for the first time in South Carolina in 2008 on the Chattooga River near the Highway 76 Bridge (Hill 2009). Edmund's snaketail larvae inhabit clear, cold rivers and streams with rocks and riffles in the southern Appalachians. Adults occur in the riparian areas of rivers and streams. This species is susceptible to alterations in stream flow, siltation, flood scouring, pollution, and loss of adult foraging habitat. Although Edmund's snaketail has never been documented in the Chauga River, potential habitat does exist within and downstream of the project area.

Northern long-eared bat. On October 2, 2013, the USFWS proposed to list the northern long-eared bat as an endangered species throughout its range (Federal Register 2013). The USFWS concluded that critical habitat could not currently be determined. In their listing proposal, the USFWS identified several potential risk factors and management concerns for this species. However, white-nose syndrome, which is caused by a fungus (*Geomyces destructans*) that grows on and within exposed tissues of hibernating bats, is the only factor identified as significantly affecting populations and prospects for long-term persistence of the species across its range.

Northern long-eared bats range across much of the eastern and north central United States, and most of the Canadian provinces. This species occurs within South Carolina, and has been recorded at several locations on the Andrew Pickens Ranger District during live-trapping and acoustical surveys. Loeb and O'Keefe (2006) report that northern long-eared bats were the third most common species mist-netted during 17 nights of trapping on the Andrew Pickens Ranger District.

Northern long-eared bats predominantly overwinter in hibernacula that include caves and cave-like structures (e.g., abandoned or active mines, railroad tunnels). During summer, this species typically roosts singly or in colonies underneath bark or in cavities or crevices of both live trees and snags. Summer roost locations for males and non-reproductive females may include cooler sites, including caves and mines. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, bridges, behind window shutters, and in bat houses. Although this species has not been recorded within the project area, it has been detected in similar habitat adjacent to the Chauga River approximately 1 ½ miles away.

Rafinesque's big-eared bat is a colonial roosting species, with some roosts containing over 100 individuals. They use a wide variety of roost sites: tree cavities, caves, mines, buildings, and other human-made structures, including bridges. However, a statewide survey found Rafinesque's big-eared bat did not use bridges in the Blue Ridge Mountains (Bennett et al. 2008). Rafinesque's big-eared bats leave their roosts only when it is completely dark, forage for

insects and return to the roosts before sunrise. This species hibernates in the winter months, but may be active during warm spells in the southern portions of its range. Although Rafinesque's big-eared bats are not known to roost within the project area, potential habitat exists.

Southern Appalachian salamanders inhabit deciduous forests. They are known to occupy birch-beech-hemlock forests with witch hazel (*Hamamelis virginiana*), mountain laurel, and rhododendron in the understory (Nishikawa 1990). Southern Appalachian salamanders seek shelter under rotting logs and less frequently under rocks and leaf litter. Like many salamanders, their activity levels correspond with moisture availability. Although not known to occur within the project area, potential habitat may exist.

Sweet pinesap is a cryptic species that occurs in dry to mesic upland woods under oaks and pines (particularly Virginia pine, *Pinus virginiana*, and shortleaf pine, *P. echinata*), especially slopes or bluffs with abundant heaths. Eleven populations of this species have been documented on the Andrew Pickens Ranger District, although more are thought to occur. Although sweet pinesap has not been documented within the project area, potential habitat does exist.

VII. EFFECTS OF PROPOSED MANAGEMENT ACTION ON EACH SPECIES EVALUATED

This effects analysis takes into account not only the knowledge of species distribution from previous field surveys, but also the adequacy of those surveys. The best available science (including species' habitat requirements, reasons for species' decline, limiting factors, project area habitat conditions, and the biological effects of the intensity of the proposed action) is also considered in the effects analysis. The effects of a proposed action on a species can be direct, indirect, or cumulative.

Direct Effects

Direct effects are effects to the species known to occur in the proposed project area. They occur at the same time and place as the project activity.

Bald eagles are not known to nest or roost within the project area. If they were to occur during project implementation, road and bridge relocation activities could cause temporary relocation to undisturbed areas. There would be no direct effects to this species.

Chauga crayfish and Edmund's snaketail. Implementation of the proposed action may result in direct effects to these aquatic species. Road and bridge relocation activities may lead to a short-term increase in sediment deposition in the Chauga River. Sedimentation can cause direct mortality to the life stages of aquatic species through burial and suffocation of eggs and larvae. Sedimentation can also result in species displacement and behavioral avoidance of affected stream reaches, reduced feeding and growth, respiratory impairment, reduced tolerance to disease and toxicants, and physiological stress.

Although concrete would not be used within the river (no piers or support structures would be located in the river), concrete would be used within the project area. Direct effects could occur to Chauga crayfish and Edmund's snaketail if wet concrete were to enter the river via accidental discharge or runoff from the construction site. Concrete changes the pH of water. A range of pH from 6.5 to 9 is generally considered safe for aquatic life. Concrete can increase the pH of water to values greater than 9. High pH can cause death; damage to outer surfaces like gills, eyes, and skin; and decrease an organism's ability to dispose of metabolic wastes. Alkaline conditions may also increase the toxicity of other substances. For example, the toxicity of ammonia is more severe at pH 8 than it is at pH 7.

In order to minimize direct effects on Chauga crayfish and Edmund's snaketail, several design measures would be implemented to reduce or eliminate sediment deposition and the introduction of wet concrete into the Chauga River (see Design Criteria). Erosion control for this project would be as per SCDOT Standard Specifications for Highway Construction - 2007, Section 815 - Erosion Control. During construction, temporary Best Management Practices (BMPs) would be followed to minimize erosion and remove sediment by capturing and filtering runoff before it leaves the project limits. BMPs would be installed with a phased approach where perimeter controls are installed prior to clearing and earthwork activities and additional measures are introduced throughout varying stages of the construction process. Upon project completion, permanent BMPs would be followed to ensure long-term erosion and sediment control within the project area.

To further assure that wet concrete would not be introduced into the river, it would be placed in forms and would not be placed directly in the river. Once the concrete cures, the forms would be removed. Concrete washout areas (CWAs), as specified in the Davis & Floyd engineering specifications, would also be used during project implementation to prevent off-site movement of concrete. CWAs are designed and located to keep concrete from getting into the water. CWAs would be located temporarily on each side of the river during the pouring of concrete and would be used for all concrete operations, including the rinsing of concrete forms and the washing of residual concrete from concrete truck chutes (D. Mack Kelly, Oconee County engineer, personal communication, August 20, 2013).

Diana fritillary. If adults were present during project activities, they would likely relocate to undisturbed areas. If individuals occurred as immobile pupae or larvae with reduced mobility, they would be less likely to relocate if disturbed. It is possible that if pupae or larvae were present during road and bridge relocation activities, individuals could be harmed.

Eastern small-footed bat and Rafinesque's big-eared bat. Two project activities could directly affect eastern small-footed bats and Rafinesque's big-eared bats: 1) removal of trees and other vegetation along the newly proposed route and 2) dismantling and removal of the old bridge. Because of the highly mobile nature of bats, any disturbance would likely result in the temporary displacement of individuals to undisturbed areas. However, flightless young would be most vulnerable since their ability to relocate would be limited. Given the small size of the project area (0.4 acre of tree removal) and assuming that bats would be using similar habitats across the Andrew Pickens Ranger District, direct effects are not likely to affect the viability of eastern small-footed bat and Rafinesque's big-eared bat.

All other project activities (e.g., obliteration of the existing road segment, construction of parking areas and hiking trail, construction of a new bridge, and stabilization/rehabilitation of disturbed areas of the site) would have no effect on eastern small-footed bats or Rafinesque's big-eared bats because they would occur after removal of trees and other vegetation along the newly proposed route.

Northern long-eared bat. Two project activities could directly affect northern long-eared bats: 1) removal of trees and other vegetation along the newly proposed route and 2) dismantling and removal of the old bridge. Because of the highly mobile nature of bats, any disturbance would likely result in the temporary displacement of individuals to undisturbed areas. However, flightless young would be most vulnerable since their ability to relocate would be limited. All other project activities (e.g., obliteration of existing road segment, construction of parking areas and hiking trail, construction of a new bridge, and stabilization/rehabilitation of disturbed areas of the site) would have no effect on northern long-eared bat because they would occur after the removal of trees and other vegetation.

Tree removal would occur prior to November 2014 (Kyle Reid, Oconee County assistant manager of roads and bridges, personal communication, February 7, 2014). As such, this activity would take place before the northern long-eared bat is listed as federally endangered[2]. Considering the small size of the project area (0.4 acre of tree removal) and assuming that bats would use similar habitats across the Andrew Pickens Ranger District, direct effects from tree removal are not likely to jeopardize the continued existence of the species.

Dismantling and removal of the old bridge would likely take place after the northern long-eared bat is listed as federally endangered. It is possible that northern long-eared bats could use the old bridge as roosting habitat and that its removal could result in direct effects to this species. In order to avoid direct effects to northern long-eared bats, design criterion #10 would be followed. By following this conservation measure, dismantling and removal of the old bridge is not likely to adversely affect the species once it becomes listed as endangered.

Southern Appalachian salamander is not known to occur within the project area, but potential habitat does exits. If this species did occur, road and bridge relocation activities could result in harm or mortality of individuals. Considering the relatively small size of the project area, and assuming that southern Appalachian salamander would be using similar habitats across the Andrew Pickens Ranger District, project activities would not affect the viability of the species.

Sweet pinesap is not known to occur within the project area, but is assumed to occur based on the availability of suitable habitat. If this species did occur, road and bridge relocation activities could result in harm or mortality of individuals. Given the relatively small amount of suitable habitat that would be impacted, direct effects to these species would not affect the viability of the species.

Indirect Effects

[2] USFWS's listing of the northern long-eared bat as federally endangered would presumably occur in October 2014, with a 30-day final ruling occurring in November 2014.

Indirect effects include the consequences of management activities that result in the modifications of habitat and ecological conditions that affect food, water, shelter and other life requirements for a species. Indirect effects could occur during or after project implementation.

Bald eagle, Diana fritillary, southern Appalachian salamander, and sweet pinesap. Tree removal and subsequent actions (road realignment, construction of parking areas and connector trail) could eliminate potential bald eagle nest and roost trees and alter habitat for Diana fritillary, southern Appalachian salamander, and sweet pinesap. These indirect effects are not likely to cause a trend to federal listing or a loss of viability because of the relatively small size of the impact area (0.4 acre) and the availability of potential habitat across the Andrew Pickens Ranger District. Additionally, habitat for these species could become available once the existing road segment is obliterated and stabilized (0.2 acre). The dismantling and removal of the old bridge would have no indirect effects on bald eagle, Diana fritillary, southern Appalachian salamander, and sweet pinesap.

Chauga crayfish and Edmund's snaketail. Project activities could result in short-term habitat degradation through the introduction of sediment or wet concrete into the Chauga River. In order to minimize indirect effects on Chauga crayfish and Edmund's snaketail, several design measures would be implemented to reduce or eliminate erosion, sedimentation, and introduction of concrete in the river (see analysis in Direct Effects). However, road realignment and construction of a new bridge are expected to improve aquatic habitat in the long-term by addressing existing storm drainage and water quality issues.

Eastern small-footed bat and Rafinesque's big-eared bat. Tree removal would alter existing habitat conditions for eastern small-footed bat and Rafinesque's big-eared bat. Tree removal would eliminate potential roost trees and modify foraging habitat. Dismantling and removal of the old bridge could also affect potential roost sites. However, the old bridge would be replaced with a new bridge, which would likely provide similar roosting opportunities. These indirect effects are not likely to cause a trend to federal listing or a loss of viability because of the relatively small size of the impact area (0.4 acre) and the availability of potential habitat across the Andrew Pickens Ranger District.

Northern long-eared bat. Tree removal would alter existing habitat conditions for northern long-eared bat. Removal of trees and other vegetation along the newly proposed route would eliminate potential roost trees and modify foraging habitat. Because of the relatively small size of the impact area (0.4 acre) and the availability of potential habitat across the Andrew Pickens Ranger District, these indirect effects are not likely to jeopardize the proposed species.

Dismantling and removal of the old bridge could also affect potential roost sites. However, the old bridge would be replaced with a new bridge, which would likely provide similar roosting opportunities. Bridge removal is not likely to adversely affect habitat for northern long-eared bat.

All other project activities (e.g., obliteration of existing road segment, construction of parking areas and hiking trail, construction of a new bridge, and stabilization/rehabilitation of disturbed

areas of the site) would have no effect on northern long-eared bat habitat because the activities would occur after removal of trees and other vegetation along the newly proposed route.

Cumulative Effects

Cumulative effects are those resulting from incremental impacts of the proposed action added to other past, present, and future actions. Cumulative effects can result from individually minor but collectively significant actions that take place over a period of time.

In the past, projects on the Andrew Pickens Ranger District included timber harvesting, timber stand improvement practices, prescribed burning, mechanical and chemical control of non-desirable species (including non-native invasives), wildlife opening construction and maintenance, trail construction and maintenance, road construction and maintenance (including culvert repair), and erosion control practices. In the future, all activities are expected to continue at about the same levels, except for southern pine beetle control and storm-damaged timber salvage, which are difficult to predict.

On privately owned lands within the National Forest boundary, the primary land uses are timber management, farming, livestock production, hunting, and residential uses. State and county roads and road rights-of-way are routinely maintained within the administrative boundary of the Andrew Pickens Ranger District. The proposed action is not expected to result in adverse cumulative effects.

VIII. DESIGN CRITERIA

Forest Plan standards, *South Carolina Best Management Practices for Forestry*, and *South Carolina Department of Transportation Best Management Practices* would be followed. Where design criteria from one source differ from those of another, the more conservative criterion would be applied.

The following design criteria apply to the action alternative.

11. SC DOT Standard Spec Sec 815 Erosion Control would be followed (located in project file).

12. SC DOT Supplemental Technical Specifications SC-M-815-11 would be followed (located in project file).

13. Davis & Floyd Engineering specifications for the project have been developed and would be followed for :
    a. Silt Fence Construction
    b. Stone Construction Entrance Detail
    c. Sediment Tube Detail
    d. Concrete Washout Area Detail
    e. Type “A” Inlet Protection Detail
    f. Type “E” Inlet Protection Detail

14. Specific Erosion Control Measures (additional measures in BMP and other technical specification documents also apply)

a. TEMPORARY SEDIMENT AND EROSION CONTROL

Erosion Control for this project shall be as per SCDOT Standard Specifications for Highway Construction-2007, Section 815-Erosion Control. During construction, temporary Best Management Practices (BMPs) will be installed to minimize erosion and remove sediment by capturing and filtering runoff before it leaves the project limits. The intent is for the BMPs to be installed with a phased approach where perimeter controls are installed prior to clearing and earthwork activities and additional measures are introduced throughout varying stages of the construction process.

b. TEMPORARY PERIMETER CONTROLS

During the actual construction of the project, several BMPs will be installed to control sediment deposition from the project site. These measures will include:

1) Silt Fence installation for several applications including:
   a) Perimeter of soil stockpiles.
   b) Along downslope side of the access roads to the bridge.
   c) Beyond proposed embankment toes of slope with a double row of silt fence spaced a minimum of five feet apart along the top of bank of the river on both sides of the river.
   d) Delineation of work limits as required.

2) Gravel Construction Entrances.
   a) Ditch checks within the access road ditch section.
   b) Stabilized contractor and material staging area(s).
   c) Tree barricades.

c. TEMPORARY BEST MANAGEMENT PRACTICES

In addition, other erosion control measures will be installed as applicable to the type of construction:

1) Concrete washout area(s).
2) Soil Tracking.
3) Dust Control.
4) Surface roughening, temporary seeding and mulching.
5) Type “A” and “E” inlet protection filters at catch basins and drop inlets as construction sequencing dictates.
6) Within the limits of this project along the downstream edge of the bridge construction limit, silt turbidity curtains will be installed if and when construction activities generate excessive turbidity.

d. PERMANENT BEST MANAGEMENT PRACTICES

The following measures are permanent water quality structures which may be incorporated as part of a bridge project:

6) Manufactured Treatment Devices and Inlet Filters
7) Hydraulic Erosion Control Products (Type 4).
8) Stabilized protection at stormwater outfalls.
9) Vegetative swales.
10) Trash and recycling containers.

As each of the BMPs has its own varying degree of erosion prevention and trapping efficiency, calculations will be performed on the perimeter silt fencing as it is both the most prominent BMP during construction as well as the last line of defense prior to permanent stabilization. Calculations will be performed against a 100 foot sample section of the worst case scenario where a single row of silt fence would receive the most contributory area against the steepest back-slope. In addition, the fence is assumed to be installed at the toe of the steepest slope such that the proposed maintenance shelf will only improve the calculated results. Furthermore, the calculation will assume the upper-end of the runoff coefficient for bare soil as well as eliminating the contributory effects of other downstream BMPs. The resulting trapping efficiency of the worst case condition will be calculated and detailed in the contract documents.

15. Identified heritage sites would be avoided during site disturbing activities.

16. Identified PETS species locations would be avoided during site disturbing activities.

17. The spread of nonnative invasive plant species would be minimized by ensuring equipment cleaning provisions are met, that no non-native invasive species are planted and that invasive plant species are treated that have the potential to impact resource management objectives in the project area.

18. Road surface approaches to the new bridge would be paved to reduce annual road maintenance disturbance within the riparian corridor and improve water quality.

19. A plunge pool would be constructed near the parking area on the west side of the river to function as a sediment trap to avoid erosion due to the steep slope adjacent to the proposed parking area on the west side of the river.

20. Prior to dismantling the existing bridge, Forest Service biological staff must carefully examine the underside of the bridge for the presence of bats. If any bats are found roosting under the bridge, then all dismantling activities must be suspended until further notice. Forest Service biological staff will contact USFWS's Charleston Field Office.

IX. DETERMINATION OF EFFECT AND RATIONALE

Bald eagle – MAY IMPACT INDIVIDUALS BUT NOT LIKELY TO CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF VIABILITY

Rationale: Direct effects are not expected since any disturbance would cause bald eagles to temporary relocate to undisturbed areas. Potential nesting and roosting habitat could be adversely affected; however, considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, effects of project activities on bald eagle habitat are not significant.

Chauga crayfish, Edmund's snaketail – MAY IMPACT INDIVIDUALS BUT NOT LIKELY TO CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF VIABILITY

Rationale: Project activities could cause a short-term increase of sedimentation in the Chauga River, resulting in direct and indirect effects. However, several design measures would be implemented to reduce or eliminate sediment deposition or the introduction of wet concrete into the river. Road realignment and new bridge construction are expected to increase long-term habitat quality for these species.

Diana fritillary – MAY IMPACT INDIVIDUALS BUT NOT LIKELY TO CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF VIABILITY

Rationale: Road and bridge relocation activities could cause direct effects to pupae or larvae within the project area. The proposed action could also alter habitat conditions, causing indirect effects. Considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of this project on Diana fritillary are not significant.

Eastern small-footed bat, Rafinesque's big-eared bat – MAY IMPACT INDIVIDUALS BUT NOT LIKELY TO CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF VIABILITY

Rationale: Tree and bridge removal could cause direct effects to bats if an occupied roost site were disturbed. Project activities could also alter habitat conditions, causing indirect effects. Considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of this project on eastern small-footed bats and Rafinesque's big-eared bats are not significant.

Northern long-eared bat

Two proposed activities could result in direct and indirect effects to northern long-eared bats: 1) removal of trees and other vegetation along the newly proposed route and 2) dismantling and removal of the old bridge. All other project activities (e.g., obliteration of the existing road segment, construction of parking areas and hiking trail, construction of a new bridge, and stabilization/rehabilitation of disturbed areas of the site) would

have "no effect" on northern long-eared bat because they would occur after the removal of trees and other vegetation.

Following are effects determinations based on the proposed activities that could result in direct and indirect effects relative to the timing of USFWS's listing of the northern long-eared bat as federally endangered. The timing of listing is important because it affects the type of determination and the requirement to consult with USFWS.

Removal of trees and other vegetation along the newly proposed route – NOT LIKELY TO JEOPARDIZE PROPOSED SPECIES OR MODIFY PROPOSED CRITICAL HABITAT

Rationale: Removal of trees and other vegetation could cause direct effects to bats if an occupied roost tree were removed. Tree removal could also alter habitat conditions, causing indirect effects. Considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of tree removal are not significant.

The above effects determination for tree removal is based on the assumption that this activity would occur prior to the listing of northern long-eared bat as federally endangered. According to ESA Section 7(a)(4), the above effects determination does not require conference with USFWS.

Dismantling and removal of the old bridge – NOT LIKELY TO ADVERSELY AFFECT

Rationale: Dismantling and removal of the old bridge could result in direct effects to northern long-eared bat. In order to avoid direct effects, design criterion #10 would be followed. Removal of the old bridge could affect the availability of potential roost sites, however the new bridge is likely to provide similar roosting opportunities.

The above effects determination for dismantling and removal of the old bridge is based on the assumption that this activity would occur after the species is listed as federally endangered. Under ESA Section 7(a)(2), consultation with USFWS is required for this determination.

Southern Appalachian salamander – MAY IMPACT INDIVIDUALS BUT NOT LIKELY TO CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF VIABILITY

Rationale: Project activities could result in harm or mortality to individuals, assuming they were present. Potential habitat could be adversely affected; however, considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of project activities on southern Appalachian salamander habitat are not significant.

Sweet pinesap – MAY IMPACT INDIVIDUALS BUT NOT LIKELY TO CAUSE A TREND

TO FEDERAL LISTING OR A LOSS OF VIABILITY

Rationale: Individual plants could be harmed or destroyed by project activities. Potential habitat could be adversely affected; however, considering the relatively small size of the project area and the availability of potential habitat across the Andrew Pickens Ranger District, the direct and indirect effects of project activities on sweet pinesap habitat are not significant.

X. SIGNATURE

This Biological Assessment/Biological Evaluation was prepared by:

/s/ Jeffrey M. Magniez *2/18/2014*

Jeffrey M. Magniez Date
Zone Wildlife Biologist
Sumter National Forest

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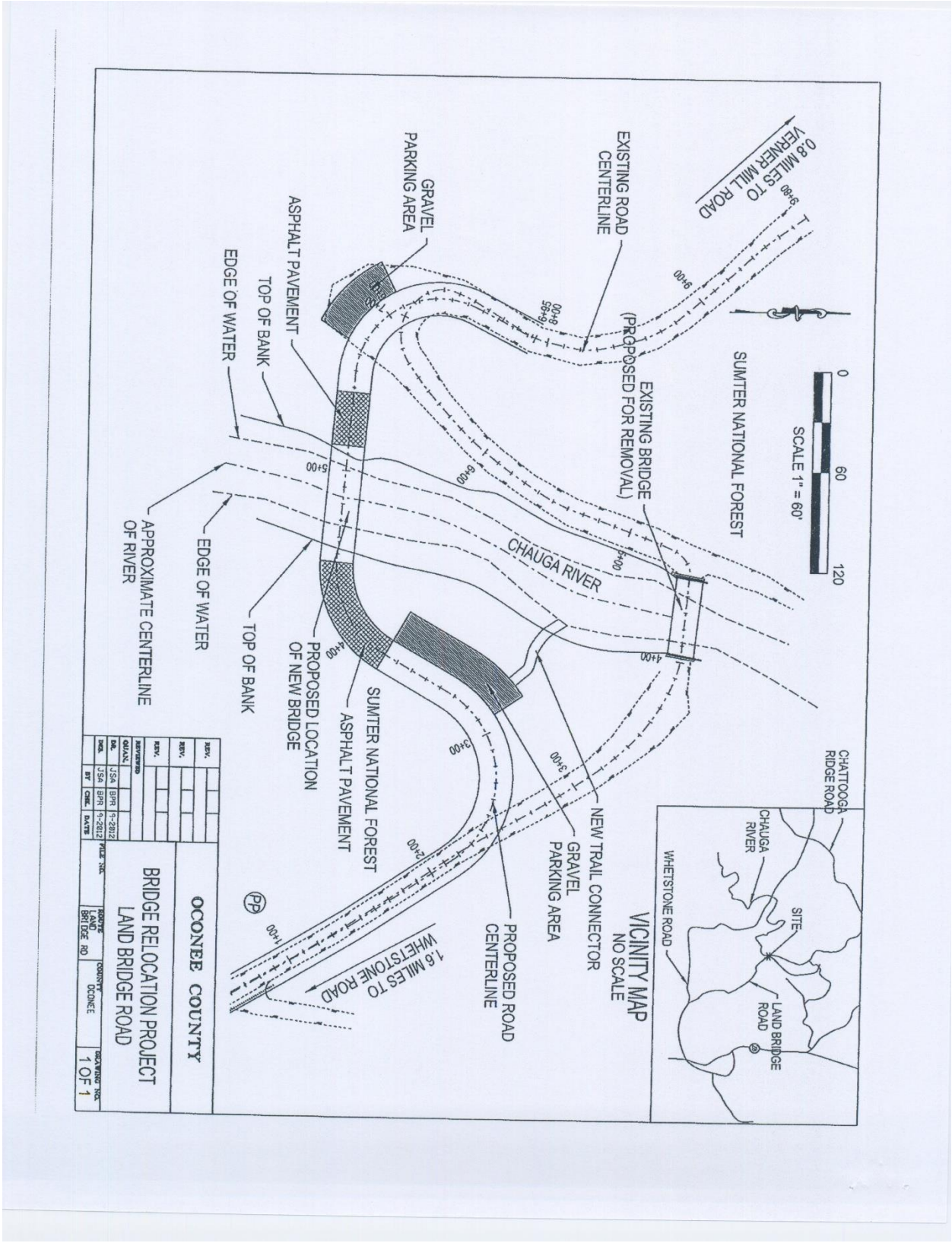
APPENDIX A – PROJECT VICINITY AND SITE MAP



APPENDIX B

Proposed, Endangered, Threatened and Sensitive (PETS) Species of the Sumter National Forest (2014). Obs = PETS species observed during project field surveys or known to occur based on existing records, Hab = Suitable habitat exists within the project area, "+" = meets criterion, "--" = does not meet criterion. P = piedmont (Enoree and Long Cane Ranger Districts), M = mountains (Andrew Pickens Ranger District).

SPECIES	STATUS	HABITAT	Obs	Hab	Range
CAROLINA HEELSPLITTER *Lasmigona decorata*	Federally Endangered	Known historically from Catawba, Pee Dee, and Saluda drainages in South Carolina; occurs in Mountain, Beaverdam, Cuffytown, Sleepy, and Turkey Creeks **Project is outside of known range**	--	--	P
NORTHERN LONG-EARED BAT *Myotis septentrionalis*	Proposed Federally Endangered	Winters in caves and cave-like structures (e.g., mines, railroad tunnels); summer roosts include cavities, underneath bark, crevices, or hollows of both live and dead trees **Potential habitat occurs within project area**	--	+	M
PERSISTENT TRILLIUM *Trillium persistens*	Federally Endangered	Known from one site in South Carolina; occurs in mixed mesic forest in the Tugaloo River Composite watershed **Not known to occur**	--	--	M
RELICT TRILLIUM *Trillium reliquum*	Federally Endangered	Basic mesic forests in Savannah and Chattahoochee drainages; known from the lower piedmont/fall line sandhills region **Project is outside of known range**	--	--	P
SMOOTH CONEFLOWER *Echinacea laevigata*	Federally Endangered	Occurs along the Brevard Geologic Belt in association with grassy understories and open canopies **Not known to occur**	--	--	M
WOOD STORK *Mycteria americana*	Federally Endangered	Known to forage in freshwater wetlands on both Enoree and Long Cane Ranger Districts **Project is outside of known range**	--	--	P
FLORIDA GOOSEBERRY *Ribes echinellum*	Federally Threatened	Known from the Stevens Creek drainage, on north facing hardwood slopes in association with basic soils **Project is outside of known range**	--	--	P
SMALL WHORLED POGONIA *Isotria medeoloides*	Federally Threatened	Occurs in mixed mesic forests at moderate elevations (>1,000 feet) **Not known to occur**	--	--	M

Proposed, Endangered, Threatened and Sensitive (PETS) Species of the Sumter National Forest (2014). Obs = PETS species observed during project field surveys or known to occur based on existing records, Hab = Suitable habitat exists within the project area, "+" = meets criterion, "--" = does not meet criterion. P = piedmont (Enoree and Long Cane Ranger Districts), M = mountains (Andrew Pickens Ranger District).

SPECIES	STATUS	HABITAT	Obs	Hab	Range
ASHLEAF GOLDENBANNER *Thermopsis mollis* var. *fraxinifolia*	Sensitive	Pine-oak heaths and roadsides **Not known to occur**	--	--	M
BACHMAN'S SPARROW *Aimophila aestivalis*	Sensitive	Occurs in forest stands with open canopies and grassy understories **Project is outside of known range**	--	--	P
BALD EAGLE *Haliaeetus leucoocephalus*	Sensitive	Perennial rivers and lakes, nesting in dominant or co-dominant pines 3 km or less from open water **Potential habitat occurs within project area**	--	+	P, M
BILTMORE SEDGE *Carex biltmoreana*	Sensitive	Thin soils on rock outcrops and adjacent woodlands; known from the Chattooga River Corridor **Not know to occur**	--	--	M
BROOK FLOATER *Alasmidonta varicosa*	Sensitive	Small streams with gravel bottoms; known from Chattooga River on the Andrew Pickens Ranger District, and Turkey and Upper Stevens Creek watersheds on the Long Cane Ranger District **Not known to occur**	--	--	P, M
BUTTERNUT *Juglans cinerea*	Sensitive	Basic mesic forests along the Brevard Geologic Belt; usually at old homesites **Not known to occur**	--	--	M
CAROLINA DARTER *Etheostoma collis*	Sensitive	Localized populations occur in lower and middle piedmont streams with slow to moderate current. Known from Saluda and Broad River watersheds **Project is outside of known range**	--	--	P
CAROLINA PLAGIOMNIUM *Plagiomnium carolinianum*	Sensitive	Damp, shaded, vertical rock faces along streams in mountain gorges; known from Long Creek and Opossum Creek **Not known to occur**	--	--	M
CHAUGA CRAYFISH *Cambarus chaugaensis*	Sensitive	Fast-moving, rocky 3rd and 4th order streams in tributaries of the upper Savannah River; known most recently from the Chauga and Chatooga Rivers **Potential habitat occurs within project area**	--	+	M

Proposed, Endangered, Threatened and Sensitive (PETS) Species of the Sumter National Forest (2014). Obs = PETS species observed during project field surveys or known to occur based on existing records, Hab = Suitable habitat exists within the project area, "+" = meets criterion, "--" = does not meet criterion. P = piedmont (Enoree and Long Cane Ranger Districts), M = mountains (Andrew Pickens Ranger District).

SPECIES	STATUS	HABITAT	Obs	Hab	Range
DIANA FRITILLARY *Speyeria diana*	Sensitive	Violets are larval host plant; open areas for nectar sources in summer **Potential habitat occurs within project area**	--	+	M
EASTERN SMALL-FOOTED BAT *Myotis leibii*	Sensitive	At southern terminus of range on Andrew Pickens Ranger District; known from Moody Creek near Lake Cherokee; may commonly roost in hemlock trees near streams in summer **Potential habitat occurs within project area**	--	+	M
EDMUND'S SNAKETAIL *Ophiogomphus edmundo*	Sensitive	Clear moderately flowing mountain streams and rivers with sand or gravel riffles; known to occur in the Chattooga River **Potential habitat occurs within the project area**	--	+	M
FORT MOUNTAIN SEDGE *Carex communis* var. *amplisquama*	Sensitive	Found in rich coves, at Tamassee Knob, East Fork of the Chattooga, and White Rock Cove on the Andrew Pickens Ranger District **Not known to occur**	--	--	M
FRASER'S LOOSESTRIFE *Lysimachia fraseri*	Sensitive	Open stands or rights-of-way with grassy understories **No known to occur**	--	--	M
GEORGIA ASTER *Symphyotrichum georgianus*	Sensitive; Federal Candidate	Open stands or rights-of-way with grassy understories; piedmont and lower elevations in mountains **Not known to occur**	--	--	P, M
HARTWIG'S LOCUST *Robinia viscose* var. *hartwegii*	Sensitive	Pine-oak heaths and roadsides in the mountains; one location known near Village Creek on the Andrew Pickens Ranger District **Not known to occur**	--	--	M
INDIGO BUSH *Amorpha schwerini*	Sensitive	Pine-oak heaths and oak-hickory communities **Project is outside of known range**	--	--	P
JEWELED TRILLIUM *Trillium simile*	Sensitive	Basic mesic forests of the mountains **Not known to occur**	--	--	M
LANCELEAF TRILLIUM *Trillium lancifolium*	Sensitive	Basic mesic forests of the piedmont **Project is outside of known range**	--	--	P

Proposed, Endangered, Threatened and Sensitive (PETS) Species of the Sumter National Forest (2014). Obs = PETS species observed during project field surveys or known to occur based on existing records, Hab = Suitable habitat exists within the project area, "+" = meets criterion, "--" = does not meet criterion. P = piedmont (Enoree and Long Cane Ranger Districts), M = mountains (Andrew Pickens Ranger District).

SPECIES	STATUS	HABITAT	Obs	Hab	Range
LIVERWORT SP. *Cheilolejeunea evansii*	Sensitive	Bark of trees in moist escarpment gorges or gorge-like habitats **Not known to occur**	--	--	M
LIVERWORT SP. *Plagiochila caduciloba*	Sensitive	Found on damp, shaded, vertical rock faces along streams in mountain gorges; southern appalachian endemic **Not known to occur**	--	--	M
LIVERWORT SP. *Plagiochila sharpii*	Sensitive	Found on damp, shaded, vertical rock faces along streams in mountain gorges **Not known to occur**	--	--	M
LIVERWORT SP. *Radula sullivantii*	Sensitive	Wet shaded rocks and crevices **Not known to occur**	--	--	M
MIGRANT LOGGERHEAD SHRIKE *Lanius ludovicia migrans*	Sensitive	Breeds in open areas dominated by grasses interspersed with shrubs, trees, or bare ground; uses agricultural landscapes (pastures) **Project is outside of known range**	--	--	P
MOUNTAIN WITCH ALDER *Fothergilla major*	Sensitive	Occurs in oak-hickory forests; may occur on monadnocks or north-facing slopes in piedmont **Not known to occur**	--	--	M
NODDING TRILLIUM *Trillium rugelii*	Sensitive	Rich wooded slopes over mafic or calcareous rocks **Not known to occur**	--	--	P, M
OGLETHORPE OAK *Quercus oglethorpensis*	Sensitive	Poorly drained soils and streamside forests in the Carolina Slate belt **Project is outside of known range**	--	--	P
PIEDMONT or **BOUQUET ASTER** *Eurybia mirabilis*	Sensitive	Nutrient-rich bottomlands and moist slopes, endemic to the NC and SC piedmont **Project is outside of known range**	--	--	P
PIEDMONT STRAWBERRY *Waldsteinia lobata*	Sensitive	Occurs in mixed mesic hardwood forests in the lower elevations of the mountains **Not known to occur**	--	--	M
RADFORD'S SEDGE *Carex radfordii*	Sensitive	Occurs in basic mesic and mixed mesic hardwood forests **Not known to occur**	--	--	M

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SPECIES	STATUS	HABITAT	Obs	Hab	Range
RAFINESQUE'S BIG-EARED BAT *Corynorhinus rafinesquii*	Sensitive	Restricted to the mountains, sandhills, and coastal plain Physiographic regions; may be found in hollow trees or behind loose bark near streams, caves, mines, or human-made structures **Potential habitat occurs within project area**	--	+	M
RAYED PINK FATMUCKET *Lampsilis splendida*	Sensitive	Primarily a costal plain species; one occurrence in Middle Saluda River Composite watershed **Project is outside of known range**	--	--	P
ROBUST REDHORSE *Moxostoma robustrum*	Sensitive	Occurs in the Lower Savannah River composite watershed and introduced to the Broad River **Project is outside of known range**	--	--	P
SHOAL'S SPIDER LILY *Hymenocallis coronaria*	Sensitive	Rocky river shoals; sandhills and piedmont **Project is outside of known range**	--	--	P
SOUTHERN APPALACHIAN SALAMANDER *Plethodon teyahalee*	Sensitive	Birch-beech-hemlock forests with witch hazel, mountain laurel, and rhododendron in the understory; seeks shelter under rotting logs and less frequently under rocks and leaf litter **Potential habitat occurs within project area**	--	+	M
SOUTHERN OCONEE BELLS *Shortia galacifolia* var. *galacifolia*	Sensitive	Large colonies in mixed mesic forests near Lake Jocassee **Not known to occur**	--	--	M
SPREADING POGONIA *Cleistes bifaria*	Sensitive	Dry ridgetops under pines **Not known to occur**	--	--	M
SUN-FACING CONEFLOWER *Rudbeckia heliopsidis*	Sensitive	Open forests with herbaceous understories; known from roadsides in the vicinity of Lake Cherokee on the Andrew Pickens Ranger District **Not known to occur**	--	--	M
SWEET PINESAP *Monotropsis odorata*	Sensitive	Shortleaf pine-oak heaths in the southern Appalachians and piedmont **Potential habitat occurs within project area**	--	+	P, M

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SPECIES	STATUS	HABITAT	Obs	Hab	Range
WEBSTER'S SALAMANDER *Plethodon websteri*	Sensitive	Mesic hardwood slopes with rocky outcrops; Greenwood, Edgefield, and McCormick Counties **Project is outside of known range**	--	--	P
WHORLED HORSEBALM *Collinsonia verticillata*	Sensitive	Found in basic mesic forests along the Brevard Geologic Belt in South Carolina **Not known to occur**	--	--	M