

Dear Interested Citizen:

The Nantahala, Chattooga River and the Andrew Pickens Ranger Districts have completed the *Chattooga River Boating Access Environmental Assessment* (EA). The U.S. Forest Service proposes to establish boater access sites at Green Creek confluence (put-in only); Norton Mill Creek confluence; Bullpen Bridge; Burrells Ford Bridge; and Lick Log Creek (take-out only). The access sites could also be used by other recreation users. The EA is available at the following website location: <http://go.usa.gov/v3R9>. The proposed project is an activity implementing a land management plan and is subject to the pre-decisional objection process at 36 CFR 218 Subparts A and B.

### **How to Comment and Timeframe**

The opportunity to comment ends 30 days following the date of publication of the legal notice in the newspaper of record. Only those who submit timely and specific written comments §218.2 regarding the proposed project or activity during a public comment period established by the responsible official are eligible to file an objection §218.24(b)(6). For issues to be raised in objections, they must be based on previously submitted specific written comments regarding the proposed project or activity and attributed to the objector. The publication date of the legal notice in the newspaper of record is the exclusive means for calculating the time to submit written comments on a proposed project or activity. The time period for the opportunity to comment on a proposed project or activity to be documented with an environmental assessment shall not be extended. It is the responsibility of all individuals and organizations to ensure that their comments are received in a timely manner.

Although separate decisions will be issued by each District Ranger, written comments must be submitted to Chattooga Planning Team, 4931 Broad River Road, Columbia, South Carolina 29212. The office business hours for those submitting hand-delivered comments are: 8:00 am to 4:30 pm Monday through Friday, excluding holidays. Electronic comments must be submitted in a format such as an email message, plain text (.txt), rich text format (.rtf), or Word (.doc, .docx) to [comments-southern-francismarion-sumter@fs.fed.us](mailto:comments-southern-francismarion-sumter@fs.fed.us). For objection eligibility, each individual or representative from each entity submitting timely and specific written comments regarding the proposed project or activity must either sign the comments or verify identity upon request §218.24(b)(8).

Please state "Chattooga River Boating Access" in the subject line when providing electronic comments, or on the envelope when replying by mail.

Additional information regarding this project or activity can be obtained from: Jim Knibbs, 803-561-4078.



United States  
Department of  
Agriculture

Forest  
Service

September 26, 2014



# **Environmental Assessment**

## **Chattooga River Boating Access**

### **Sumter National Forest**

Oconee County, South Carolina

### **Chattahoochee-Oconee National Forest**

Rabun County, Georgia

### **Nantahala National Forest**

Jackson and Macon Counties, North Carolina

Location of Action: Sumter National Forest, Andrew Pickens Ranger District, South Carolina  
Chattahoochee-Oconee National Forest, Chattooga River Ranger District, Georgia  
Nantahala National Forest, Nantahala Ranger District, North Carolina

Type of Document: Environmental Assessment

Lead Agency: U.S. Forest Service

Responsible Officials: Mike Crane, Andrew Pickens Ranger District  
Ed Hunter, Chattooga River Ranger District  
Mike Wilkins, Nantahala Ranger District

Contact Person: Jim Knibbs  
U.S. Forest Service  
Francis Marion and Sumter National Forests  
4931 Broad River Road, Columbia, SC 29212  
Phone: (803) 561-4078

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# Chapter 1 – Purpose and Need for Action

## 1.1 Introduction

In January 2012, the U.S. Forest Service released three Decision Notices and Findings of No Significant Impact for the Environmental Assessment, *Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor* (USFS, 2012), hereafter referred to as the 2012 EA. These decisions selected Alternative 13A to accomplish the following specific purposes and needs for action:

1. Respond to an appeal decision on the Sumter Land and Resource Management Plan;
2. Provide consistent management of the upper segment of the Chattooga Wild and Scenic River (WSR) on all three national forests; and
3. Preserve the upper segment of the Chattooga WSR's free flowing condition, protect its water quality and protect and enhance its Outstanding Remarkable Values (ORVs), as well as preserve the wilderness character of the Ellicott Rock Wilderness.

The 2012 EA and Decision Notices are available at:

<http://www.fs.usda.gov/detail/scnfs/landmanagement/planning/?cid=STELPRDB5253595>.

As described on p. 39 of the 2012 EA, boaters are permitted to put-in and take-out near the following locations:

1. Green Creek confluence (put-in only);
2. Norton Mill Creek confluence;
3. Bullpen Bridge;
4. Burrells Ford Bridge; and
5. Lick Log Creek (take-out only).

Pursuant to Alternative 13A in the 2012 EA, put-ins and take-outs, and access routes to and from, will be designated after site-specific analysis under the National Environmental Policy Act (NEPA). In addition, both the North Carolina and South Carolina decisions (p. 5) and the Georgia decision (p. 7) state, “[t]he appropriate District Ranger will designate the specific put-in and takeout locations after site-specific NEPA analysis is completed.”

## 1.2 Proposed Action

The U.S. Forest Service proposes to construct, reconstruct, designate and maintain trails and boater access sites pursuant to the 2012 EA decisions at the following access locations:

1. Green Creek confluence (put-in only);
2. Norton Mill Creek confluence;
3. Bullpen Bridge;
4. Burrells Ford Bridge; and
5. Lick Log Creek (take-out only).

### 1.3 Forest Plan Direction

This project would adhere to standards and guidelines as outlined in the following land management plans (Forest Plans) including all amendments:

1. *Revised Land and Resource Management Plan, Sumter National Forest* (2004)
2. *Nantahala and Pisgah National Forests Land and Resource Management Plan* (1987)
3. *Revised Land and Resource Management Plan Chattahoochee-Oconee National Forest* (2004)

The proposal is consistent with the Decision Notices signed by the forest supervisors for the Sumter, Chattahoochee and Nantahala national forests including:

1. Amendment #1 to the *Revised Land and Resource Management Plan, Sumter National Forest*;
2. Amendment #22 to the *Nantahala and Pisgah National Forests Land and Resource Management Plan*; and,
3. Amendment #1 to the *Revised Land and Resource Management Plan Chattahoochee-Oconee National Forest*.

Detailed information from the 2012 EA is incorporated by reference into this EA. In addition, the Chattahoochee-Oconee National Forest is proposing to amend their forest plan to provide protection to the Indiana bat (federally listed as an endangered species) that was recently discovered on the forest. Equivalent protection measures are proposed in this EA.

### 1.4 Public Involvement

Public involvement began with pre-scoping field trips to the proposed access sites hosted by the ranger districts in summer 2012. The three rangers initially decided to scope their respective boater access sites individually with the intent of completing separate decisions. However, the U.S. Forest Service decided to complete one EA and that the three district rangers would sign three separate Decision Notices. The agency prepared a consolidated proposal and began scoping on July 24, 2013.

### 1.5 Issues

Many of the comments received pertain to previously made decisions documented in the 2012 EA (Decision Notices signed in January 2012). Judge Mary G. Lewis issued an Order and Opinion in US District Court for the District of South Carolina, Anderson Division (civil action number 8:09-2665-MGL) on April 15, 2013 finding that the 2012 Plan for management of the Chattooga WSR complies with federal law and granted the U.S. Forest Service's Motion for Judgment on the Administrative Record.

Comments received during scoping related to boating access on the upper segment of the Chattooga WSR have been evaluated and are part of the project file.

Issues are summarized below.

**Comment 1:**

There is concern that trail construction/reconstruction could increase soil erosion since some of the trails are on steep and sensitive soils. There is concern that recreation use could impact riparian areas and potential, endangered, threatened and sensitive species (PETS). In addition, sedimentation into the river could impact trout habitat.

**Response:**

Effects on soils, water, riparian areas, PETS and trout will be considered in Chapter 3.

**Comment 2:**

There is concern that improved/designated boating access would decrease the recreation experience of non-boaters and create conflicts with other recreation users.

**Response:**

The first boating season began in December of 2012 and use has been tracked by the Forest Service. Effects on existing recreation are analyzed in Chapter 3 of the EA.

**Comment 3:**

There is concern that improved/designated access would adversely impact the river's ORV (including plants) and Ellicott Rock Wilderness values.

**Response:**

The impacts of the proposed action on ORVs and Ellicott Rock are analyzed in Chapter 3 of the EA.

## **Chapter 2 – Alternatives**

### **2.1 Alternative 1: No Action**

No new trails would be constructed or designated and current access points to the river would continue to be used by boaters and other recreational users.

### **2.2 Alternative 2: Proposed Action**

The U.S. Forest Service proposes to identify and designate trails and boater access points to facilitate boating on the upper segment of the Chattooga WSR during the designated boating season. The trails would also provide foot access for other forest visitors. Trails generally follow existing routes; however, some short trail segments would be constructed to facilitate access to existing trail systems. All trails would be constructed, reconstructed and maintained as needed to enhance or protect physical, biological and social resources (see maps 1 - 6).

#### **Nantahala Ranger District, Nantahala National Forest**

##### **Green Creek<sup>1</sup>**

This site would provide access for paddlers wishing to experience this segment of the Chattooga WSR (see map 2). A foot trail would be constructed on an old existing road bed that connects the Chattooga Trail to the river. The old road bed intersects the river approximately 700 feet downstream of the confluence of Green Creek and the Chattooga WSR. The trail length would be approximately 0.28 miles. The old road bed would require some construction and minor realignment to produce a sustainable trail. The designated trail would continue to be used for fishing access to the Chattooga WSR. The put-in location would be designated as within 200 feet of the trail and river intersection and would provide access for other recreation along the river. This trail also would provide an exit for anglers who have fished upstream towards Greens Creek. Parking at this location can safely accommodate approximately eight vehicles.

##### **Norton Mill Creek**

The proposed County Line Trail (old road bed) would provide a second access location for paddlers wishing to experience this segment of the Chattooga WSR (see map 3). The old road bed would be designated as a 1.2 mile trail and maintained for recreationists to access the Chattooga WSR at Norton Mill Creek. Hikers and anglers currently use the trail; the U.S. Forest Service signed and maintained it in the past. Public parking on the road shoulders near the earthen berm would continue. Parking along this road can safely accommodate approximately five to eight vehicles. The old road bed connects Whiteside Cove Road (State Route 1106) with the Chattooga River Trail and follows the Chattooga River Trail north to a flat area along the river with numerous rocks and eddies that would facilitate put-in. The old road bed is open, relatively free of brush and receives regular use by anglers, hunters and hikers; however, it would require some reconstruction to produce a sustainable trail. Paddlers would be authorized to put-in along a 300-foot stretch of the Chattooga WSR below Norton Mill Creek.

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<sup>1</sup> Locally this route is also known as Greens Creek. Both Greens Creek and Green Creek will be used interchangeably throughout this document.



## **Bull Pen Bridge**

Bull Pen Bridge would provide access for paddlers wishing to run this segment of the Chattooga WSR to South Carolina (see map 4). A pull off west of the bridge provides parking for approximately six vehicles.

The existing Upper Bull Pen access is a designated short trail of less than 100 feet in a good location and provides easy access along river right (the Macon County side), upstream of Bull Pen Bridge. For boaters that do not wish to put-in and immediately experience a highly technical section of whitewater, the U.S. Forest Service would construct a foot trail (less than 300 feet in length) below the bridge to the Lower Bull Pen put-in on river left to get paddlers off Bull Pen Road (Forest Service Road 1128), down the road bank to the river.

## **Chattooga River Ranger District, Chattahoochee National Forest**

### **Burrells Ford Bridge**

The Burrells Ford Bridge access areas would be located on the Georgia side of the Chattooga WSR in Rabun County and would be accessible from an existing parking area off Burrells Ford Road near the bridge (see map 5). Parking can safely accommodate up to 12 vehicles.

Presently, three user-created trails lead from the trailhead at this parking area to the Chattooga WSR. The proposed action would include the following:

1. Harden the proposed route from the parking area to the river bank with gravel or other natural and sustainable materials on approximately 200 feet of trail;
2. Decommission two of the undesignated routes by placing large woody debris across the current tread and re-establishing native vegetation as needed;
3. Widen the proposed route by removing all non-merchantable woody vegetation within six feet of the existing tread and treating the area to eliminate the spread of non-native invasive plants;
4. Armor and stabilize the river's bank with felled trees and large materials;
5. Remove hazard trees within the project area and place them in the river when possible to improve aquatic conditions; and
6. Add gravel and signage, as well as replace old timbers currently being used as barriers in the parking area.

## **Andrew Pickens Ranger District, Sumter National Forest**

### **Lick Log**

The proposed take-out, located near Mountain Rest, SC, would be accessible from SC State Highways 28 and 107 (see map 6). Two existing parking areas can accommodate six and ten vehicles. The total distance from the parking areas to the take-out is approximately one mile.

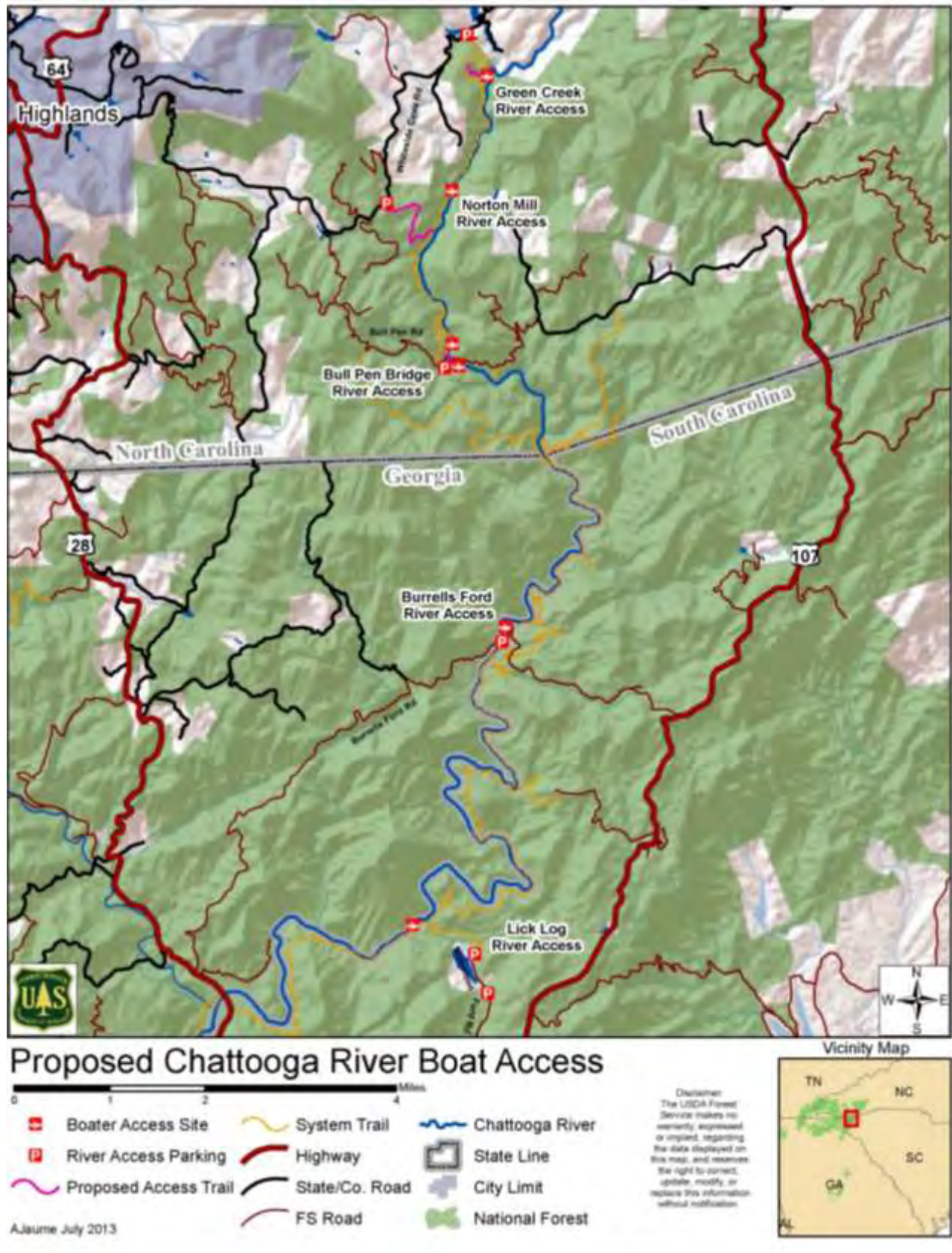
A new approximately 500-foot section of trail would be constructed and available for hikers and boaters taking out at Lick Log Creek. The new section would intersect with the Chattooga River Trail. Trail construction would consist of clearing and minor excavation with hand tools.

A sustainable pitch, downhill and cross-slope trail would be created with minimum ground disturbance using hand tools where practical. Trail construction down to the shore would not be necessary. New construction would begin approximately 25 yards away from the water's edge, on the uphill edge of a small plateau. The trail would then rise to the north until it meets the existing Chattooga River Trail.

During trail construction, vegetation would be removed within the trail corridor, primarily including thinning, limbing or removing rhododendron, mountain-laurel and trees under 6" in diameter. Existing large trees would be avoided. Some hazard trees may be cut along the new trail during construction. Two or three new signs, modeled after existing signs, would be installed along the trail to help forest visitors find their way from the river to the parking lot (see Lick Log Access Parking 1 on map 6).

Routine methods to prevent soil movement would be used, including physical barriers such as water bars and stabilization measures through vegetation.

Map 1: Proposed Boater Access Points on the upper segment of the Chattooga WSR



Map 2: Proposed Boater Access Points—Green(s) Creek (Nantahala RD)





Map 3: Proposed Boater Access Points—Norton Mill Creek (Nantahala RD)



Map 4: Proposed Boater Access Points—Bull Pen Bridge (Nantahala RD)



## Proposed Chattooga River Access - Bull Pen Bridge

0 0.01 0.02 0.04 Miles

- |  |                       |  |              |  |                 |
|--|-----------------------|--|--------------|--|-----------------|
|  | River Access Parking  |  | System Trail |  | City Limit      |
|  | Boater Access Site    |  | FS Road      |  | State Line      |
|  | Proposed Access Trail |  | Stream       |  | National Forest |

AJaurie July 2013

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### Vicinity Map



Map 5: Proposed Boater Access Points—Burrells Ford (Chattooga WSR RD)



### Proposed Chattooga River Access - Burrells Ford

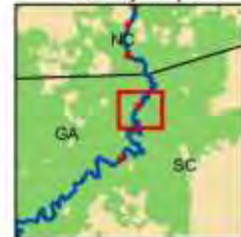
0 0.025 0.05 0.1 Miles

- |   |                       |   |              |   |                 |
|---|-----------------------|---|--------------|---|-----------------|
|  | River Access Parking  |  | System Trail |  | City Limit      |
|  | Boater Access Site    |  | FS Road      |  | National Forest |
|  | Proposed Access Trail |  | Stream       |   |                 |

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Vicinity Map





Map 6: Proposed Boater Access Points—Lick Log (Andrew Pickens RD)



## Proposed Chattooga River Access - Lick Log

0 0.15 0.3 0.6 Miles



River Access Parking

Boater Access Site

Proposed Access Trail

System Trail

FS Road

Stream

City Limit

State Line

National Forest

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Vicinity Map





**Table 2.2-1 Proposed Project Activity Summary**

<b>Access Site</b>	<b>Distance*</b>	<b>Project Work</b>
Green Creek	0.28 miles	Project work would include reconstruction and maintenance of the existing route and designating it as a system trail.
Norton Mill Creek (aka County Line Trail)	1.2 miles	Project work would include reconstruction and maintenance of the existing route and designating it as a system trail.
Bull Pen Bridge - above road	<100 feet	Project work would include maintenance of the existing route and designating it as a system trail.
Bull Pen Bridge - below road	<300 feet	Project work would include construction of a new system trail.
Burrells Ford Bridge	200 feet	Project work would include reconstruction and maintenance of the existing route and designating it as a system trail. Hazard trees would be cut down.
Lick Log	500 feet	Project work would include construction of a new system trail.
Burrells Ford – Georgia side.	375 feet	Two undesignated trails (approximately 375 feet) that lead from the parking area would be decommissioned. The river bank would be stabilized by wood and rock. Additional gravel would be put down and barriers would be replaced in the parking area. Water from the parking area and roadway would be diverted away from the river where possible.

\*distances are approximate

## 2.3 Design Criteria

This project would adhere to standards and guidelines as outlined in the Forest Plans for the three national forests including all amendments (refer to section 1.3).

The following site-specific design criteria would be included with the proposed action.

1. When possible, the Chattooga River, Andrew Pickens and Nantahala Ranger Districts would fell any trees required for the project or to alleviate safety hazards during the hibernation season (December 1 through March 15 for the Chattooga River and Andrew Pickens Ranger Districts and October 15 through April 15 for the Nantahala Ranger Districts) for the Northern Long-eared bat. When this is not possible, trees to be removed would be assessed for bat habitat suitability by a biologist or knowledgeable technician. If trees to be removed do not support suitable bat habitat characteristics (loose bark, crevices), then they can be removed outside of the hibernation season. If suitable bat habitat characteristics are noted during the suitability surveys, simple emergence surveys would be conducted immediately prior to project implementation. If no bats are observed (regardless of species), the trees may be removed outside of the hibernation season. If bats are observed, conversation with the state wildlife agency and USFWS would outline appropriate survey or project design measures.
2. The following conservation/mitigation measures for Indiana Bat apply to the Chattooga River Ranger District:
  - a. Trees known to have been used as roosts by Indiana bats or other federally protected bat species are protected from cutting and/or modification until they are no longer suitable as roost trees, unless their cutting or modification is needed to protect public or employee safety. Where roost tree cutting or modification is deemed necessary, it occurs only after consultation with the US Fish and Wildlife Service.

- b. Snags are not intentionally felled from April 1 through September 1 unless needed to provide for immediate safety of the public, employees or contractors. Exceptions will require evaluation by a qualified individual (i.e. biologist or other individual approved by the district biologist) for current Indiana bat or other protected bat species use and may require coordination with the US Fish and Wildlife Service.
- c. Compliance of Indiana bat and other protected bat species standards will be monitored. The Forest will submit an annual report to the U.S. Fish and Wildlife Service documenting compliance with Standards.

## 2.4 Alternatives Considered but Not Developed

Alternative locations were considered, but not evaluated in detail for the reasons described below:

1. **Bamford** – This site was considered as an alternative to Greens Creek. While it would have required less trail construction than the Greens Creek location, it would have opened a shorter section of river to paddling access compared to Greens Creek. Although Greens Creek requires more trail construction, the presence of the existing old road bed minimizes impacts from the trail construction.
2. **Garnett Ridge** – This site was considered as an alternative to Greens Creek. This access would cross private property. The public has no legal access across private land to access National Forest System lands. This location also would have required trailhead parking on private land.
3. **Cane Creek** – This site was considered as an alternative to Greens Creek. This site would have required new trail construction to access the river at an acceptable grade. River access would have been more difficult since it is in a steeper section of the river corridor than other locations. This trail would result in more environmental impacts and public safety concerns than the proposed Greens Creek trail.

## 2.5 Comparison of Alternatives

Section 2.5 compares aspects of the alternatives to one another. Analysis of the effects can be found in Chapter 3, Affected Environment and Environmental Consequences.

**Table 2.5-1 Comparison of Alternatives**

	<b>Alternative 1 No Action</b>	<b>Alternative 2 Proposed Action</b>
Would proposed trails be designated by the U.S. Forest Service as system trails?	No	Yes
Would proposed trails be constructed, reconstructed and maintained to Forest Service standards?	No	Yes
Could designated trails be used by all recreation users?	Yes	Yes
Would resource impacts be reduced by designation, construction, reconstruction and maintenance of trails?	No	Yes
Would the ORVs, free-flowing condition and water quality of the Chattooga WSR be protected?	Yes	Yes

# Chapter 3 – Affected Environment and Environmental Consequences

## 3.1 Introduction

This chapter describes the affected environment and environmental effects of the alternatives described in Chapter 2. Potential impacts are evaluated for current management (Alternative 1) and the proposed action (Alternative 2).

- 3.2 ORVs
  - 3.2.1 Recreation
  - 3.2.2 Biology (Fisheries, Wildlife and Botany components)
  - 3.2.3 Scenery
  - 3.2.4 History
  - 3.2.5 Geology
- 3.3 Other River Values
  - 3.3.1 Free-flowing Condition
  - 3.3.2 Water Quality
- 3.4 Other Physical Resources
  - 3.4.1 Soils
  - 3.4.2 Wetlands, Floodplains and Riparian Corridors
  - 3.4.3 Air
  - 3.4.4 Climate Change
- 3.5 Other Biological Resources: Vegetation
- 3.6 Social Environment
  - 3.6.1 Human Health and Safety
  - 3.6.2 Social Impact Analysis
  - 3.6.3 Economics
- 3.7 Wilderness and Roadless Areas

The environmental consequences disclose the direct, indirect and cumulative effects of implementing each alternative. For the cumulative effects analysis, the list of past, present and reasonably foreseeable activities in Table 3.1-1 were considered. The activities listed in the table are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. The proposed action would complement the objectives of many of these projects by reducing erosion and sediment by designating and maintaining a sustainable trail system for recreation users. ORVs and other river values would be protected and maintained consistent with the three Forest Plans and the Wild and Scenic River Act.

The upper segment of the Chattooga WSR is primarily forested but has a variety of private land uses that include highways, roads, urban areas, rural homes, farms and pastures, golf courses, gardens, small dams and industry.

**Table 3.1-1. Past, Present and Reasonably Foreseeable Future Actions within the Chattooga WSR Watershed.**

State	Activity	Year(s) Implemented	Acres /Miles Affected	Past	Present	Reasonably Foreseeable	Project Outcomes
GA	Duck's Nest Gap Rx Burn	2010-14	1050 a	X	X	X	1
GA	Roach Mill Rx Burn	2010-14	695 a	X	X	X	1
GA	Chintilly Rx Burn	2010-14	230 a	X	X	X	1
GA	Rabun Bald Trail Reroute	2008-2010	3.5 mi	X			2,3
GA	Water Gauge Yellow Pine-Oak Woodland Restoration (Rx Burn)	2010-14	232 a	X	X	X	1
GA	Tri-District Land Exchange	2010	157 a	X			3
GA	Bartram Trail Reroute @ Wilson Gap	2009	0.5 mi	X			2,4
GA	Satolah Soil and Water Complex	2009	5	X			4
GA	Camp Creek Rx Burn	2009	1800	X		X	1
GA	Upper Warwoman Vegetation Management	2009-2010	200 a	X			1
GA	Invasive Plant Eradication	2014	50a		X	X	1
GA	Herbicide Release of Young Forest Communities	2009-2012	150 a	X	X		1
GA	Vegetation Management for Forest Health	2009-2014	500 a	X	X	X	1
GA	Woodall Shoals Rx Burn	2010-2011	1100 a	X	X		1
GA	Buckeye Branch/Lick Log Rx Burn	2010-2011	2470 a	X	X		1
GA	Willis Knob Horse Trail Reroutes	2010-2014	5 mi	X	X	X	2,4
GA	Sarah's Creek Crossing Replacement	2010	0.05 mi	X			4
GA	Burrells Ford North Rx Burn	2010-2015	2545 a	X	X	X	1
GA	Burrells Ford South Rx Burn	2010-2015	1341 a	X	X	X	1
GA	Willis Knob 1 Rx Burn	2010-2015	1560 a	X	X	X	1
GA	Willis Knob 2 Rx Burn	2010-2015	1628 a	X	X	X	1
GA	Willis Knob 3 Rx Burn	2010-2015	1654 a	X	X	X	1
GA	Hale Ridge East Rx Burn	2010-2015	834 a	X	X	X	1
GA	Hale Ridge West Rx Burn	2010-2015	870 a	X	X	X	1
GA	Tallulah Gorge Co-Op RX Burn	2010-2015	100 a	X	X	X	1
GA	Water Gauge Rock Mtn. Rx Burn	2010-2015	1100 a	X	X	X	1
GA	Water Gauge Stone Place RX Burn	2010-2015	750 a	X	X	X	1
GA	Ammons Culvert Replacement	2011	-		X		4
GA	Buck Branch Timber Sale	2013	50 a			X	1
GA	Pre-commercial Thinning	2012-2013	200 a			X	1
GA	Bog Restoration – Hale Ridge	2010-2015	5 a	X	X	X	1
GA	Bog Restoration –Hedden	2010	5 a	X			1
GA	Bog Restoration – Water Gauge	2010	7 a	X			1
GA	Sandy Ford Road – County Paving Project	2014-2015	2		X	X	4
SC	Loblolly Removal and Restoration Project	2010-2014	5605 a		X	X	1
SC	Crane Mountain RX Burn	2009, 2013	300 a	X		X	1
SC	Earls to Sandy Rx Burn	2010	1000 a	X			1
SC	Whetstone Thinning	2008-2009	64 a	X			1
SC	Garland Tract Rx Burn and Dove Field Maintenance	2004-2014	600 a	X	X	X	1,5
SC	FSR 719 Reconstruction	2009-2010	2.4 mi	X			4
SC	Horse trail closures, relocations	2010-2011	10 mi		X	x	1,4
SC	Horse camp reconstruction	2011	12 a	x			2
SC	Burrells Ford Campground Reconstruction	2009-2010	6 a	X			2,4
SC	Outfitting and Guiding Special Use Permits	2011-2016	-		X	X	2
SC	Simms Field and Fishermen's Trail	2011	1.3 mi			x	2,4

State	Activity	Year(s) Implemented	Acres /Miles Affected	Past	Present	Reasonably Foreseeable	Project Outcomes
	Reconstruction						
SC	Highway 76 Parking Lot Repaving	2010	0.75 a	X			4
SC	Lick Log Creek designated take-out and associated trail to river	2012	0.5 mi			X	2,4
SC GA	Burrells Ford designated put-in/take-out	2012	100 feet			X	2,4
NC	White Bull/Blue Ox Timber Sales	2007	225	X			1
NC	Bullpen/Journ McCall Paving Project (NC Dept. of Transportation (DOT) proposal)	2008	1.5	X			4
NC	Whiteside Cove Paving (NCDOT Proposal)	2008	3	X			4
NC	Garnet Hill Paving (NCDOT proposal)	2008	.3	X			4
NC	Silver Run Rx Burn	2014	300 a			X	1
NC	Ammons Branch Campground – replace pit toilet	2011	-	X			2
NC	Buckwheat Vegetation Management (restoration, wildlife and timber sale projects)	2012	43 a harvest 150 a Rx burn 30 a riparian restoration			X	1
NC	Green Creek designated put-in and Norton Mill Creek designated put-in/take-out and associated trails off Chattooga River Trail to the river	2014/2015	1 mi			X	2,4
NC	Bullpen Bridge designated put-in/take-out	2014/2015	100 ft./<300 ft.			X	
All	Trail/Campsite Designation/Restoration (planning stage)	2-14/2015	No estimate yet				2,4
All	Wildlife Opening maintenance	Ongoing			X	X	5
All	System Road Maintenance	Ongoing			X	X	2,4
All	Recreational activities including hiking, biking and driving.	Ongoing – various locations			X	X	2
All	Invasive Plant Treatments	Ongoing – various locations		X	X	X	1

Source: U.S. Forest Service – Nantahala RD, Andrew Pickens RD and Chattooga River RD (updated 2-11-2014)

1 = maintain/restore and enhance ecosystems/hazard fuel reduction/improve forest health/improve wildlife habitat

2 = recreation management/reduce recreation impacts on other resources

3 = improve resource management

4 = sediment reduction/erosion control/improve aquatic resources

5 = maintain wildlife habitat

## 3.2 Outstandingly Remarkable Values (ORVs)

### 3.2.1 Recreation

#### Affected Environment

Boaters have been allowed to access the upper segment of the Chattooga River at the existing sites since December 2012; many of the trails (both designated and user-created) either have been used by anglers or other river users in the past or follow old logging roads. Erosion and sedimentation occur when trails cross steep, sensitive or wet areas and compact soils or create bare ground. The trails lead users to the river, but do not always definitively provide a single route into the water; without guidance, anglers or boaters who access the river's channel have developed several poorly defined routes down the bank.

The U.S. Forest Service has tracked boating use levels since 2012 through the same self-registration system used on the lower segment. Table 3.2.1-1 shows the number of days that boating was allowed (December 1 through April 30 when flows were above 350 cfs at the Burrells Ford gauge) and the number of days that boaters actually floated the upper segment. Tables 3.2.1-2 and 3.2.1-3 show how use was distributed by access trail for put-ins and take-outs in the first two boating seasons (2012-13 and 2013-14).

**Table 3.2.1-1. Number of boatable days and number of days actually boated in first two years of Upper Chattooga boating.**

Month	2012-2013		2013-2014	
	Boatable days	Used Boatable days	Boatable days	Used Boatable days
December	2	2	16	4
January	11	6	4	2
February	8	2	3	0
March	2	0	0	0
April	9	7	3	1
Total	32	17	26	7

- In the 2012-13 boating season (December 1 – April 30), flows reached 350 cfs or higher at the Burrells Ford gauge on 32 days. Boaters floated the upper segment on 17 of those days (53% of days).
- In the 2013-14 boating season (December 1 – April 30), flows reached 350 cfs or higher at the Burrells Ford gauge on 26 days. Boaters floated the upper segment on 7 days (27% of days).
- Some boatable days had very high flows that may not be attractive to some users. At least eight of the 32 days in the 2012-13 boating season had flows more than 800 cfs while the 2013-14 boat season had at least six of the 26 days with flows more than 800 cfs; these flows provide challenging whitewater that is beyond the optimal range for “big water boating” in the Chattooga Cliffs and Ellicott Rock reaches (as described in Whittaker and Shelby, 2007).

Uncertainty about whether flows might increase to levels that are considered too challenging may have prevented additional boaters from using those days.

- Some boaters may be uncertain about whether flows would reach 350 cfs or higher; when such flows occur, it can be challenging to organize trips on short notice (Whittaker and Shelby, 2007).

**Table 3.2.1-2. Boating use by access area in 2012-13 boating season.**

Launch site*	Trips	Boaters	People/trip	Percent of total (by boaters)
<b>Put-ins</b>				
Green Creek	23	79	3.4	43
Bull Pen Bridge	24	84	3.5	45
Burrells Ford	7	22	3.1	12
<b>Total put-ins</b>	<b>54</b>	<b>185</b>	<b>3.4</b>	<b>100</b>
<b>Take-outs</b>				
Bull Pen Bridge	6	20	3.3	12
Burrells Ford	36	122	3.4	70
Lick Log Creek	9	32	3.6	18
<b>Total take-outs</b>	<b>51</b>	<b>174</b>	<b>3.4</b>	<b>100</b>
<b>Total use by access point</b>				
Green Creek	23	79		22
Bull Pen Bridge	30	104		29
Burrells Ford	43	144		40
Lick Log Creek	9	32		9

\*No use of Norton Mill Creek (aka County Line Trail). Also, a few permits were incomplete so put-in and take-out totals do not match.

#### Summary Results of 2012 -13 Boating Season

- About 40% of boaters paddled the Chattooga Cliffs Reach, with the Green Creek put-in attracting all the use (no boaters were recorded putting in at Norton Mill Creek).
- Almost half (44%) of all boaters started their trips at Bull Pen Bridge, and many extended their Chattooga Cliffs trips through the Ellicott Rock Reach (about 87% of all boaters started their trips at either Green Creek or Bull Pen Bridge).
- Relatively few boaters (13%) paddled the Rock Gorge Reach from Burrells Ford.
- Approximately 9% of boaters paddled all three reaches.
- The take-out used most often was Burrells Ford, with about 70% of all use.
- Relatively few boaters ended their trips at Bull Pen Bridge (12%) or Lick Log (18%).
- Taken together, in 2012-2013, the highest boating use access areas were Burrells Ford (41% of all boaters used this for either put-in or takeout) and Bull Pen Bridge (29%). Green Creek was also used often (22%), while relatively few used Lick Log.

**Table 3.2.1-3. Boating use by access area in 2013-14 boating season.**

Launch site*	Trips	Boaters	People/trip	Percent of total (by boaters)
<b>Put-ins</b>				
Green Creek	2	12	6	41
Bull Pen Bridge	5	15	3	52
Burrells Ford	1	2	2	7
<b>Total put-ins</b>	<b>8</b>	<b>29</b>	<b>3.6</b>	<b>100</b>
<b>Take-outs</b>				
Bull Pen Bridge	1	8	8	28
Burrells Ford	6	19	3	65
Lick Log Creek	1	2	2	7
<b>Total take-outs</b>	<b>8</b>	<b>29</b>	<b>3.6</b>	<b>100</b>
<b>Total use by access point</b>				
Green Creek	2	12		21
Bull Pen Bridge	6	23		40
Burrells Ford	7	21		36
Lick Log Creek	1	2		3

\* No use of Norton Mill Creek (aka County Line Trail).

#### Summary Results of 2013 -14 Boating Season

- About 25% of boaters paddled the Chattooga Cliffs Reach, with the Green Creek put-in attracting all the use (no boaters were recorded putting in at Norton Mill Creek).
- Over half (63%) of all boaters started their trips at Bull Pen Bridge, and one extended their Chattooga Cliffs trip through the Ellicott Rock Reach during the 2013-14 boating season (about 88% of all boaters started their trips at either Green Creek or Bull Pen Bridge this season).
- Relatively few boaters (13%) paddled the Rock Gorge Reach from Burrells Ford.
- The take-out used most often was Burrells Ford, with about 75% of all use.
- Relatively few boaters ended their trips at Bull Pen Bridge (13%) or Lick Log (13%).
- Taken together, in 2013-2014, the highest boating use access areas were Burrells Ford (44% of all boaters used this for either put-in or takeout) and Bull Pen Bridge (38%).

There were almost no interactions between boaters and non-boaters on the North Carolina side during the 2012/2013 and 2013/2014 seasons. Less information exists about use levels for other activities; the U.S. Forest Service has not yet implemented a comprehensive use monitoring program, although a request for monitoring proposals is planned for 2015.

#### Recreation Opportunity Spectrum (ROS)

National Forest System lands are often categorized into one of six different Recreation Opportunity Spectrum (ROS) classes that range from “primitive” to “urban” (USFS, 1982). This classification system helps land managers and the public understand how a range of setting attributes (ecological, social and managerial) affect the quality of recreation experiences. It offers a framework for



inventorying recreation settings and attributes, and considering how changes to that setting may change recreation experiences.

The ROS inventories for the areas where the five access trails are proposed range from primitive to roaded natural under existing conditions:

- The proposed Green Creek, County Line and Lick Log trails are all in backcountry areas (more than one-quarter mile from the road) in the Chattooga Cliffs and Rock Gorge reaches that fit the ***primitive class***, which are areas “characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls, with motorized use not permitted.”
- The proposed Bull Pen Bridge access trails are in a lower use frontcountry setting in the Chattooga Cliffs Reach that is best described as the transition between ***semi-primitive motorized*** (due to the presence of the road) and ***semi-primitive non-motorized*** (to reflect that motorized use is not allowed off the road). The ***semi-primitive*** setting is, “characterized by a predominately natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but they are subtle.”
- The Burrells Ford Frontcountry Area fits in the ***roaded-natural*** class, which is “characterized by predominantly natural-appearing environments with moderate evidences of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderated, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.”

The management actions in each alternative will be analyzed to determine whether trail improvements are compatible with the existing ROS inventory or whether they might change it to the next use and development class.

#### Potential future capacities associated with the proposed boater access trails

This EA assesses the potential effects the proposed boater access trails would have on capacities in Alternative 2. Trail development does not increase the size of parking areas at trailheads, and is not intended to modify capacities adopted in the Forest Plans. Instead, this EA focuses on whether trail improvements or extensions would attract more use than existing parking or established capacities.

In general, this EA recognizes that social impacts (especially potential crowding and congestion at the access trailheads) remain the limiting factor for use levels in the area, as outlined in the 2012 EA. While higher use of these proposed trails may have adverse impacts on biophysical or cultural resources in recreation settings (and will be analyzed), the type (or behavior) of users often matters more than the amount of use. In addition, many biophysical impacts can be reduced more effectively

by other actions in the management prescription (e.g., trail hardening and redesign, directing use away from sensitive areas) rather than adjusting use levels (Cole 1987, 1994, 2000).

Because capacity is based on achieving a defined management prescription, the impact that is violated at the lowest use level is the limiting factor. For the proposed trails and access sites, capacities were established in the 2012 EA to ensure that management actions would continue to do the following:

1. Protect, and, wherever possible enhance, the river's ORVs (this section of the EA specifically addresses the Recreation ORV); and,
2. Provide opportunities for desired recreation experiences of both traditional and new users.

#### **A. Alternative 1 - Direct and Indirect Effects**

##### **1. Types of Existing Use**

###### **a. Trout Fishing**

Fishing opportunities would continue to be available in the vicinity of the five existing access trails. These user-created trails are occasionally used by anglers, although they are not considered primary access points.

###### **b. Boating**

Boating would continue to occur on the upper segment of the Chattooga WSR in accordance with the three Forest Plans. Boaters would be able to use the five access locations even in their existing state. Current conditions do not appear to have prevented boaters from taking their trips.

###### **c. Other Recreational Activities – Hiking, Camping, Relaxing, Picnicking, Swimming, Sightseeing and Hunting**

User-created trails would continue to provide access to the river at the existing five locations, although none appear to be primary access points for these activities.

##### **2. Recreation Experience**

###### **a. Wild, Scenic and Recreational Designation**

The ROS inventories are consistent with the wild, scenic and recreational classifications for the various locations in the upper segment of the Chattooga WSR. Scenic classifications for Bull Pen and Burrells Ford allow road access and parking lots; the existing trails are appropriate in primitive and semi-primitive areas.

###### **b. ROS Class**

The ROS inventories for the area would remain as described above: Primitive for Green Creek, County Line and Lick Log; Semi-primitive for Bull Pen Bridge, and Roaded Natural for Burrells Ford.

### 3. Future Recreation Trends

Likely recreation use trends would apply to existing use patterns over the 10-year planning cycle. Fishing and hunting uses are likely to grow slowly or remain stable, even with small regional population increases; these uses are not expected to substantively increase the relatively low-use levels that have occurred in recent years. Hiking and frontcountry use could increase, but are less likely to do so during the cooler winter months when boating is allowed. Boating is likely to remain low given the use levels that have occurred so far. As predicted by Whittaker and Shelby (2007), a decrease in boating use may occur after the skilled boaters in the area have had a chance to paddle the upper segment reaches for the first time in three decades. Second year data seems to indicate that use has declined.

### 4. Capacities

The capacities established in the 2012 Forest Plans for frontcountry areas and backcountry reaches would remain in place under Alternative 1. Based on recent use information about boating, the capacities are not at risk of being exceeded in this alternative.

It appears that less than 60% of all days when boating was allowed were used in the first year, and in the 2013-14, use has been even lower. Forty-six boaters paddled on the highest use day in 2012-13, with 29 putting in at Green Creek (the highest use at a single access area on a single day) and 25 putting in at Burrells Ford. Average use levels on days when boating occurred were much lower (about 13 per day).

Boating use levels would likely continue at levels similar to the last two years, and are unlikely to increase substantially the number of encounters per day with anglers. Most boating is occurring at higher flows (boaters were present on three days between 350 and 500 cfs). Based on Whittaker and Shelby (2007), flows are considered unacceptably high for fly fishing at 450 cfs and for spin fishing at 525 cfs; flows are optimal below 250 cfs for fly fishing and 325 cfs for spin fishing. The level of actual encounters and potential for face-to-face conflict between these two groups has probably remained very low to date.

Encounters between boaters are likely to remain low under this alternative; on rare days with peak use as many as eight to 10 groups of boaters may float the Chattooga Cliffs Reach, but it is not certain that all groups would encounter each other if several are on different schedules.

Parking would stay informal and undefined at trailheads, but appears adequate to handle the average number of boating-based vehicles that would use any given trailhead. In 2012-2013 (first boating season), boater use on a single day may have produced eight to 10 boater cars at the Green Creek trailhead, filling the parking spots available at that site. However, boaters have the option of running shuttles or carpooling to reduce cars at the upstream trailhead

when this site is filled. At other locations, the number of boaters on the highest use day would not fill parking capacities at trailhead parking areas.

Undesignated and user-created trails in the vicinity of the proposed access trails would remain the same, with little to no design changes or maintenance activities to reduce erosion impacts or handle drainage problems. Therefore, the sense of naturalness along these routes may slightly deteriorate if these existing trails saw higher use in the future.

## 5. Recreation ORV

Opportunities for fishing, hiking and general riverside recreation would continue to be available; use levels would remain low enough to protect all recreation opportunities occurring in the area. Capacities are not likely to be exceeded by continued use of the current access locations. As a result, the overall Recreation ORV would continue to be protected.

### **B. Alternative 1 - Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. None of these activities would affect recreation use, experience, access or opportunities at the current access points. Projects listed in Table 3.1-1 do not overlap with current use to cause cumulative effects. No specific actions on private lands were identified during scoping that may combine with the effects of the proposed action and contribute to cumulative effects.

### **C. Alternative 2 – Direct and Indirect Effects**

#### 1. Types of Existing Use

##### a. Trout Fishing

Fishing opportunities would continue to be available in the vicinity of the five existing access locations. Improvements as described in the proposed action would reduce potential resource impacts. New trails at Bull Pen and Lick Log would improve access to the river and place less reliance on the poorly located user-created trails. The new access locations are not considered primary fishing access points and are not likely to induce new fishing use. They may encourage a few anglers to access the channel at specific locations (as opposed to accessing the channel via user-created spur trails). With increased hemlock downfall and heavy understory vegetation growth in the area, designated trails are likely to receive the most use and would discourage use on the old user-created spurs into the river.

b. Boating

Boating would continue to occur on the upper segment; boaters also would be able to use the improved five access locations. These locations are unlikely to induce additional boating use, which is attracted by the whitewater, not the access trails. Boating use levels have been relatively low since 2012 and seem unlikely to increase substantially in the future.

c. Other Recreational Activities – Hiking, Camping, Relaxing, Picnicking, Swimming, Sightseeing and Hunting

User-created trails would continue to provide access to the river. However, with the exception of the County Line Trail (which is a primary access route for hikers and anglers); none appear to be primary access points for these activities. New trails at Bull Pen and Lick Log would improve access to the river and place less reliance on the poorly located user-created trails. The new locations are not considered primary hiking, hunting or riverside recreation access points and are not likely to induce new use. They may simply encourage a few users to access the channel at specific locations (as opposed to accessing the channel via user-created spur trails). With increased hemlock downfall and heavy understory vegetation growth in the area, designated trails are likely to receive the most use and will discourage use on the old user-created spurs into the river.

2. Recreation Experience

a. Wild, Scenic and Recreational Classification

The wild, scenic and recreational classifications in the upper segment would remain consistent with the trail improvements and would not trigger any changes. All three classifications allow for trails and trail improvements. None of the improvements would create roads or road-like conditions. Scenic classifications for Bull Pen and Burrells Ford also allow road access and parking lots (which currently exist and would not change).

b. ROS Class

The ROS inventories for the area would remain the same: Primitive for Green Creek, County Line and Lick Log; Semi-primitive for Bull Pen Bridge; and Roaded Natural for Burrells Ford. Trail improvements are unlikely to induce new use, but would allow existing use to occur with less resource impact. While the development level of the specific trails would increase slightly, none of these changes would “tip the scale” to a higher ROS class. In most cases, trail improvements and elimination of user-created spur trails are expected to decrease resource impacts and thus would make the area appear more primitive (i.e., fewer signs of human use overall, although a single trail would exist in each location).

3. Future Recreation Trends

The effects are the same as in Alternative 1.

#### 4. Capacities

As discussed for Alternative 1, boating use would likely continue at levels similar to the last two years. Boating use would occur on a portion of the days that boating is allowed, and these would probably continue to be at flows that are less attractive to anglers. Encounters between boaters are also likely to remain low under Alternative 2, as the newly designated trails are unlikely to induce additional boating use.

As under Alternative 1, parking would remain informal and undefined at trailheads; parking appears adequate to handle the average number of vehicles that would use any given trailhead. However, occasional days with higher use may produce eight to 10 boater cars at the Green Creek trailhead (filling the parking spots available at that site). When this site is full, boaters would have the option of running shuttles or carpooling to reduce cars at the upstream trailhead. At other locations, the number of boaters on the highest use day would not fill parking capacities at trailhead parking areas.

Two undesignated and user-created trails in the vicinity of the Burrells Ford Bridge would be eliminated in Alternative 2; design changes or maintenance activities would reduce erosion impacts or handle drainage problems on all five of the existing locations. This would increase the sense of naturalness along these trails, even if use were to increase.

Designating put-in and take-out sites and trails to them would also improve access for non-boating users; however, new use is unlikely to occur. People who currently travel to these sites know there is trail-related access to the channel, even if those trails are user created. In Alternative 2, the U.S. Forest Service would be funneling use onto a single designated trail to the channel. This is not likely to induce new use that would threaten to exceed capacities; it would only direct use that is already occurring in the area.

One new trail would be developed downstream from Bullpen Bridge into Ellicott Rock Wilderness. While this would be new development, it would replace existing user-created trails in the area that have the potential for greater resource impacts that would detract from a sense of naturalness.

Monitoring would allow the forests to determine if use is exceeding frontcountry or backcountry capacities. If use approaches or exceeds those capacities, there are options for using education to help better distribute use on high use days (e.g., carpooling for boaters in larger groups).

#### 5. Recreation ORV

Opportunities for fishing, hiking and general riverside recreation would continue to be available; use levels would remain low enough to protect all recreation opportunities occurring in the area. Capacities are not likely to be exceeded by new and improved trails at the current access locations.

#### **D. Alternative 2 - Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat.

Designating, maintaining and constructing these access points would have cumulative positive effects on recreation use in the upper segment of the Chattooga WSR by developing sustainable trails and access points similar to other recreation projects in the watershed. However, the effects are minor given the small size of the proposal as listed in Table 2.2-1. None of these activities would affect recreation use, experience, access or opportunities at the current access points. Projects listed in Table 3.1-1 do not overlap with current use to cause cumulative effects. No specific actions on private lands were identified during scoping that may combine with the effects of the proposed action and contribute to cumulative effects.

### **3.2.2 *Biology (Fisheries, Wildlife and Botany Components)***

#### **3.2.2A *Fisheries***

##### **Affected Environment**

Conditions at the time of designation and in the 1996 ORV report have been described in the 2012 EA and are incorporated by reference into this analysis.

Streams in the proposed project area include the Chattooga WSR and notable tributaries including but not limited to Green Creek, Norton Mill Creek, Cane Creek, Ammons Branch, Fowler Creek, East Fork Chattooga WSR, Harden Creek, King Creek, Lick Log Creek and Reed Creek (all in the upper segment). These streams contain cool and cold water aquatic communities.

1. Aquatic Federally Threatened, Endangered and Proposed Aquatic Species and Region 8 Forest Sensitive Aquatic Species (PETS)

No federally listed aquatic species occur in the Chattooga WSR or its tributaries. Five Region 8 forest sensitive aquatic species may occur in the watershed (see Table 3.2.2A-1).

**Table 3.2.2A-1. PETS Aquatic Species for Chattooga WSR Watershed.**

Species	Species Ranking				Forest List	Habitat
	Global	State	AFS	Forest		
Chauga crayfish <i>Cambarus chaugaensis</i>	G2	GA-S1 SC-S2S3 NC-S2	T	Sensitive	CONF SNF NNF	Fast-moving, rocky tributaries of the upper Savannah River.
Brook floater <i>Alasmidonta varicosa</i>	G3	GA-S2 SC-SNR NC-S1	T	Sensitive	CONF SNF	High gradient streams and moderate gradient rivers among rocks and gravel substrates in sandy shoals, riffles and moderate rapids.
Georgia beloneurian	G2	GA-S2		Sensitive	CONF	High elevation waterfalls spray cliffs and

Species	Species Ranking				Forest	Habitat
stonefly <i>Beloneuria georgiana</i>		NC-S1S3				spring brooks.
Mountain river cruiser <i>Macromia margarita</i>	G3	GA-S1 SC-SNR		Sensitive	CONF SNF NNF	Mountain, sometime Piedmont streams and rivers with high water quality, forested watersheds and silt deposits among rocks.
Edmund's snaketail <i>Ophiogomphus edmundo</i>	G1G2	GA-S1 NC-S1		Sensitive	CONF SNF NNF	Clear moderately flowing mountain streams and rivers with sand or gravel riffles.

Documented occurrences in the Chattooga WSR watershed exist for four of the five U.S. Forest Service Region 8 forest sensitive aquatic species.

State natural heritage program element occurrence (EO) records maintained by all three states exist for *Cambarus chaugaensis* and *Alasmidonta varicosa* in the Chattooga WSR. *Cambarus chaugaensis* range includes the Chattooga WSR watershed in North Carolina, South Carolina and Georgia and the Chauga River watershed in South Carolina, where it is most abundant (NatureServe, 2014). *Alasmidonta varicosa* is located in the main channel from the vicinity of the Highway 28 Bridge and downstream in South Carolina and Georgia. The mussel's range extends along the East Coast from Georgia into Canada.

English (1990) sampled *Beloneuria georgiana* in the Chattooga WSR and two Georgia tributaries. *Beloneuria georgiana* is known from Georgia, North Carolina and Tennessee. The proposed access points and trails would not affect any waterfalls, spray cliffs or spring brooks within the CONF. Therefore, this species will not be evaluated further in this analysis.

*Macromia margarita* is documented from Alabama, Georgia, North Carolina, South Carolina, Tennessee and Virginia. In South Carolina, this species is documented from the Seneca River watershed in Pickens County. *Macromia margarita* is not documented from the watershed, but occurs in adjacent watersheds in South and North Carolina. For this reason, and the likelihood of discovering more occurrences (NatureServe, 2014), this species is included for analysis.

*Ophiogomphus edmundo* was recently reported from the Chattooga WSR in the main channel of the river in the vicinity of the Highway 76 Bridge (Abbott, 2010). This species has also been reported from Georgia, North Carolina and Tennessee. There is the possibility that this aquatic insect occurs in a wider range than is documented due to the lack of wide-range sampling and the difficulty of identifying individuals at different life stages. English and Pike (2009) found the genus *Ophiogomphus* at seven sites in the Chattooga WSR watershed, but were unable to identify them to the species level.

#### *Species Evaluated and Rationale*

Sensitive species considered in this analysis are those identified by the regional forester for which population viability is a concern (August, 2001). Ten aquatic species listed by the



regional forester as sensitive are either known to occur or may occur on the NNF (refer to the Biological Evaluation or BE). The NCNHP database was queried for occurrences of aquatic sensitive species in Jackson and Macon counties. Seven sensitive aquatic species remained. These seven species were then filtered by watershed, resulting in only two species remaining, *Cambarus chaugaensis* and *Macromia margarita* (refer to the BE).

There are 34 U.S. Forest Service sensitive species on the CONF. All sensitive species were initially considered during this evaluation. However, there are no known locations of sensitive animal species that were identified in U.S. Forest Service records or the Georgia Natural Heritage Program (GANHP) database for the project area. In addition, the current user trail system and parking area does not provide suitable habitat for any sensitive species. A field visit on November 23, 2012 confirmed that the existing parking area and user-created trail did not provide suitable habitat for sensitive species. Therefore, all sensitive species known to occur on the Chattooga River Ranger District were dropped from further consideration due to the fact that this project area is limited to an existing parking area and user-created trail network, which does not serve as suitable habitat for any sensitive species. Although the adjacent riparian zone could serve as suitable habitat for some sensitive species, this habitat would not be affected by the proposed project activities.

Six sensitive aquatic species occur on the SNF. These species were then filtered based upon habitat information and the availability of these habitats within the aquatic analysis area. Based upon the results of this filtering process four sensitive aquatic species were evaluated for this analysis.

## 2. Locally Rare, Forest Concern Aquatic Species<sup>2</sup>

The CONF maintains a locally rare species list and the NNF maintains a forest concern species list. The SNF does not maintain either list. The analysis will include effects on locally rare species that may occur in the project areas. Those species that may occur in the watershed are listed in Table 3.2.2A-2. *Notropis leuciodus* has been located in the Chattooga WSR by the SCDNR and Georgia Department of Natural Resources (GADNR).

**Table 3.2.2A-2. Forest Listed Locally Rare (LR) Species/Forest Concern (FC) Species Ranking.**

Species	Species Ranking				Forest List	Habitat
	Global	State	AFS <sup>3</sup>	Forest		
Whitetail shiner - <i>Cyprinella galactura</i>	G5	GA-S3S4	CS	LR	CONF	Cool, usually clear, high gradient headwaters, creeks and small rivers with clean gravel and rubble.
Tennessee shiner - <i>Notropis leuciodus</i>	G5	GA-S3	CS	LR	CONF	Pools and runs of cool usually clear creeks and small to medium rivers with gravel-rubble substrate.
<i>Cryptobranchus alleganiensis</i>	G3G4	NC-S3	-	FC	NNF	Rivers and large streams, TN and Savannah River systems

<sup>2</sup> For simplicity and clarity in this document, both the NNF and the CONF species will be referred to as locally rare.

<sup>3</sup> The American Fisheries Society (AFS) ranking of CS means “currently stable.” This denotes a species whose distribution is widespread and stable or a species that may have declined in portions of its range, but is not in need of immediate conservation management actions.

<i>Beraea gorteba</i>	G1G2	NC-S1S2	-	FC	NNF	Specifics unknown
<i>Homoplectra monticola</i>	G2G3	NC-31	-	FC	NNF	Scattered central and southern mountains (Jackson and Macon)
<i>Hydropsyche carolina</i>	G2G3	NC-S1	-	FC	NNF	Cullasaja River (Macon); Whitewater River (Jackson)
<i>Oropsyche howellae</i>	G2	NC-S2	-	FC	NNF	Streams (Jackson and Macon)
<i>Stylurus scudderi</i>	G4	NC-S2?	-	FC	NNF	Streams and rivers
<i>Etheostoma inscriptum</i>	G4	NC-S1	-	FC	NNF	Large streams in Savannah River system
<i>Micropterus coosae</i>	G5	NC-S1	CS	FC	NNF	Clear upland creeks and small to medium rivers in rocky pools and runs. May move to small tributary streams for spawning.
<i>Notropis lutipinnis</i>	G4Q	NC-S1	-	FC	NNF	Savannah and Little TN River systems, Jackson and Transylvania Co.; Broad River system
<i>Baetopus trishae</i>	G1G2	NC-S1	-	FC	NNF	Specifics unknown

Fifty-six aquatic forest concern species are either known to occur or may occur on the NNF. The NCNHP database was queried for occurrences of forest concern species in Macon and Jackson counties. Twenty-nine forest concern species remained after this initial filter. These twenty-nine species were then filtered using their habitat information and the availability of these habitats within the aquatic analysis area. Based upon the results of this filtering process twelve forest locally rare species were evaluated in this analysis. These species were analyzed for this project because they are either known to occur within the project area or suitable habitat exists for these species. Species that do not have suitable habitat within the project area were eliminated from further analysis.

### 3. Aquatic Management Indicator Species (MIS) and Management Indicator Communities

MIS and management indicator communities 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 and standards and guidelines. The MIS concept is used to identify a few species that are representative of many other species and to evaluate the effects of proposed management on MIS habitats. Both population and habitat data are used to monitor MIS on the national forests. The SNF monitors cool and cold water aquatic communities while the NNF monitors particular fish species.

**Table 3.2.2A-3. Aquatic MIS and Management Indicator Communities for the NNF and SNF.**

Aquatic MIS and Mgmt. Indicator Communities	Forest	Habitat
<b>Management Indicator Species</b>		
Brook trout, <i>Salvelinus fontinalis</i>	NNF	Coldwater streams.
Rainbow trout, <i>Oncorhynchus mykiss</i>	NNF	Coldwater streams.
Brown trout, <i>Salmo trutta</i>	NNF	Coldwater streams.
Blacknose dace, <i>Rhinichthys atratulus</i>	NNF	Coldwater streams.
<b>Management Indicator Communities</b>		
Cold Water Communities	SNF	Chattooga River and tributaries; brook trout, rainbow trout, brown trout, blacknose dace, aquatic insects, crayfish and mollusks.
Cool Water Communities	SNF	Chattooga River and tributaries; trout and other fish species, aquatic insects, crayfish and mollusks.

Continued monitoring indicates that, while individual populations exhibit high annual variability in age class structure and biomass, overall trends in *Salvelinus fontinalis*, *Oncorhynchus mykiss*, *Salmo trutta* and *Rhinichthys atratulus* populations across the Nantahala and Pisgah National Forests have remained stable during the last 13 years (National Forests in North Carolina FY 2009 Monitoring and Evaluation Report, USFS 2009).

The Chattooga WSR and its tributaries contain cold to cool water aquatic communities from the headwaters to the downstream reaches. The cold water and cool water aquatic communities serve as management indicators that are monitored to indicate the effects of management on riparian resources. Fish, crayfish, aquatic insects and mollusks are all components of these communities.

The aquatic communities include one forest-listed locally rare fish species: *Notropis leuciodus*. The fish species diversity of the Management Indicator Community in the Chattooga WSR watershed has not changed in more than 20 years of sampling the main stem of the river (SCDNR unpublished data in project file). NatureServe has assigned a global rank of either G4 (apparently secure) or G5 (secure) to all of the fish species in the community.

The aquatic communities include one forest sensitive crayfish *Cambarus chaugaensis*. All other crayfish are rated as G4 or G5 by NatureServe and CS by AFS (Taylor et al., 2007). In addition, *Cambarus asperimanus* is ranked as S1 by the SC Natural Heritage Program (SCNHP), S2 by the GANHP and S3? by the NCNHP.

The aquatic communities include one forest sensitive mussel species: *Alasmidonta varicosa*. *Elliptio producta* has a global rank of G3 and is ranked as special concern by the AFS (Williams et al. 1992). *Elliptio angustata* has a global rank of G4 and is ranked as special concern by the AFS. *Elliptio complanata* has a global rank of G5 and is ranked as CS by the AFS.

Aquatic insect surveys were conducted in the Chattooga WSR from 1986-89 by English (1990), in 2007-08 by English and Pike (2009), and in 1994 by Weber and Isely (1995). Weber and Isely conclude that water quality in the Chattooga WSR basin was good to excellent using macroinvertebrates as biological indicators of water quality. Analysis of macroinvertebrate data in the English 1990 report indicates the water quality in the Chattooga WSR watershed was good. The average density over the entire Chattooga WSR watershed suggested that the river was neither over nor under productive compared to streams in the Great Smoky Mountains National Park. Sites from the 1990 report were resampled in fall 2007 and 2008 (English and Pike 2009) and encompass sample sites from the headwaters downstream to just above Tugaloo Lake, including some tributaries.

#### 4. Aquatic Habitat

Stream habitat surveys using Basinwide Visual Estimation Technique (Doloff et al., 1993) were conducted in six South Carolina tributaries to the Chattooga WSR in 2001 and 2002. The total area of riffle habitat in these streams was 1.5 to 3.8 times greater than the total pool area. The lack of in-stream habitat complexity is in part associated with a low percentage of large woody debris within the streams. Presence of large woody debris classes considered large enough to be stable and create fish habitat ranged from one to 15 percent of the total wood surveyed within the streams. The larger, most stable, woody debris class (greater than five meters in length and 55 cm in diameter) ranged from one to seven percent of the total wood. Recent monitoring indicates that large wood is not being cut in the newly opened paddling reaches in the Chattooga River mainstem (USFS 2014). Construction, reconstruction and maintenance of trails and access sites would have no impact on aquatic habitat and will not be evaluated further in this analysis.

This analysis addresses proposed activities that may contribute sediments or otherwise impact aquatic habitat or species. Fine sediments can alter and degrade aquatic habitats and eliminate benthic macroinvertebrates or reduce their density and diversity. This in turn decreases a food source for some aquatic species. Sedimentation can cause mortality in egg and larval stages of aquatic species reproduction. Sediments can fill in and destroy habitat niches within a stream. Van Lear et al. (1995) found that 80 percent of observable sediment sources in the Chattooga WSR watershed were associated with open graveled and unsurfaced roads. The use of these roads contributes to their degradation through heavy trafficking and by increasing the need for maintenance, both of which aggravate sedimentation. Van Lear (1995) also found that the wild and scenic corridor of the main stem Chattooga WSR contributes relatively little new sediment.

Species conservation status and known population trends and aquatic habitat conditions are discussed in the affected environment section. The *Final Environmental Impact Statement for the Revised Land and Resource Management Plan Sumter National Forest* acknowledges that effects on aquatic ecosystems do occur on a watershed scale and sediment has been determined to be a risk factor for aquatic species viability in the Chattooga WSR watershed. Trail erosion and sediment input and turbidity were identified as an existing impact issue on the river by Whittaker and Shelby (2007).

**A. Alternative 1 – Direct and Indirect Effects**

The aquatic community (including sensitive, locally rare, MIS and aquatic communities ) would remain in the present state or continue current population trends as described above. This alternative would meet standards for all three Forest Plans by maintaining existing MIS populations.

**B. Alternative 1 – Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. Projects aimed at reducing soil erosion and sediment in the drainage would lead to long term reductions in sediment in the Chattooga River. The Riparian Corridor Management Prescription addressing perennial and intermittent streams and the Forestwide Standards specific to ephemeral channels for all three national forests would be implemented for all these projects.

Current access sites would continue to contribute minor amounts of erosion and sediment when considered in context with the effects that existing roads are having in the drainage. However, cumulative erosion and sediment reductions are likely under this alternative. No specific actions on private lands were identified during scoping that may combine to substantially increase erosion and sediment in the river.

**C. Alternative 2 – Direct and Indirect Effects**

**Locally Rare and Sensitive Species**

Recreational boating use on the upper segment of the Chattooga WSR is expected to be low due to the high skill level required and the relatively isolated location of the access points. Recreational boaters would only use these trails for five months of the year when flows reach 350 cfs, which would be approximately 10 – 30 days per year. Furthermore, all access sites would be constructed/reconstructed and maintained to minimize erosion and sedimentation to analysis area waters by hardening the trails and/or seeding and mulching any disturbed soil. No in-stream construction is proposed for this project. Project design features to minimize erosion and sedimentation would prevent visible sediment from reaching analysis area waters and habitats suitable for locally rare and sensitive aquatic species. One small tributary would have a short wooden footbridge constructed across the channel for the Greens Creek Trail. This footbridge construction may involve some excavation within the riparian area for installation of abutments/supports but this construction would be limited to a very small area (approximately five linear feet along the stream banks) and would be seeded and mulched after construction is completed. There are no effects anticipated from this construction due to the application of best management practices to control erosion and sedimentation. Furthermore, the footbridge would span the entire bankfull channel; therefore, no in-stream disturbance would occur.

The probability of an individual of the forest concern or locally rare aquatic species occurring at one of the access points during a high flow event at the exact moment that a boater launches his/her boat

is extremely low. Also, current use is lower than predicted which would further reduce the chances of someone stepping on an individual of the locally rare and sensitive aquatic species. These factors, coupled with the limited number of days per year that flows would be high enough to enable paddling, further reduces the chances of direct and indirect effects on individuals of the locally rare and sensitive aquatic species.

#### *Determination of Effect*

Implementation of this project would have no direct impact to the locally rare and sensitive aquatic species beyond those previously disclosed in the Biological Evaluation for *Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor* (2012 EA) because the proposed access points would not involve in-stream construction or modification of the river channel. Project design features would prevent visible sediment from entering analysis area waters. Implementation may produce indirect sediment effects on locally rare and sensitive aquatic species through visitors hiking trails and paddling the river, but those impacts would be no greater than those previously disclosed in the BE for the 2012 EA.

#### MIS and Management Indicator Communities

##### **Wild rainbow trout, wild brown trout, blacknose dace, aquatic insects, crayfish and mussels**

The effects of this alternative on the project MIS and Management Indicator Communities would generally be the same as those described for the locally rare and sensitive species described above. Construction of the trail segments and the one stream crossing for the Green Creek Trail would have no effects on any aquatic resources because best management practices would be used to prevent sedimentation to analysis area streams. There would be no other direct or indirect effects on the aquatic MIS and Management Indicator Communities from this project.

Implementation of this project would not change the current forest-wide trend for wild rainbow trout, wild brown trout, blacknose dace, aquatic insects, crayfish and mussels. The current forest-wide trends for wild rainbow trout, wild brown trout, blacknose dace, aquatic insects, crayfish and mussels are stable and implementation of Alternative 2 would not affect these population trends because the project design features would prevent measureable sediment from entering any stream with fish populations.

#### Aquatic Habitat

Implementation of Alternative 2 would stabilize boat access trails and access points; thereby, minimizing the potential for additional sediment sources resulting from the recreational activities within the corridor. Recent monitoring indicates that large wood is not being cut in the newly opened paddling reaches in the Chattooga River mainstem (USFS 2014).

#### **D. Alternative 2 – Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest

health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, maintain wildlife habitat. Projects aimed at reducing soil erosion and sediment in the drainage would lead to long term reductions in sediment in the Chattooga River. The Riparian Corridor Management Prescription addressing perennial and intermittent streams and the Forestwide Standards specific to ephemeral channels for all three national forests would be implemented for all these projects.

Cumulative decreases in erosion and sediment to the Chattooga River are expected with implementation of the proposed action when considered in context with other projects in the drainage. No specific actions on private lands were identified during scoping that may combine to substantially increase erosion and sediment in the river.

### **3.2.2B Wildlife**

#### **Affected Environment**

##### **1. PETS, Locally Rare Species**

The information provided in this section will be used to disclose and analyze the potential effects alternatives 1 and 2 may have on PETS and/or locally rare wildlife species.

The Chattooga WSR watershed has a geology and climate which is unique in the Southern Appalachians; therefore it provides suitable habitats for several wildlife species which are listed as “state rare” or altogether “globally rare.” Some of the most important and unique habitat components for locally rare wildlife species within the watershed include: exposed rock outcrops; deep, narrow gorges and associated vertical rock walls; steep, exposed, rocky forested slopes; and sheltered riparian corridors. These unique geologic features and habitats, combined with an average annual rainfall which can exceed 100 inches in some areas, provide a full spectrum of important and unique wildlife habitats. These unique features are mostly associated with the upper portion of the watershed and for this reason; approximately 70% of all locally rare species known or with potential to occur in the Chattooga WSR watershed are restricted to the upper portion of the watershed.

Table 3.2.2B-1 contains information on all natural communities which occur in the Chattooga WSR watershed.

**Table 3.2.2B-1. Comparison of Natural Communities Abundance within the Chattooga WSR Watershed, and the Upper (north of US 28) and Lower (south of US 28) Segments of the Chattooga WSR Corridor.**

<b>Natural Communities</b>	<b>Acres</b>	<b>% in Watershed</b>	<b>Upper Segment Wild &amp; Scenic Corridor (Ac)</b>	<b>% Upper Corridor</b>	<b>Lower Segment Wild &amp; Scenic Corridor (Ac)</b>	<b>% Lower Corridor</b>
High Elevation Red Oak Forest	1990	1%	23	0.3%	0	0%
Montane oak-hickory forest	10892	6%	156	2%	0	0%
Montane White Oak Forest	2046	1%	13	0.2%	0	0%
White Pine/Heath Forest	17328	9%	1331	19%	436	2%
Mesic oak-hickory forest	37729	20%	636	9%	4916	25%

Table Mountain Pine-Oak/Heath Forest	298	0.2%	0	0%	0	0%
Pitch Pine-Oak/Heath Forest	17687	9%	955	14%	2257	12%
acidic cove forest	6518	3%	423	6%	2323	12%
Eastern Hemlock/ Rhododendron maximum Forest	18302	10%	842	12%	92	0.5%
Alluvial Forest	1789	1%	156	2%	628	3%
Chestnut Oak/Northern Red Oak/ Rhododendron	5244	3%	528	7%	367	2%
Chestnut Oak/Scarlet Oak/Heath Forest	12656	7%	604	9%	187	1%
Dry oak-hickory forest	18718	10%	1048	15%	976	5%
Shortleaf Pine-Southern Red Oak-Blackjack Oak Forest	14106	7%	9	0.1%	1099	6%
Shortleaf Pine-Southern Red Oak Forest	19890	11%	141	2%	5721	29%
Heath Bald	565	0.3%	0	0%	0	0%
Swamp Forest/Bog	1165	1%	0	0%	0	0%
Rock Outcrops	234	0.1%	0	0%	0	0%
Urban	223	0.1%	0	0%	0	0%
Water	1585	1%	182	3%	496	3%
<b>Totals</b>	<b>188965</b>		<b>7047</b>		<b>19498</b>	

Fifteen PETS and locally rare wildlife species are known to occur (documented) within the overall Chattooga WSR watershed. An additional three wildlife species have the potential to occur within the watershed, as well as within the proposed boater access points/routes (see Table 3.2.2B-2).

**Table 3.2.2B-2. Chattahoochee, Nantahala and Sumter Wildlife Species which are Known to Occur, or have Potential to Occur, within the Chattooga WSR Watershed and Boater Access Sites.**

Type	Scientific Name	Common Name	Element Occurrence Location <sup>4</sup>	Number of Separate Element Occurrences	Forest	Rank <sup>5</sup>
Mammal	<i>Myotis sodalis</i>	Indiana Bat	Upper and Lower Watershed	Not documented (potential to occur)	NNF CONF	E
Mammal	<i>Myotis septentrionalis</i>	Northern Long Eared Bat	Upper and Lower Watershed	Not documented (potential to occur)	NNF SNF CONF	P
Amphibian	<i>Aneides aenus</i>	Green Salamander	Upper and Lower Watershed	28 (27 Upper, 1 Lower)	NNF CONF	LR
Amphibian	<i>Plethodon</i>	Southern	Upper Watershed	10	NNF	S

<sup>4</sup> Upper watershed includes all tributaries of the North Fork of the Chattooga WSR above the West Fork – North Fork confluence as well as all the tributaries of the West Fork of the Chattooga WSR. Lower watershed includes all tributaries which drain into the North Fork of the Chattooga WSR below the West Fork – North Fork confluence.

<sup>5</sup> E = Endangered; P = Proposed; LR = Locally Rare; S = Sensitive; TSA = Threatened – Similarity of Appearance.



Type	Scientific Name	Common Name	Element Occurrence Location <sup>4</sup>	Number of Separate Element Occurrences	Forest	Rank <sup>5</sup>
	<i>teyahalee</i>	Appalachian Salamander			CONF	
Bird	<i>Aegolius acadicus pop. 1</i>	Northern Saw-whet Owl	Upper Watershed	1	NNF	LR
Bird	<i>Falco peregrinus</i>	Peregrine Falcon	Upper Watershed	1	NNF	S
Bird	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Upper Watershed	1	NNF	LR
Butterfly	<i>Erora laeta</i>	Early Hairstreak	Upper Watershed	1	NNF	LR
Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Upper and Lower Watershed	Not documented (potential to occur)	NNF SNF CONF	S
Mammal	<i>Myotis leibii</i>	Eastern Small-footed Bat	Upper Watershed	5	NNF SNF CONF	S
Mammal	<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	Upper Watershed	1	NNF	S
Mammal	<i>Neotoma floridana haematoreia</i>	Southern Appalachian Woodrat	Upper and Lower Watershed	2	CONF	LR
Mammal	<i>Sorex palustris punctulatus</i>	Southern Water Shrew	Upper Watershed	2	NNF	S
Mammal	<i>Sorex dispar</i>	Long-tailed Shrew	Upper Watershed	1	CONF	LR
Mammal	<i>Tamiasciurus hudsonicus</i>	Red Squirrel	Lower Watershed	3	CONF	LR
Reptile	<i>Eumeces anthracinus</i>	Coal Skink	Upper Watershed	2	NNF	LR
Reptile	<i>Clemmys muhlenbergii</i>	Bog Turtle	Upper Watershed	2	NNF CONF	T SA (NNF) S (CONF)
Reptile	<i>Pituophis m. melanoleucus</i>	Northern Pine Snake	Lower Watershed	1	CONF	LR

### Wildlife Species Initially Considered

All PETS and locally rare species lists and information were compiled by:

1. Consulting US Forest Service plant and animal inventory records;
2. Consulting Georgia, North Carolina and South Carolina Natural Heritage Program element occurrence records;
3. Consulting with other federal, state and non-governmental organization biologists;
4. Reviewing USFWS lists for proposed, endangered and threatened species in Jackson, Macon, Oconee and Rabun counties; and
5. Using the references at the end of this document.

Initially, wildlife species which are listed on the CONF and the NNF were considered in this analysis. This initial list did not include some Piedmont species and Ridge and Valley species which are included on the CONF list but do not occur in the Southern Blue Ridge Subsection. This initial list included 104 PETS and locally rare wildlife species (see Table 3.2.2B-3). The SNF does not maintain a locally rare list of wildlife species.

**Table 3.2.2B-3. CONF, NNF and SNF Threatened, Endangered, Sensitive and Locally Rare Wildlife Species List and Project-level Analysis Information.**

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING	ANALYZED / REASON1
Mammal	<i>Glaucomys sabrinus coloratus</i>	Carolina Northern Flying Squirrel	High elevation forests, mainly spruce-fir	NNF	E	No / 4
Mammal	<i>Myotis sodalis</i>	Indiana Bat	Roots in hollow trees or under loose bark (warmer months), in caves (winter).	NNF CONF	E	Yes / 1
Mammal	<i>Puma concolor cougar</i>	Eastern Cougar	Extensive forests, remote areas	NNF	E	No / 5
Mammal	<i>Myotis septentrionalis</i>	Northern Long-eared Bat	Roosts under loose bark, crevices or hollow trees	NNF CONF SNF	P	Yes / 1
Reptile	<i>Clemmys muhlenbergii</i>	Bog Turtle	Bogs, wet pastures, wet thickets	NNF CONF	T (S/A) S	No / 4
Spider	<i>Microhexura montivaga</i>	Spruce-fir Moss Spider	In moss of spruce-fir forests (endemic to North Carolina and adjacent Tennessee)	NNF	E	No / 4
Terrestrial Gastropod	<i>Patera clarki nantahala</i>	Noonday Globe	Nantahala Gorge (endemic to this site)	NNF	T	No / 3
Amphibian	<i>Desmognathus santeetlah</i>	Santeetlah Dusky Salamander	Stream headwaters and seepage areas; southwestern mountains	NNF	S	No / 4
Amphibian	<i>Eurycea junaluska</i>	Junaluska Salamander	Forests near seeps and streams in the southwestern mountains	NNF	S	No / 3
Amphibian	<i>Plethodon aureolus</i>	Tellico Salamander	Forests in the Unicoi Mountains	NNF	S	No / 3
Amphibian	<i>Plethodon teyahalee</i>	Southern Appalachian Salamander	Moist forests, in southwestern mountains at all elevations	CONF NNF SNF	S	No / 2
Beetle	<i>Cicindela ancocisconensis</i>	Appalachian Tiger Beetle	Habitat specialist preferring sand and cobble along permanent streams or grassy openings, above 4000 feet	CONF NNF	S	No / 4
Beetle	<i>Cicindela patruela</i>	A Tiger Beetle	Sandy soil in open pine or pine-oak woods	CONF	S	No / 4
Beetle	<i>Trechus luculentus unicolor</i>	A ground beetle	Beneath rocks and moss in wet ravines and near seeps and springs	NNF	S	No / 3
Beetle	<i>Trechus rosenbergi</i>	A ground beetle	Deep in mat of spruce and fir needles piled up against wet, vertical rock faces, Plott Balsam and Great Balsam Mountains	NNF	S	No / 4
Bird	<i>Aimophila aestivalis</i>	Bachman's Sparrow	Dry, open, pine or oak woods with well developed herb layer	CONF	S	No / 4
Bird	<i>Falco peregrinus</i>	Peregrine Falcon	Cliffs (for nesting)	CONF NNF	S	No / 4

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING	ANALYZED / REASON1
Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Mature forests near large bodies of water (for nesting)	CONF NNF SNF	S	Yes / 1
Bird	<i>Lanius ludovicianus migrans</i>	Migrant Loggerhead Shrike	Fields and pastures (breeding season only)	CONF NNF	S	No / 4
Bird	<i>Thryomanes bewickii altus</i>	Appalachian Bewick's Wren	Woodland borders or openings, farmlands or brushy fields, at high elevations (breeding season only)	NNF	S	No / 4
Butterfly	<i>Callophrys irus</i>	Frosted Elfin	Open woods and borders, usually in dry situations; host plant-lupines ( <i>Lupinus</i> ) and wild indigos ( <i>Baptisia</i> )	NNF	S	No / 4
Butterfly	<i>Speyeria diana</i>	Diana Fritillary	Rich woods and adjacent edges and openings; host plants violets ( <i>Viola</i> ), pine forests	CONF NNF SNF	S	No / 2
Grasshopper	<i>Melanoplus divergens</i>	Divergent Melanoplus	Glades and balds, 1800-4717 feet	NNF	S	No / 4
Grasshopper	<i>Melanoplus serrulatus</i>	Serrulate Melanoplus	Valleys and lower slopes, Nantahala Mountains	NNF	S	No / 3
Grasshopper	<i>Scudderella septentrionalis</i>	Northern Bush Katydid	Woodlands	NNF	S	No / 4
Grasshopper	<i>Trimerotropis saxatilis</i>	Rock-loving Grasshopper	Boulderfields	NNF	S	No / 4
Mammal	<i>Microtus chrotorrhinus carolinensis</i>	Southern Rock Vole	Rocky areas at high elevations, forests, or fields	NNF	S	No / 4
Mammal	<i>Myotis austroriparius</i>	Southeastern Bat	Standing snags, hollow trees and buildings	CONF	S	No / 4
Mammal	<i>Myotis leibii</i>	Eastern Small-footed Bat	Roosts in hollow trees, rock outcrops, bridges (warmer months), in caves and mines (winter)	CONF NNF SNF	S	Yes / 1
Mammal	<i>Sorex palustris punctulatus</i>	Southern Water Shrew	Stream banks in montane forests or northern hardwood forests above 3000 ft.	CONF NNF	S	No / 4
Mammal	<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	Roosts in old buildings, hollow trees, caves, mines, and beneath bridges, usually near water	CONF NNF SNF	S	Yes / 1
Moth	<i>Euchlaena milnei</i>	Milne's Euchlaena	Hardwood forest and riparian areas in mountains	NNF	S	No / 2
Moth	<i>Semiothisa fraserata</i>	Fraser Fir Angle	spruce/fir forests with fraser fir	NNF	S	No / 4
Spider	<i>Nesticus cooperi</i>	Lost Nantahala Cave Spider	Caves and along Nantahala River (apparently endemic to Swain County, NC)	NNF	S	No / 3
Spider	<i>Nesticus sheari</i>	a nesticid spider	on the ground in moist or rich forests (apparently endemic to Graham County, NC)	NNF	S	No / 4
Spider	<i>Nesticus silvanus</i>	a nesticid spider	Habitat not indicated (apparently endemic to southern mountains of NC)	NNF	S	No / 2
Terrestrial Gastropod	<i>Pallifera hemphilli</i>	Black Mantleslug	High elevation forest, mainly spruce-fir	NNF	S	No / 4

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING	ANALYZED / REASON1
Terrestrial Gastropod	<i>Paravitrea placentula</i>	Glossy Supercoil	Leaf litter on wooded hillsides	NNF	S	No / 3
Amphibian	<i>Ambystoma talpoideum</i>	Mole Salamander	Breeds in fish-free semi-permanent woodland ponds; forages in adjacent woods	NNF	FC	No / 2
Amphibian	<i>Aneides aeneus</i>	Green Salamander	Damp, shaded crevices of cliffs or rock outcrops in deciduous forests (southern forests)	CONF NNF	LR FC	No / 2
Amphibian	<i>Eurycea longicauda longicauda</i>	Longtail Salamander	Moist woods and floodplains; small ponds for breeding	NNF	FC	No / 3
Amphibian	<i>Hemidactylium scutatum</i>	4-toed Salamander	Pools, bogs and other wetlands in hardwood forests	CONF	LR	No / 4
Bird	<i>Accipiter striatus</i>	Sharp-shinned hawk	Forests and Woodlands	NNF	FC	No / 3
Bird	<i>Aegolius acadicus pop. 1</i>	Northern Saw-whet Owl	Spruce-fir forests or mixed hardwood/spruce forests (for nesting) [breeding season only]	NNF	FC	No / 4
Bird	<i>Bombycilla cedrorum</i>	Cedar Waxwing	Hardwood, pine forest / woodland (breeding season only)	CONF	LR	No / 4
Bird	<i>Catharus guttatus</i>	Hermit Thrush	Spruce-fir forests (for nesting) [breeding season only]	NNF	FC	No / 4
Bird	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	Deciduous forests, mainly at higher elevations [breeding season and habitat only]	NNF	FC	No / 4
Bird	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Montane conifer forests ( mainly spruce-fir) with openings or dead trees [breeding season only]	NNF	FC	No / 4
Bird	<i>Corvus corax</i>	Common Raven	High elevation, remote cliffs and rock outcrops	CONF	LR	No / 4
Bird	<i>Dendroica cerulea</i>	Cerulean Warbler	Mature hardwood forests; steep slopes and coves in mountains [breeding season only]	NNF CONF	FC LR	No/ 2
Bird	<i>Dendroica magnolia</i>	Magnolia Warbler	Spruce-fir forests, especially in immature stands [breeding season only]	NNF	LR	No / 4
Bird	<i>Empidonax alnorum</i>	Alder flycatcher	High elevation, shrub/sapling thicket	NNF	LR	No / 4
Bird	<i>Empidonax minimus</i>	Least Flycatcher	Open hardwood forests, groves, streamside trees (breeding season only)	CONF	LR	No/ 2
Bird	<i>Empidonax trailii</i>	Willow Flycatcher	Wet thickets, streamsides, riparian areas (breeding season only)	CONF	LR	No/ 2
Bird	<i>Loxia curvirostra</i>	Red Crossbill	Pine and pine / oak forests and woodlands (breeding season only)	CONF	LR	No / 4
Bird	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	Hardwood forests at mid-to high elevations (breeding season only)	CONF	LR	No / 4
Bird	<i>Regulus satrapa</i>	Golden-crowned Kinglet	Mixed pine / hardwood forests at mid-to high elevations (breeding season only)	CONF	LR	No / 4
Bird	<i>Shyrapicus varius appalachiensis</i>	Appalachian Yellow-bellied Sapsucker	Mature, open hardwoods with scattered dead trees [breeding season only]	NNF	FC	No/ 2
Bird	<i>Sitta canadensis</i>	Red-breasted Nuthatch	Mixed conifer and hardwood forest and woodland (breeding season only)	CONF	LR	No/ 2

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING	ANALYZED / REASON1
Bird	<i>Troglodytes troglodytes</i>	Winter Wren	Mixed conifer and hardwood forest and woodland at mid to high elevations (breeding season only)	CONF	LR	No / 4
Bird	<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Old fields, woodlands and hardwood successional forests (breeding season only)	CONF	LR	No / 4
Bird	<i>Vermivora pinus</i>	Blue-winged Warbler	Low elevation brushy fields and thickets	NNF	FC	No / 4
Bird	<i>Vireo gilvus</i>	Warbling Vireo	Scattered hardwoods in open country [breeding season only]	NNF	FC	No / 4
Bird	<i>Wilsonia canadensis</i>	Canada Warbler	Shrub thickets in riparian areas, second growth deciduous hardwoods (breeding season only)	CONF	LR	No / 4
Butterfly	<i>Autochton cellus</i>	Golden-banded Skipper	Moist woods near streams; host plant-hog peanut ( <i>Amphicarpa bracteata</i> )	NNF	LR	No/ 2
Butterfly	<i>Chlosyne gorgone</i>	Gorgone Checkerspot	Woodland Openings and borders	NNF	FC	No / 4
Butterfly	<i>Celastrina niger</i>	Dusky Azure	Rich, moist deciduous forests; host plant-goat's beard ( <i>Aruncus dioicus</i> )	NNF	FC	No/ 2
Butterfly	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	Bogs, marshes, wet meadows, rarely upland habitat, host plants turtle hrad ( <i>Chelone</i> ) and false foxglove ( <i>Aureolaria</i> )	NNF	FC	No / 4
Butterfly	<i>Papilio cressphontes</i>	Giant Swallowtail	Primarily coastal in maritime forests or thickets	NNF	FC	No / 4
Butterfly	<i>Phyciodes batesii maconensis</i>	Tawny Crescent	Rocky ridges, woodland openings, at higher elevations; host plants- Asters, mainly <i>Aster undulatus</i>	NNF	FC	No / 4
Butterfly	<i>Polygonia progne</i>	Gray comma	Rich deciduous woods	NNF	FC	No / 3
Butterfly	<i>Satryium edwardsii</i>	Edward's Hairstreak	Xeric oak woods , host plants oaks	NNF	FC	No / 4
Butterfly	<i>Erora laeta</i>	Early Hairstreak	Deciduous forests, especially along roads or edges at high elevations	NNF	FC	No / 4
Fly	<i>Eulonchus marialiciae</i>	Mary Alice's Small-headed Fly	High-elevation hardwood – hemlock forests	NNF	FC	No / 4
Grasshopper	<i>Melanoplus cherokee</i>	Cherokee Melanoplus	Woodlands, 1800-5100 feet	NNF	FC	No / 4
Grasshopper	<i>Melanoplus viridipes eurycerus</i>	Green-legged Melanoplus	Woodlands and forest edges	NNF	FC	No / 4
Grasshopper	<i>Melanoplus acrophilus acrophilus</i>	A short-winged Melanoplus	Shrubby areas, 3600-5000 feet elevation	NNF	FC	No / 4
Mammal	<i>Condylura cristata</i>	Star – nosed mole	Forested wetlands, bogs/fens and swamps	CONF	LR	No / 4
Mammal	<i>Mustela nivalis</i>	Least Weasel	Mixed hardwood pine grassy upland and riparian woodland, grassland	CONF	LR	No / 4
Mammal	<i>Neotoma floridana</i>	Eastern Woodrat – Southern Appalachian	Rocky places in deciduous or mixed forests	CONF	LR	No/ 2

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING	ANALYZED / REASON1
	<i>haematoreia</i>	Pop.				
Mammal	<i>Neotoma magister</i>	Allegheny woodrat	Rocky places and abandoned buildings in deciduous or mixed forests in the northern mountains and adjacent Piedmont.	NNF	FC	No / 3
Mammal	<i>Sorex dispar</i>	Long-tailed Shrew	High elevation forests with talus or rocky slopes	CONF NNF	LR FC	No / 4
Mammal	<i>Sylvilagus obscurus</i>	Appalachian cottontail	High elevation balds and shrub thickets	CONF	LR	No / 4
Mammal	<i>Tamiasciurus hudsonicus</i>	Red Squirrel	Mixed conifer and hardwood forest and riparian areas	CONF	LR	No / 2
Moth	<i>Hepialus sciophanes</i>	a ghost moth	Spruce-fir forests	NNF	FC	No / 4
Moth	<i>Itame subcessaria</i>	Barred Itame	High elevation forests with gooseberries	NNF	FC	No / 4
Reptile	<i>Eumeces anthracinus</i>	Coal Skink	Rocky slopes, wooded hillsides and road banks	CONF	LR	No / 2
Reptile	<i>Pituophis m. melanoleucus</i>	Northern Pine Snake	Dry and/or sandy pine/oak uplands	CONF	LR	No / 4
Reptile	<i>Sternotherus minor</i>	Loggerhead Musk Turtle	Streams and rivers in Mississippi drainage	NNF	FC	No / 3
Spider	<i>Nesticus species nova 1</i>	A nesticid spider	Talus fields, known only from a five mile radius on the northern end of Chunky Gal Mountain	NNF	FC	No / 3
Spider	<i>Nesticus species nova 2</i>	A nesticid spider	Rocky talus fields along the Chattooga WSR and rock crevices of Whiteside Mountain	NNF	FC	No / 4
Terrestrial Gastropod	<i>Glyphyalinia junaluskana</i>	Dark Glyph	Moist leaf litter in deciduous woods on mountainsides	NNF	FC	No / 2
Terrestrial Gastropod	<i>Glyphyalinia pentadelphia</i>	Pink Glyph	Pockets of moist leaves in upland woods	NNF	FC	No / 2
Terrestrial Gastropod	<i>Haplotrema kendeighi</i>	Blue-footed Lancetooth	Mountainsides in leaf litter, usually above 2000 feet elevation	NNF	FC	No / 2
Terrestrial Gastropod	<i>Helicodiscus bonamicus</i>	Spiral Coil	Leaf litter on wooded hillsides	NNF	FC	No / 3
Terrestrial Gastropod	<i>Helicodiscus fimbriatus</i>	Fringed Coil	Leaf litter and under rocks on wooded hillsides	NNF	FC	No / 3
Terrestrial Gastropod	<i>Appalachina chilhoweensis</i>	Queen Crater	Under leaf litter or in rock piles	NNF	FC	No / 3
Terrestrial Gastropod	<i>Patera clarki</i>	Dwarf Proud Globe	Under leaf litter on wooded mountainsides	NNF	FC	No / 2
Terrestrial Gastropod	<i>Inflectarius ferrissi</i>	Smoky Mountain Covert	Under rock ledges, in rock piles, under downed logs at elevations above 2000 feet; Great Smokey Mountains and Plott Balsams	NNF	FC	No / 3
Terrestrial Gastropod	<i>Fumonlelix orestes</i>	Engraved Covert	In crevices in rock ledges; high elevations in the Plott Balsam Mountains	NNF	FC	No / 3
Terrestrial Gastropod	<i>Paravitrea lacteodens</i>	Ramp Cove Supercoil	Habitat unknown-probably leaf litter on mountainsides	NNF	FC	No / 3
Terrestrial Gastropod	<i>Paravitrea lamellidens</i>	Lamellate Supercoil	Pockets of deep, moist leaf litter on wooded hillsides or in ravines	NNF	FC	No / 2

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING	ANALYZED / REASON1
Terrestrial Gastropod	<i>Paravitrea umbilicatus</i>	Open Supercoil	Pockets of deep, moist leaf litter on wooded hillsides or in ravines	NNF	FC	No / 2
Terrestrial Gastropod	<i>Zonitoides patuloides</i>	Appalachian Gloss	Pockets of deep, moist leaves on mountainsides and in ravines	NNF	FC	No / 2

1 = suitable habitat for the species occurs in the analysis area and this species could potentially be impacted by one or more alternatives in this analysis; therefore, species is analyzed in project – level effects analysis;

2 = Dropped - = suitable habitat for the species occurs in the analysis area, but this proposal does not include management actions which would affect this species;

3 = Dropped – the analysis area is outside of the known or suspected range of the species (only includes nesting range for birds); therefore, species is dropped from further analysis;

4 = Dropped – Within range, but no suitable habitat in the analysis area; therefore, species is dropped from further analysis; and

5 = Dropped – the best available science indicates this species is extirpated.

From this list, 78 species were immediately dropped from further consideration due to the following criteria:

1. Unsuitable habitat for the species occurring in the analysis area;
2. The analysis area being outside the known or suspected range of the species;
- or
3. The species being considered extirpated.

An additional 21 PETS and/or locally rare wildlife species, although either being known or having potential to occur in project area, were dropped from consideration because the project activities would have no effect on the species or its habitat. Examples include species that occur in rock outcrops or old large hollow trees, both of which represent habitats that would not be affected by alternatives 1 or 2. Five species (bald eagle, Indiana bat, northern long-eared bat, Rafinesque's big-eared bat and Eastern small-footed bat) were identified as having potential to occur within the project area, and could be potentially affected by Alternative 2 for this project (Table 3.2.2B-4). These two species will be further analyzed in the effects analysis section of this document. No locally rare species are considered in this list and therefore, will not be evaluated further in this EA.

**Table 3.2.2B-4. CONF, NNF and SNF Proposed, Endangered and Sensitive Species which have Potential to Occur in the Project Area and could Potentially be Impacted by the Alternatives.**

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING
Mammal	<i>Myotis sodalis</i>	Indiana Bat	Roots in hollow trees or under loose bark (warmer months), in caves (winter).	NNF CONF	Endangered
Mammal	<i>Myotis septentrionalis</i>	Northern Long-eared Bat	Roosts under loose bark, crevices or hollow trees	NNF CONF SNF	Proposed
Mammal	<i>Myotis leibii</i>	Eastern Small-footed Bat	Hollow trees, rock outcrops, bridges (warmer months), in caves and mines (winter months)	NNF CONF SNF	Sensitive
Mammal	<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	Old buildings, hollow trees, caves, mines, and beneath bridges, usually near water	NNF CONF SNF	Sensitive

TYPE	SCIENTIFIC NAME	COMMON NAME	HABITAT/RANGE	FOREST	LISTING
Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Open bodies of water, such as rivers and lakes, and adjacent forested habitats	NNF CONF SNF	Sensitive

a. Indiana Bat, *Myotis sodalis*

The range of Indiana bat includes much of the Midwest, portions of New England, the Southeast and the south-central states, with accidental/non-regular occurrences outside this range. The majority of the population hibernates at relatively few sites, including several caves and one mine in Missouri, southern Indiana and Kentucky. About 85% of the total population hibernates in nine Priority 1 caves (NatureServe, 2013). There are several extant hibernacula in western North Carolina, eastern Tennessee and northern Alabama (USFWS, 2007). In Georgia, there are historic hibernacula records for Indiana bats in two Dade County caves. However they were last documented there in the fall and winter of 1966 (Trina Morris, GADNR, pers. comm.).

Most of the known maternity sites have been located in forested tracts in agriculturally dominated landscapes (e.g., Missouri, Iowa, Indiana, Illinois) but maternity colonies also exist to the south in heavily forested regions to at least eastern Tennessee and western North Carolina (NatureServe, 2013). Until recently, Indiana bats were thought to be absent south of Tennessee in summer. However in early April 2012, a radio-tagged female Indiana bat was tracked from a cave in White County, Tennessee to the Rich Mountain Wildlife Management Area in Gilmer County, Georgia. The site is located on state lands, approximately two miles south of the CONF boundary. This bat was monitored daily for approximately 10 days until the transmitter battery failed. During this period, she roosted in multiple pine snags in a pine beetle killed area. In addition, another 13 bats were observed using one of these roost trees. Given this, it is assumed that this represents the first Indiana bat maternity colony in Georgia (Trina Morris, GADNR, pers. comm.) Based on this new maternity colony record as well as hibernacula and maternity records from the adjoining states, the entire CONF is considered to be within the potential range of the Indiana bat (Trina Morris, GADNR, pers. comm with Pete Pattavina, USFWS). Additional mist net surveys at the new Georgia site in June, July and August 2012 failed to capture any additional Indiana bats. A number of mist netting surveys also were conducted throughout north Georgia in the summer of 2013 by Georgia DOT contractors and personnel from the USFWS, GADNR, and U.S. Forest Service. No Indiana bats were captured during these surveys. There are currently no known roost locations within the project area and within the entire northeast part of Georgia.

Maternity sites generally are found behind loose bark of dead or dying trees or in tree cavities. In the Southern Appalachian region, maternity colonies are often located in sun-exposed conifer snags (Britzke et al. 2003). Females establish primary maternity roosts under the sloughing bark of dead yellow and white pines and Eastern hemlock. In the southern portion of its range, both males and females of this species prefer yellow pine snags (with loose bark patches) for roosting (Joy O'Keefe, Indiana State University and Susan Loeb, Southern Research Station, U.S. Forest Service, personal communication).



Single bats may use a variety of tree species for roosts, as long as there is available sloughing bark or crevices on those trees (NatureServe, 2013).

The forests of North Georgia represent the southern edge of the range of Indiana bats, and summer roosting/possible maternity habitat in this region differs from summer habitat in the core of the range. Preferences for open-canopied, patchy stands with yellow pine snags have been documented within this region. The typical roost tree is a large yellow pine snag on a southern aspect, with an open canopy above the roost location, at an advanced stage of decay (most bark already gone) (Joy O'Keefe, unpublished information). Contiguous forested habitat and snags are plentiful within the project area, but stand densities are typically high and closed-canopied, and yellow pine snags and the availability of native yellow pine species other than Virginia pine is somewhat limited due to fire suppression and other past land use practices. However, due to the recent range expansion for this species into Georgia, and given the likelihood that potential roost trees may be impacted by the project, this species will be carried through the effects analysis for this project.

b. Northern Long-eared Bat, *Myotis septentrionalis*

The northern long-eared bat was proposed for listing as endangered in October 2013 (USFWS, 2013). White-nose syndrome (WNS) was identified as the primary threat to this species and has led to dramatic and rapid declines in northern long-eared bats of up to 99 percent of pre-WNS levels in some areas.

The northern long-eared bat ranges across much of the eastern and north central United States, and all Canadian Provinces west to the southern Yukon Territory and eastern British Columbia (USFWS, 2013). In the United States, the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to the Florida panhandle. More than 780 winter hibernacula have been identified including two in northwestern Georgia and one in northeast Georgia (Trina Morris, pers. comm.) as well as North Carolina (n=20), South Carolina (n=2) and Tennessee (n=11). Numerous summer records for this species exist on the CONF including 51 records from mist-net surveys conducted in 2001-2002 and 2006-2007. A number of mist netting surveys also were conducted throughout north Georgia in the summer of 2013 by Georgia DOT contractors and personnel from the USFWS, GADNR, and the U.S. Forest Service. More than 50 northern long-eared bats were captured during these 2013 surveys, including several from net sites on the Forest (Trina Morris, Dottie Brown pers. comm.).

During summer, northern long-eared bats typically roost singly or in colonies underneath bark or in cavities or in crevices of both live trees and snags (USFWS, 2013). The northern long-eared bat appears to be somewhat opportunistic in tree roost selection, selecting varying roosts and types of roosts throughout its range. Northern long-eared bats also have been observed roosting in human-made structures.

Although there are some minor differences, summer roost preferences of northern long-eared bats appear to be similar to those of the Indiana bat (Jeffery 2013, USFWS, 2014). Northern long-eared bats appear to be somewhat more flexible than Indiana bats tending to

select hardwoods for roosts more often than Indiana bats and displaying a wider variability in roost tree diameters (>three-inch diameter). Northern long-eared bats also appear to select roost sites with somewhat more canopy cover than Indiana bats (USFWS,2014). However, both selected relatively large diameter roost trees, generally on the upper portions of south-facing slopes. Both species showed a preference for roosts with relatively low canopy coverage which allows for greater solar exposure.

c. Eastern Small-footed Bat, *Myotis leibii*

This species is one of the smallest North American bats. At the southern terminus of its range on the Andrew Pickens Ranger District, this species was detected near Lake Cherokee and over the Chattooga WSR near Highway 28. In winter, eastern small-footed myotis roost in caves, rock shelters and fissures in cliffs. During migration and summer, little is known about the species' roosting habits, although there are reports of the species using abandoned buildings, bridges and rock shelters. There are five occurrence records for this species within the "Georgia side" of the Chattooga WSR Watershed.

d. Rafinesque's Big-eared Bat, *Corynorhinus rafinesquii*

This species is one of the least known bats of the southeastern United States. Its colonial roosts can contain more than 100 individuals. These bats use a wide variety of roost sites: caves, old mine shafts, hollow trees, areas behind loose bark, abandoned buildings and under bridges. They leave their roosts only when it is completely dark, forage for insects and return to the roosts before sunrise. Rafinesque's big-eared bat hibernates in the winter months, but may be active during warm spells in the southern portions of its range. Eight individuals have been detected on the Andrew Pickens Ranger District, as well as one individual on the Chattooga River Ranger District. While none are known to occur directly within the project area, potential habitat exists.

e. Bald Eagle, *Haliaeetus leucocephalus*

This species nests in tall, usually living trees near an open body of water. This species mostly forage 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 Chattooga River, and Andrew Pickens Ranger Districts, but there are documented nests on the Nantahala Ranger District; however, the Chattooga, Chauga Rivers and several large water bodies (e.g., Lake Cherokee, Lake Cheohee and Chattooga Lake) provide suitable foraging habitat for this species, and the project area may provide potential nest and roost sites.

## 2. Management Indicator Species (MIS)

The CONF, NNF and SNF have a combined total of 20 terrestrial MIS. These species and their important habitat components are listed in Table 3.2.2B-5. Of these species, only those that are indicators of important habitat components that might be directly or indirectly affected by two alternatives will be analyzed in detail. Specifically, only those MIS that are indicators of the following important habitat components will be analyzed further in this analysis:

1. Large contiguous forest interior;
2. Hard mast forest;
3. Pine/pine-oak forest;
4. Mid- to late-successional riparian forests;
5. Mid- to late-successional mesic forests; and
6. Standing dead trees (snags).

Those species that will not be included in this analysis are dropped because their important habitat components do not occur in amounts or arrangements suitable for supporting a viable population of the species and/or simply because their important habitat components would not be affected by the alternatives.

**Table 3.1.2B-5. CONF, NNF, and SNF Management Indicator Species (MIS) List and Project-level Analysis Information.**

Type	Common Name	Important Habitat Component	Forest	Project Level Analysis / Reason*
Mammal	Black Bear	Hardmast Forest, Early Successional Forest, Large Contiguous Forest Interior with Low Disturbance	CONF NNF SNF	Yes / 1
Mammal	White-tailed Deer	Hardmast Forest, Early Successional Forest	CONF NNF	Yes / 1
Bird	Pileated Woodpecker	Standing Dead Trees (Snags)	CONF NNF SNF	Yes / 1
Bird	Ovenbird	Large Contiguous Deciduous Forest Interior	CONF NNF	Yes / 1
Bird	Eastern Towhee	Early Successional Forest	NNF	No / 2
Bird	Pine Warbler	Pine / Pine – Oak Forest	CONF NNF SNF	Yes / 1
Bird	Ruffed Grouse	Early Successional Forest	NNF	No / 2
Bird	Acadian Flycatcher	Mid – Late Successional Riparian Forests	CONF NNF SNF	Yes / 1
Bird	Hooded Warbler	Mid – Late Successional Mesic Forests	CONF SNF	Yes / 1
Bird	Scarlet Tanager	Hardmast Forest	CONF SNF	Yes / 1
Bird	Brown-headed Nuthatch	Pine Woodlands	SNF	No / 2
Bird	Prairie Warbler	Early Successional Forest	CONF SNF	No / 2
Bird	Swainson's Warbler	Early Successional Riparian Forest	CONF SNF	Yes / 1
Bird	Field Sparrow	Woodland, Savanna and Grassland Habitat	CONF SNF	No / 2
Bird	American Woodcock	Early Successional Riparian Forest	SNF	No / 2
Bird	Bobwhite Quail	Early Successional Forest, Woodland, Savanna and Grassland Habitat	SNF	No / 2
Bird	Eastern Wild Turkey	General Forest Habitat	SNF	Yes / 1
Bird	Red-cockaded Woodpecker	Longleaf Pine Woodland / Savanna	CONF	No / 2
Bird	Wood Thrush	Forest Interior	CONF	Yes / 1
Bird	Chestnut-sided Warbler	High Elevation Early Successional Forest	CONF	No / 2

\* Listed below are the reasons why a particular MIS is or is not considered in the analysis.

1 = Species has important habitat components in the project area which may be affected by one or more of the proposed alternatives.

2 = Species does not have important habitat components in the project area which may be affected by one or more of the proposed alternatives.

a. Black Bear

Black bear is used as an MIS on all three national forests within this analysis area. This species was selected as an MIS to help indicate the effects of management in meeting public demand as a hunted species. In the Southern Appalachians, important habitat elements for black bears are habitat diversity, den site availability, availability of hard mast and habitat remoteness. Black bear populations in the Southern Appalachians have been increasing steadily for the past 25 years and are currently described as “stable to slightly increasing” for the three states included in this analysis.

b. White-tailed Deer

White-tailed deer is used as an MIS on the NNF and CONF. This species was selected as an MIS to help indicate the effects of management in meeting public demand as a hunted species. White-tailed deer require a mixture of habitats in various successional stages. Key requirements include the interspersed of mature, mast-producing stands during fall and winter; early successional forest to provide browse and soft mast; and high quality permanent openings. Currently, deer populations on the CONF, NNF and SNF are considered stable.

c. Pileated Woodpecker

The pileated woodpecker is used as an MIS on all three national forests to help indicate the effectiveness of management in maintaining desired conditions relative to abundance of standing dead trees (snags). Typical habitat consists of extensive areas of late successional coniferous or deciduous forest. However, young forests that retain scattered, large, dead trees also provide suitable habitat. Forest management activities that favor this species include maintaining older forests and retaining dead trees, hollow trees, and older live trees to replace existing snags over time. Trend estimates indicate that populations of pileated woodpecker are stable across the southeastern United States; however, from 1992-2004 this species has decreased annually 2.3%, 0.5% and 1.2% on the NNF, CONF and SNF, respectively (La Sorte et al., 2007).

d. Ovenbird

The ovenbird is used as an MIS on the NNF and CONF to help indicate the effects of management on species associated with mature interior forest habitats. The ovenbird requires large, contiguous, mature forests for successful breeding. It is commonly found in mature mesic deciduous forests. Typical forested communities where ovenbirds breed include oak-hickory and oak-pine forests. Overall, the US Geological Survey (USGS) Breeding Bird Survey indicates a stable to slightly increasing trend for this species from 1966 to 2004 (Sauer et al., 2014); however, between 1992-2004 this species has decreased annually 0.6%, 0.1%, and 1.0% on the NNF, CONF and SNF, respectively (La Sorte et al., 2007).

e. Pine Warbler

The pine warbler is used as an MIS on all three national forests included in this analysis. This species is used to help indicate the effects of management on species associated with yellow pine and pine-oak forests. Pine warbler uses a variety of upland pine and pine-hardwood forest types throughout its range, and nests in deciduous forest with scattered individual or small groves of pines. The USGS Breeding Bird Survey indicates a positive trend for this species (Sauer et al., 2014). During 1992-2004, the population of this species increased annually on the NNF (2.8%) and on the CONF (0.4%). On the SNF, pine warbler populations have decreased 0.2% annually during the same period of time (La Sorte et al., 2007).

f. Acadian Flycatcher

The Acadian flycatcher is used as an MIS on all three national forests to help indicate the effects of management on species associated with mid- to late-successional riparian forest conditions. Breeding habitat for this species is mature mesic deciduous forests, often near streams. Habitat management includes maintaining relatively undisturbed, mature, deciduous forests in riparian areas and coves within larger blocks of mature forest. The USGS Breeding Bird Survey indicates a relatively stable trend for this species (Sauer et al., 2014). During 1992-2004, the population of Acadian flycatcher has increased annually on the NNF (11.8%) and on the CONF (3.2%). On the SNF, pine warbler populations have decreased 1.2% annually during the same period of time (La Sorte et al., 2007).

g. Hooded Warbler

The hooded warbler is used as an MIS on the CONF and SNF to help indicate the effects of management on mature mesic hardwood forests, with special focus on the presence of canopy gaps and structural diversity. This species favors moist deciduous forests with a fairly dense understory. Nesting locations are restricted to large forest patches. It typically inhabits mature forests where large trees fall to create canopy gaps. Management for hooded warbler may entail creating canopy gaps where they are absent and maintaining a shrub layer. The USGS Breeding Bird Survey indicates a stable trend for this species (Sauer et al., 2014). During 1992-2004, hooded warbler experienced a dramatic decline in the number of observations per count on the NNF (18.5% annual decline). During the same period of time, this species increased on the CONF by 8.4% annually and decreased on the SNF by 6.8% annually (La Sorte et al., 2007).

h. Scarlet Tanager

The scarlet tanager is used as an MIS on the CONF and SNF to help indicate the effects of management on species associated with mature upland oak communities. The scarlet tanager inhabits large blocks of mature forest, especially where oaks are common, but also may occur in young successional woodlands. Management emphasis for this species centers on maintaining large forest tracts and creating open canopies or canopy gaps. The USGS Breeding Bird Survey indicates a stable trend for this species (Sauer et al., 2014).

During 1992-2004, populations of scarlet tanager increased at a rate of 5.0% per year on the CONF. On the NNF and SNF, this species experienced declines of 4.8% annually and 1.0% annually, respectively (La Sorte et al., 2007).

i. Swainson's Warbler

The Swainson's warbler is used as an MIS on the CONF and SNF to help indicate the effects of management on species in canebrakes and other early-successional riparian habitats. The Swainson's warbler occurs in rhododendron or mountain laurel tangles, generally in ravines in hardwood and mixed forests. Habitat management includes maintaining relatively undisturbed, mature, deciduous forests in riparian areas and coves within larger blocks of mature forest. During 1992-2004, populations of Swainson's warbler increased annually on the NNF and SNF at a rate of 11.9% and 8.2%, respectively; no data are available for the CONF (La Sorte et al. 2007).

j. Eastern Wild Turkey

The Eastern wild turkey is used as an MIS on the SNF because it is a game species in high demand and because of its association with both open, fire-maintained habitat and mature hardwood forests. In the south, wild turkey use upland forests of oaks, hickories and pines, as well as bottomland forest habitats, which include beech, gum, bald cypress, tupelo and water ash. Habitat management centers on maintaining mature bottomland hardwood forest, open upland forest maintained with fire, and scattered openings dominated by herbaceous cover. Populations of wild turkey suffered dramatic declines in the early 1900s. Aggressive stocking programs successfully reintroduced this species to most of its eastern range where populations continue to increase.

k. Wood Thrush

The wood thrush is used as an MIS on the CONF to help indicate the effects of management on species that depend on forest interior habitat conditions. This species uses deciduous or mixed forests with a fairly well developed deciduous understory, especially where moist. The USGS Breeding Bird Survey indicates that during 1966-2012, wood thrush has experienced a 1.6% annual decline within the Appalachian Mountain Region (Sauer et al., 2014).

3. Migratory Birds

The U.S. 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 land management activities.

The Chattooga River, Nantahala and Andrew Pickens ranger districts occur within the physiographic region known as the Blue Ridge Province in the Southern Appalachian

Mountain region. 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) Priority Bird List for BCR 28;
2. USFWS Birds of Conservation Concern for BCR 28; and
3. *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 alternatives.

**Table 3.2.2B-6. Priority Migratory Birds Associated with this Analysis and Relevant Areas of the Chattooga River, Nantahala and Andrew Pickens Ranger Districts.**

Species	Habitat Association	Source
<b>Acadian Flycatcher</b> , <i>Empidonax vireescens</i>	Deciduous Forest	PIF <sup>6</sup>
<b>Bald Eagle</b> , <i>Haliaeetus leucocephalus</i>	Mixed Forest	USFWS <sup>7</sup>
<b>Carolina Wren</b> , <i>Thryothorus ludovicianus</i>	Deciduous Forest	PIF
<b>Cerulean Warbler</b> , <i>Dendroica cerulea</i>	Deciduous Forest	PIF, USFWS
<b>Chuck-will's-widow</b> , <i>Caprimulgus carolinensis</i>	Mixed Forest	PIF
<b>Hooded Warbler</b> , <i>Wilsonia citrina</i>	Deciduous Forest	PIF
<b>Kentucky Warbler</b> , <i>Oporornis formosus</i>	Deciduous Forest	PIF, USFWS
<b>Louisiana Waterthrush</b> , <i>Seiurus motacilla</i>	Deciduous Forest	PIF, USFWS
<b>Pine Warbler</b> , <i>Dendroica pinus</i>	Mixed Forest	PIF
<b>Red-bellied Woodpecker</b> , <i>Melanerpes carolinus</i>	Deciduous Forest	PIF
<b>Red-headed Woodpecker</b> , <i>Melanerpes erythrocephalus</i>	Mixed Forest	PIF, USFWS
<b>Red-shouldered Hawk</b> , <i>Buteo lineatus</i>	Deciduous Forest	PIF
<b>Swainson's Warbler</b> , <i>Limnithlypis swainsonii</i>	Deciduous Forest	PIF, USFWS
<b>Whip-poor-will</b> , <i>Caprimulgus vociferus</i>	Deciduous Forest	USFWS
<b>Wood Thrush</b> , <i>Hylocichla mustelina</i>	Deciduous Forest	PIF, USFWS
<b>Worm-eating Warbler</b> , <i>Helminthos vermivorus</i>	Deciduous Forest	PIF, USFWS
<b>Yellow-throated Vireo</b> , <i>Vireo flavifrons</i>	Deciduous Forest	PIF
<b>Yellow-throated Warbler</b> , <i>Dendroica dominica</i>	Deciduous Forest	PIF

All other migratory bird species that occur in BCR 28 were excluded from analysis because they were not identified as PIF priority species 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.

<sup>6</sup> Partners in Flight Species of Continental Importance in the Eastern Avifaunal Biome  
([http://www.partnersinflight.org/cont\\_plan/PIF3\\_Part2WEB.pdf](http://www.partnersinflight.org/cont_plan/PIF3_Part2WEB.pdf))

<sup>7</sup> USFWS Birds of Conservation Concern for BCR 28  
(<http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf>)



## 1. PETS and Locally Rare Species

Indiana bat, Northern long-eared bat, Eastern small-footed bat, Rafinesque's big-eared bat and bald eagle

The following text discloses the environmental consequences for the five species which have potential to occur within the project area, and could be impacted by alternatives 1 or 2.

### A. Alternative 1 - Direct and Indirect Effects

Alternative 1 would not include any tree cutting or manipulation of habitat. Therefore, this alternative would have no direct or indirect effect on these species. There would be the potential for disturbance to some of the species from current recreational uses but species would be able to utilize the large amount of habitat available. Under this alternative, current management plans (including the 2012 Forest Plans) would continue to guide management in the project area. The natural resources and ecological processes within the project area would continue at the existing level of human influence. The characteristics of the forest environment would be affected primarily by natural disturbances such as insects, disease and weather.

### B. Alternative 1 - Cumulative Effects

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. Projects aimed at improving forest health and restoring/maintaining diverse ecosystems would benefit Indiana bat, Northern long-eared bat, Eastern small-footed bat, Rafinesque's big-eared bat and bald eagles by enhancing habitat components such as but not limited to providing open canopy and early successional stands and foraging areas. However, there are no cumulative effects to these species since projects listed in Table 3.1-1 do not overlap with this alternative.

### C. Alternative 2 - Direct and Indirect Effects

Indiana bat, Northern long-eared bat, Eastern small-footed bat and Rafinesque's big-eared bat: It is estimated that less than half an acre would be impacted by trail construction activities and less than two acres would be impacted by reconstruction and maintenance activities. Some hazard trees and larger trees would be cut but is expected to be extremely low. Although only a minimal amount of trees would be cut as a result of this project, cutting of any trees which could serve as potential roost sites/maternity sites during the summer months could adversely affect this species. Tree cutting would most likely take place during the hibernation season for bats. The hibernation season for the CONF and SNF is December 1<sup>st</sup> through March 15<sup>th</sup> and for the NNF it is October 15<sup>th</sup> through April 15<sup>th</sup>. This would eliminate any direct impacts to bat species. However, bat habitat suitability would be assessed by a wildlife biologist if trees are cut during the active season for bats. Consultation would take place between the Forest Service, USFWS and appropriate state agencies if federally listed bats are observed using trees to be cut. This would avoid direct impacts to bat species. It is

unlikely that there would be measureable indirect effects to bat habitat given the amount of forest habitat associated with the five access sites, the high density of yellow pine snags as well as other suitable roost trees within the project area.

Bald Eagle: This species is highly mobile and any disturbance associated with trail construction, reconstruction or maintenance and from recreational use (boaters, hikers, backpackers, anglers, campers, etc.) might cause a temporary displacement of individuals to undisturbed areas. In addition, the small scale of the proposal and the low number of recreational users and associated activities are not expected to impact any habitat for this species. There would be no measureable indirect impacts to this species given the large amount of available habitat surrounding the access sites and the limited number of trees to be cut.

#### **D. Alternative 2 - Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat.

Indiana Bat, Northern Long-eared Bat, Eastern Small-footed Bat and Rafinesque's Big-eared Bat, Bald Eagles: Projects aimed at improving forest health and restoring/maintaining diverse ecosystems would benefit Indiana bat, Northern long-eared bat, Eastern small-footed bat, Rafinesque's big-eared bat and bald eagles by enhancing habitat components providing open canopy and early successional stands and foraging areas. Currently, suitable roost trees and other habitat features are widely abundant throughout the project area and the watershed. The amount of suitable roost trees would likely increase as the forests continue to become older. However, there are no cumulative effects to these species since projects listed in Table 3.1-1 do not overlap with this alternative.

### **2. MIS**

#### **A. Alternative 1 - Direct and Indirect Effects**

Alternative 1 would not impact MIS habitat since no habitat is being altered or created. There would be the potential for disturbance to some of the species from current recreational uses but species would be able to utilize the large amount of habitat available. Under this alternative, current management plans (including the 2012 Forest Plans) would continue to guide management in the project area. Effects to individual MIS and habitats are expected to be the same as was analyzed in the 2012 EA. The natural resources and ecological processes within the project area would continue at the existing level of human influence. The characteristics of the forest environment would be affected primarily by natural disturbances such as insects, disease and weather.

## **B. Alternative 1 - Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. This alternative would not have any measureable cumulative impact on species given the current access sites do not overlap with any other activities taking place in the drainage.

## **C. Alternative 2 - Direct and Indirect Effects**

### **a. Black Bear**

Direct effects on black bear are not expected to occur with the implementation of Alternative 2. Trail construction, reconstruction and maintenance activities and the use of the trails by the public may disturb this species; however, black bear would relocate to undisturbed areas. Disturbance associated with project activities during construction, reconstruction and maintenance of trails could potentially disrupt black bear reproduction. Breeding occurs in summer and peaks between June-July, a timeframe which coincides with potential project activities. However, with home ranges of Appalachian black bears estimated at 7-51 km<sup>2</sup> in Tennessee (van Manen, 1994) and 27-112 km<sup>2</sup> in Virginia (Hellgren and Vaughan, 1989), the likelihood of this project having a direct effect on black bear reproduction is low.

Habitat remoteness is an important element of black bear habitat that might be affected by Alternative 2. Human disturbance restricts available habitat and limits additional range expansion of black bear (Pelton 2001, Jones 2005). Although black bear are occasionally disturbed by hikers or anglers within the upper segment of the Chattooga WSR corridor, this area and the surrounding watershed generally provides optimal “remoteness” for this species, especially when compared to other areas across the three national forests. Alternative 2 would likely diminish the habitat remoteness element because it would facilitate more public use within the upper segment of the Chattooga WSR corridor.

### **b. White-tailed Deer**

Direct effects on white-tailed deer are not expected to occur with the implementation of Alternative 2. Trail construction and maintenance activities and the use of the trails by the public may disturb this species; however, white-tailed deer would relocate to undisturbed areas.

White-tailed deer use a wide variety of habitats and are less susceptible to human disturbance than the other MIS. Trail construction, reconstruction and maintenance activities and the use of the trail by the public are not expected to have indirect effects on this species. Availability or quality of habitat is not expected to be affected by Alternative 2.

c. All Avian MIS

Direct effects are not expected for pileated woodpecker, ovenbird, pine warbler, Acadian flycatcher, hooded warbler, scarlet tanager, Swainson's warbler, Eastern wild turkey or wood thrush. These MIS are highly mobile avian species that would relocate to undisturbed areas if they were displaced by proposed activities. However, it is possible that if any of these species were nesting during trail construction, reconstruction or maintenance activities, nests and nestlings could be lost. These effects are considered minor since only a small portion of available habitat would be managed at any one time. In addition, trail construction and maintenance activities would have to occur at the exact time when species are most vulnerable and also occur over successive years to have substantial impacts. This is unlikely given past management practices. In addition, avian species will re-nest multiple times throughout the nesting season. Recreational activities are expected to have similar minor impacts.

While Eastern wild turkey use a wide variety of habitats and are less susceptible to human disturbance than the other avian MIS, pileated woodpecker, ovenbird, pine warbler, Acadian flycatcher, hooded warbler and scarlet tanager and wood thrush are considered species that require forest interior conditions (Hamel 1992). Forest interior species tend to avoid disturbance during the breeding season. Research suggests that forest road density can adversely affect the distribution and reproductive success of forest interior birds (Ortega and Capen 1999, Rich et al. 1994), but that small (<25 feet wide) forest roads and trails had no negative effects on reproductive success of forest song birds (King and DeGraaf, 2002). Therefore, trail construction and maintenance activities and the use of the trails by the public are not expected to adversely affect the availability of habitat for these MIS.

**D. Alternative 2 - Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. There would be no cumulative effects to habitat since no activities are proposed on the currently used access sites. The proposed action would not have any measureable cumulative impact on species given the project is limited in size and it does not overlap with any other activities taking place in the drainage.

3. Migratory Birds

**A. Alternative 1 - Direct and Indirect Effects**

Under this alternative, no additional designated trails or access points to the river would be created, reconstructed or maintained. Existing trails and access points would remain in their current locations.

Direct effects are effects on the species known or assumed to occur in the proposed project area. They occur at the same time and place as the project activity. Priority migratory birds would continue to use the thickets, forest edges, interior forests and stream-side habitats within the project area.

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. Habitat conditions for priority migratory birds would not be altered under Alternative 1. The existing trails or access points within the project area would continue to provide a diversity of habitats for these species.

#### **B. Alternative 1 - Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. There would be no cumulative effects to habitat since no activities are proposed at the currently used access sites. This alternative would not have any measureable cumulative impact on species given the current access sites do not overlap with any other activities taking place in the drainage.

#### **C. Alternative 2 - Direct and Indirect Effects**

It is possible if priority migratory bird species were nesting during the construction/reconstruction/maintenance of trails or access points, nests and nestlings could be lost, but unlikely due to the small area in Alternative 2 when compared to the large amount of forested habitat contained in the upper segment of the Chattooga River. If disturbed, avian species would likely re-nest multiple times throughout the nesting season, further reducing the threat of direct effects on reproductive success. Increased human presence on these trails or at these access points would not be expected to have a substantial direct effect to these species. These highly mobile species would simply relocate to undisturbed areas if they were displaced by proposed activities and recreation use in the areas.

The construction/reconstruction/maintenance of trails or access points to the Chattooga WSR would not result in a net decrease in habitat for priority migratory bird species. Alteration of priority migratory bird habitat resulting from Alternative 2 would be minor. Priority migratory birds would continue to use the thickets, forest edges, interior forest and stream-side habitats within the project area.

Habitats in the project area would not measurably change for the priority migratory birds given the small size of the affected area and the minimal work expected in trail construction, reconstruction and maintenance. The proposed actions would not substantially reduce the amount of habitat (estimated at less than two acres) available to these species. Likewise, human disturbance associated with increased public use would not likely decrease habitat suitability.

#### D. Alternative 2 - Cumulative Effects

According to Breeding Bird Survey data from 1966-2012, 9 of the 19 selected priority migratory bird species have experienced slight population declines in the Appalachian Mountain Region over the 46-year period surveyed which is in contrast to the trend survey-wide (Sauer 2014). Ten of the species have experienced population increases in the Appalachian Mountain Region over the same period which is in contrast to the trend survey-wide. Table 3.2.2B-7 lists the population trends for priority migratory bird species.

**Table 3.2.2B-7. Population Trends for Priority Migratory Birds Associated with Alternatives 1 and 2 and Relevant Areas of the Chattooga River, Nantahala and Andrew Pickens Ranger Districts.**

Species	Percent Annual Change	
	Appalachian Mountains Region, Trend 1966-2012	Trend Survey-wide 1966-2012
Acadian Flycatcher, <i>Empidonax vireescens</i>	-0.98	-0.41
Bald Eagle, <i>Haliaeetus luecocephalus</i>	12.32	5.27
Carolina Wren, <i>Thryothorus ludovicianus</i>	1.88	1.14
Cerulean Warbler, <i>Dendroica cerulea</i>	-3.02	-3.02
Chuck-will's-widow, <i>Caprimulgus carolinensis</i>	-3.92	-2.17
Hooded Warbler, <i>Wilsonia citrina</i>	2.37	1.54
Kentucky Warbler, <i>Oporornis formosus</i>	-1.81	-1.08
Louisiana Waterthrush, <i>Seiurus motacilla</i>	-0.29	0.36
Pine Warbler, <i>Dendroica pinus</i>	0.02	0.94
Red-bellied Woodpecker, <i>Melanerpes carolinus</i>	3.03	1.05
Red-headed Woodpecker, <i>Melanerpes erythrocephalus</i>	0.63	-2.59
Red-shouldered Hawk, <i>Buteo lineatus</i>	4.96	2.93
Swainson's Warbler, <i>Limnothlypis swainsonii</i>	-0.89	1.01
Whip-poor-will, <i>Caprimulgus vociferus</i>	-3.77	-2.85
Wood Thrush, <i>Hylocichla mustelina</i>	-1.63	-2.12
Worm-eating Warbler, <i>Helminthos vermivorus</i>	0.24	0.55
Yellow-throated Vireo, <i>Vireo flavifrons</i>	-0.24	1.04
Yellow-throated Warbler, <i>Dendroica dominica</i>	0.80	0.82

Even though much of the species are in decline, this can be attributed to a loss of wintering grounds. Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat. This alternative would not have any measureable cumulative impact on species given the current access sites do not overlap with any other activities taking place in the drainage.

#### **3.2.2C Botany**

The analysis of effects on vegetation from the alternatives is divided into two sections. The first section, Botany, addresses the effects of the alternatives on the botany components of the Biology

ORV (Southern Appalachian endemics, spray cliff and old growth communities). The second section, 3.5 Other Biological Resources: Vegetation, addresses three botanical categories:

1. PETS;
2. Ecological plant communities; and
3. Non-native invasive plant species (NNIS).

Some species that are addressed in section 3.2.2C are also addressed in the section 3.5 because they are species not only within the botany component of the Biology ORV, but also listed as PETS or are components of ecological plant communities or MIS.

## Affected Environment

The botany component of the Biology ORV is composed of the Southern Appalachian endemics, spray cliff communities and old growth forests.

### 1. Southern Appalachian Endemics

Several plant species were identified as part of the Biology ORV when the Chattooga WSR was designated. All the listed species were Southern Appalachian endemics that were rare at the time of designation. It is uncertain when the other plant species associated with the Biology ORV were first identified. The 1971 Study Report did not mention all the botanical species or groups that were mentioned later in the 1996 Chattooga WSR ORV assessment. Table 3.2.2C-1 lists the ten plant species, their range and habitats and whether they are included in the analysis.

Of the ten Southern Appalachian endemics known to occur within the CONF, NNF and SNF, Fraser's loosestrife, mountain camellia and liverworts are known to occur or have habitat within or adjacent to the proposed trail work or at the boater access sites along the Chattooga WSR (see Table 3.2.2C-1).

**Table 3.2.2C-1. Southern Appalachian Endemics that occur within the Chattooga WSR Watershed and Project-level Analysis.**

Species	Forest	Range and Habitat	Analyzed?/Rationale
Biltmore Sedge <i>Carex biltmoreana</i>	NNF SNF	Narrow Southern Appalachian endemic ranging within a 100-kilometer area from Brevard, NC to northwestern SC and northeastern GA. Habitat is restricted to rock outcrops either in woodlands or high elevation granitic dome.	NO / 3
Blue Ridge Bindweed <i>Calystegia catesbeiana</i> var. <i>sericata</i>	CONF NNF SNF	Carolinas and GA to the FL panhandle. Habitats are all early seral from meadows, openings in oak-hickory forest, roadside edges to open rock outcrops.	NO / 2
Divided Leaf Ragwort <i>Packera millefolium</i>	CONF NNF	Southern Appalachian endemic (NC, SC, and GA). Occurs in high elevation granitic dome and montane cedar woodland.	NO / 3
Fraser's Loosestrife <i>Lysimachia fraseri</i>	CONF NNF SNF	Mountains of NC, SC and TN. Habitats include acidic cove forest, oak-hickory forest, wet rock outcrops, and river rocky shoals and islands.	YES / 1
Liverworts	N/A	Known to be diverse across the Chattooga WSR watershed but no	YES / 1

Species	Forest	Range and Habitat	Analyzed?/Rationale
		comprehensive survey has been conducted.	
Manhart's Sedge <i>Carex manhartii</i>	CNF NNF SNF	Northern GA and eastern TN to southwestern VA and southern WV. Habitats include mesic areas ranging from rich cove forest to oak-hickory forest.	NO / 2
Mountain Camellia <i>Stewartia ovata</i>	CONF NNF SNF	Virginia and Kentucky south to Mississippi and Florida. Habitat primarily riparian and alluvial forest, often densely covered with <i>Rhododendron maximum</i> .	YES / 1
Oconee Bells <i>Shortia galacifolia</i> var. <i>galacifolia</i>	CONF NNF SNF	Narrow range of five counties on the Blue Ridge Escarpment in NC, SC and GA. Habitat streamside typically under dense <i>Rhododendron</i> shade, humid escarpment gorges with heavy rainfall.	NO / 2
Pink Shell Azalea <i>Rhododendron vaseyi</i>	NNF	NC endemic present at the southern edge of its range in the Chattooga WSR watershed. Occurs in high elevations from closed canopy Northern hardwood forests to partially open areas including seeps, boulder fields, meadows, and Southern Appalachian bogs.	NO / 2
Rock Gnome Lichen <i>Gymnoderma lineare</i>	CONF NNF	NC mountains with peripheral populations in the mountains of TN, GA, and SC. Occurs on sloping to vertical rock faces with some seepage at higher elevations, generally above 5000 feet.	NO / 2

CONF, NNF and SNF. Reason for including or not including in analysis (Analyzed?/Rationale):

1 = Species is known to occur within project area;

2 = Species is not known to occur within project area and potential habitat does not exist;

3 = plants are inaccessible to recreationists

## 2. Spray Cliff Communities

Southern Appalachian Blue Ridge spray cliffs are vertical to gently sloping rock faces that are constantly wet from the spray of waterfalls (NatureServe, 2014, Schafale and Weakley 1990). Given these characteristics, they are inherently rare. The global rank is G2. These communities are found within southwestern North Carolina, northwestern South Carolina, northeastern Georgia and west of the escarpment in eastern Tennessee (NatureServe, 2014). It is best developed within the Blue Ridge Escarpment region across North Carolina, South Carolina and Georgia. This community is dominated by mosses, liverworts and algae with vascular herbs having substantially less cover. Most associated species require a constantly moist substrate and high relative humidity. Sheltered site characteristics result only in rare freezes. Rare bryophytes, disjunct from tropical or subtropical regions, are able to persist within this community given the relatively constant temperature and high humidity. Deeply sheltered grottoes are often associated with spray cliff communities. These dark environs provide suitable habitat for other unusual or rare plants.

## 3. Old Growth Communities

No old growth inventory was documented at the time of wild and scenic designation. The most comprehensive old growth assessment was completed across the Chattooga WSR watershed in 1995 (Carlson 1995). Old growth was defined as principally plant communities dominated by trees more than 150 years of age and with little to no signs of human disturbance. A total of 110 stands, consisting of 4,578 acres, were identified as existing old growth across all three national forests in the Chattooga WSR watershed. While old growth



conditions were identified across all forest types, the vast majority, around two-thirds, were in sub-mesic oak, which often was dominated by chestnut oak (*Quercus prinus*).

**A. Alternative 1 - Direct and Indirect Effects**

1. Southern Appalachian Endemics

Known populations of Fraser's loosestrife were found near Bull Pen Bridge, Norton Mill Creek and Burrells Ford Bridge. It is unlikely that they would be impacted by current recreation activities as users would likely continue to use existing user-created trails to access the river. Mountain camellia is unlikely to be impacted because the last known location was found in the vicinity of the Lick Log confluence with the Chattooga WSR. Current recreation access via user-created trails is concentrated south of the confluence of Lick Log Creek on an easily accessible river terrace. The three liverworts known at the Lick Log site (*Acrobolbus ciliatus*, *Radula sullivantii* and *Plagiochila caduciloba*) are unlikely to be impacted since they occur near the Lick Log waterfall near the confluence with the Chattooga WSR. Current and future recreation use occurs downstream given the topography. *Radula sullivantii*, *Plagiochila sharpie* and more common epiphytic liverworts such as *Frullania* species that occur near Bull Pen Bridge are unlikely to be impacted by current recreation use. Greens Creek and County Line were surveyed for Oconee bells on 02/20/2014. No Oconee bells were noted, only large populations of Galax. These two species can be easily confused but have distinctly different seasonal blooming periods.

2. Spray Cliff Communities

Alternative 1 would have no effect on spray cliff communities because the boater access site at Lick Log is downstream and outside the area of potential effects. They are considered to be inaccessible and unlikely to be impacted by the alternative.

3. Old Growth Communities

Old growth communities are not impacted because none are located within or adjacent to the proposed project area. This alternative would not affect old growth communities at the access sites since only minimal understory vegetation would be impacted during trail reconstruction and maintenance.

**B. Alternative 2 - Direct and Indirect Effects**

1. Southern Appalachian Endemics

It is unlikely that the known populations of Fraser's loosestrife found near Bull Pen Bridge, Norton Mill Creek and Burrells Ford Bridge would be directly impacted by trail construction/reconstruction and maintenance work or at the boater access sites. A designated maintained trail and established access site would help funnel people away from nearby plants. Mountain camellia is unlikely to be impacted because the last known location was found in the vicinity of the Lick Log confluence with the Chattooga WSR. The proposed

access trail and boater access site are south of the confluence of Lick Log Creek on an easily accessible river terrace about a 1,000 feet away. The three liverworts known at the Lick Log site (*Acrobolbus ciliatus*, *Radula sullivantii* and *Plagiochila caduciloba*) also are unlikely to be impacted since they occur in an inaccessible area near the Lick Log waterfall at the confluence with the Chattooga WSR. Current recreation use is more likely downstream given the topography. *Radula sullivantii* and *Plagiochila sharpii* may be impacted by the access along the Chattooga WSR near the new trail and the common epiphytic liverworts such as *Frullania* species that occur near Bull Pen Bridge would be impacted by the removal of trees during trail construction. Individual plants would be lost but would not lead to loss of plant populations in the area.

## 2. Spray Cliff Communities

Alternative 2 would have no effect on spray cliff communities because the boater access site at Lick Log is downstream and outside the area of potential effects. They are considered to be inaccessible and unlikely to be impacted by the alternative.

## 3. Old Growth Communities

Old growth communities are not impacted because none are located within or adjacent to the proposed project area. This alternative would not affect old growth communities at the access sites since only minimal understory vegetation would be impacted during trail reconstruction and maintenance.

### C. Alternative 1 and 2 - Cumulative Effects

Because neither the on-going uses under the No Action Alternative, or the Proposed Action would result in any effect on these species outside of the site-specific project area, none of the projects identified in Table 3.1-1 would result in measurable cumulative effects.

#### 3.2.3 Scenery

##### Affected Environment

Scenery remains largely unchanged since the time of designation. Timber harvest has not taken place in the Chattooga WSR corridor since designation. However, some changes to the vegetation have been occurring. Eastern hemlock trees are dying from hemlock wooly adelgid (HWA) an insect native to East Asia. Eventually all of the hemlocks will succumb to this pest and other vegetation will take its place.

Trails and boater put-in and take-out points at Green Creek, Norton Mill Creek and Lick Log Creek are largely within a forested environment with a variety of understory plants and shrubs. Burrells Ford Bridge and Bull Pen Bridge access sites and trails are in close proximity to the bridges. These areas generally have a more open forest canopy with a well-developed understory shrub component due to the increased sunlight provided by the adjacent roads and bridges. These two frontcountry locations provide views of the canyon and the variety of colors textures of vegetation associated with the varying seasons.

Currently, scenery impacts within the river corridor at the various proposed access points come from soil compaction, erosion and vegetation damage associated with dispersed camping and user-created trails, human waste and trash accumulation. Standing dead and dying hemlock are common throughout the area and also detract from the scenic quality of the access sites.

**A. Alternative 1 - Direct and Indirect Effects**

Scenery would remain unchanged and natural processes would continue. Views up and down the canyon at the more open bridge site locations would continue. User-created and designated trails along with dispersed campsites would continue to be evident at all the access site locations. This would continue to impact scenery. Standing dead hemlock trees will begin to fall and will become less evident under other vegetation that takes their place.

**B. Alternative 1 - Cumulative Effects**

Activities listed in Table 3.1-1 are not in close proximity to the currently used access sites. Continued use of these access sites would not have overlapping effects that would cause adverse cumulative effects to scenery.

**C. Alternative 2 - Direct and Indirect Effects**

Designation of trails and boater access sites along with decreased reliance on user-created trails to gain access to the river would result in minimal improvement to scenic quality at the sites. The designated trails would meet U.S. Forest Service design specifications and would be maintained to reduce resource impacts associated with erosion, compaction and sedimentation. Scenic quality would improve as techniques to discourage continue use of user-created trails (covering the trail with vegetation, logs, rocks and tree limbs) would result in vegetation recovery which would further hide user-created trails and improve scenic quality in the area. The long-term visual impacts would be positive on the scenery. Some forest visitors generally would be pleased with these changes or actions over time.

**D. Alternative 2 - Cumulative Effects**

Activities listed in Table 3.1-1 are not in close proximity to the currently used access sites. Constructing, reconstructing, maintaining and designating these access sites would not have overlapping effects that would cause adverse cumulative effects to scenery.

### ***3.2.4 History***

#### **Affected Environment**

Archaeologists for the three national forests evaluated the proposed project locations for the potential to impact heritage resources. No archaeological sites or other cultural resources were found during the examination of the current boater access sites.

**A. Alternative 1 and 2 – Direct and Indirect Effects**

There would be no impacts to archaeological sites or other cultural resources from these alternatives since no sites were found.

**B. Alternative 1 and 2 – Cumulative Effects**

Because the effects to historic sites are limited to the immediate area surrounding the five access sites, none of the activities listed in Table 3.1-1 would overlap with the effects of either alternatives to cause cumulative adverse effects to archaeological or other cultural resources.

**3.2.5 *Geology***

**Affected Environment**

The rocks and geologic structure found within the watershed and at the proposed access sites indicate periods of mountain building, continental rifting, erosion, sedimentation and metamorphism over millions of years. The geological and geomorphological values are still unaltered today.

The area surrounding the proposed access sites is primarily moderate to steep forested slopes with riparian areas and floodplains. Land use has remained constant since designation and has emphasized protection of ORVs.

**A. Alternative 1 – Direct, Indirect and Cumulative Effects**

Alternative 1 would not impact the Geology ORV.

Past, present and foreseeable projects listed in Table 3.1-1 would have no cumulative effects on geological and geomorphological processes.

**B. Alternative 2 – Direct, Indirect and Cumulative Effects**

There would be no impacts from Alternative 2 since land uses are not expected to change, no consumptive uses are proposed and further infrastructure development is unlikely given the extensive federal ownership in the drainage and river corridor.

Past, present and foreseeable projects listed in Table 3.1-1 would have no cumulative impacts to geological and geomorphological processes.

**3.3 *Other River Values***

**3.3.1 *Free-flowing Condition***

The WSRA requires that the managing agency preserve the free-flowing condition and protect the water quality of 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 Chattooga River was flowing in its natural condition without impoundment from Cashiers Lake south to Tugaloo Lake.

### **Affected Environment**

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

#### **A. All Alternatives – Direct, Indirect and Cumulative Effects**

Section 7 of the WSRA 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 Chattooga WSR. As a result, further Section 7 analysis is not required.

All alternatives and past, present and foreseeable projects (listed in Table 3.1-1) along with those on private lands are not water resources projects; therefore, the free-flowing conditions of the Chattooga WSR would be preserved.

### **3.3.2 Water Quality**

#### **Affected Environment**

The Chattooga WSR watershed is located in the Southern Blue Ridge Ecological Province. Streams and rivers in the Southern Blue Ridge tend to be entrenched step/pool or pool/riffle systems with boulder and cobble substrate in riffles, and some sand in pools. The Chattooga WSR Corridor is situated mostly within the Chattooga River Gorge. Topography and landforms in the gorge include steep gorge walls, alluvial terraces, hillside ravines, low ridges and bouldery river/waterfalls. The geology features weathered parent material that is sensitive to disturbance and susceptible to erosion. When exposed to the elements, disturbed areas can become chronic sediment sources.

The Chattooga WSR and its tributaries have various classifications developed by each state water quality agency, in addition to the federally designated wild and scenic river status. In North Carolina, the Chattooga WSR from its source to the state line is classified as a Class B, trout water and outstanding resource water (ORW). In Georgia, the Chattooga WSR from the Georgia-North Carolina state line to the Tugaloo Reservoir is classified as wild and scenic. The Chattooga WSR and all its tributaries are also classified as primary trout waters in Georgia. In South Carolina, the Chattooga WSR from the North Carolina state line to its confluence with Opossum Creek is classified as ORWs. Beneficial uses for the Chattooga WSR include primary recreation (swimming on a frequent or organized basis), fishing, wildlife and aquatic life which include natural trout propagation and survival of stocked trout.

**Table 3.3.2-1. State Water Classifications and Water Quality Standards.**

State	Segment	Classification	Standard
Georgia	Chattooga WSR from Georgia – North Carolina state line to Tugaloo Reservoir	Wild and scenic	There shall be no alteration of natural water quality from any source.
North Carolina	Chattooga WSR from source to North Carolina – Georgia state line	ORWs	Water quality conditions shall clearly maintain and protect the outstanding resource values. The following undesignated tributaries to the Chattooga WSR. shall comply with the same ORW standards: see below (*)
South Carolina	Chattooga WSR from confluence with Opossum Creek to Tugaloo River	Freshwater	Turbidity not to exceed 50 Nephelometric Turbidity Unit (NTU) provided existing uses are maintained. See SC state standards for further information
	That portion of the river from North Carolina line to its confluence with Opossum Creek	ORWs	Water quality conditions shall be maintained and protected to the extent of the South Carolina Department of Health and Environmental Control statutory authority. Numeric and narrative criteria for class ORW shall be those applicable to the classification of the water body immediately prior to reclassification to class ORW, including consideration of natural conditions.

\*Note: The following NC tributaries shall comply with the same ORW standards: North and South Fowler creeks, Green and Norton Mill creeks, Cane Creek, Ammons Branch, Glade Creek and associated tributaries. Source: NC Division of Water Quality.

Sediment is the primary pollutant of concern in forested watersheds in the Southeast (Coats and Miller, 1981); this area is no exception. Excess fine sediment in stream systems fills interstitial space between larger rocks and reduces the amount of available fish and macroinvertebrate habitat. Many of the streams in the Chattooga WSR watershed have excess stored sediment from past land management activities as well as the high erosive potential of micaceous soils in the region (Van Lear et al., 1995).

Unpaved dirt and gravel roads with fine aggregate surfacing and roads with poor surface drainage are the primary contributors to stream sedimentation in the Chattooga WSR watershed (Van Lear et al., 1995). Another source of sediment comes from recreation sites and user-created recreation areas. Managing recreation impacts can reduce sedimentation and improve overall water quality.

Recreation uses have increased since 1995; therefore, recreation impacts from existing users to water quality in the Chattooga WSR watershed are likely higher today. Managing impacts from these uses can improve water quality in the Chattooga WSR watershed.

Under the Clean Water Act, each state is required to publish a 305(b) monitoring report that summarizes water quality conditions for state waters. If a stream does not have high enough water quality to meet its designated beneficial uses, it is listed as not supporting or impaired based on the presence of certain pollutants. Streams that are not supporting their designated beneficial uses are added to the state's 303(d) list of impaired streams.

As of the 2012 303(d) listings for all three states, no streams are listed in the project area. All streams in the Chattooga WSR watershed in North Carolina are currently supporting designated beneficial uses, although in 1998 Norton Mill Creek was impaired by sediment. By the following reporting cycle in 2000, Norton Mill Creek was removed. In South Carolina and Georgia, all streams also are supporting designated beneficial uses in the project area. However, sediment continues to be an issue or concern to address with many types of activities and land use.

**A. Alternative 1 – Direct and Indirect Effects**

The existing trail network and unauthorized user-created trails would continue to be used and are likely to have an increase in use in the foreseeable future. User-created trails that currently experience erosion and subsequent sedimentation would likely continue to do so and would likely get progressively more unstable. For example, at the Burrells Ford Bridge site, three user-created trails access the river and have a high likelihood of contributing sediment to the Chattooga WSR.

**B. Alternative 1 – Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat.

Camping along the river has some potential to expose, disturb and compact soils, damage trees, contribute solid or other waste materials and start fires. Effects of designated facilities are generally mitigated by design, but use outside of designated trails and facilities are not. River access currently occurs off system trails by means of user-created trails. Such trails are frequently not to U.S. Forest Service design standards and are often an erosion and sediment problem because of steep slopes and inadequate drainage. These trails were mapped and conditions noted during the 2007 biophysical inventory. Frontcountry locations are more heavily impacted by users and are causing more resource damage since they provide quick access to the river. Erosion points and un-vegetated areas were also documented and though they may cause local sediment and erosion concerns they are minor when placed in context with the upper corridor segment.

Past actions within the watershed such as splash-dams, logging, skidding, cultivation, drainage, farming operations and buildings have had a substantial impact on sediment loading to the Chattooga WSR. Reasonably foreseeable activities that would have the greatest impact include alteration of forest to developed land and associated roads. By continuing existing management under this alternative, user-created trails would continue to be used to access the river. With the potential for increased recreational use, this user-created trail network could become more unstable and result in an increasing source of sediment to the river. At this time, the uses combined with the impacts from the projects identified in Table 3.1-1 do not exceed any required sedimentation threshold.

### **C. Alternative 2 – Direct and Indirect Effects**

This alternative proposes to construct, designate and maintain approximately 1.63 miles of foot trail to access five boater put-in and take-out sites along the Chattooga WSR. Trails accessing the Green Creek and Norton Mill Creek sites would be constructed on existing road beds, requiring some reconstruction and minor realignment to produce a sustainable trail. Sections of these old road beds are currently used although they are not designated or maintained. The proposed work on these new trails would improve their conditions and reduce impacts to water resources.

At the Bull Pen Bridge and Lick Log sites, another 300 and 500 feet of trail, respectfully, would be constructed to the river. At the Burrells Ford Bridge site, three user-created trails access the river. Approximately 200 feet of one of these trails would be stabilized and become part of the maintained system trail network, while the remaining two trails would be decommissioned and stabilized, thereby eliminating their use and potential to produce sediment.

Impacts on forested riparian corridor function would be minimal since the area of proposed disturbance would occur over an area less than an acre spread out over the five sites. Potential impacts to streamside areas (including riparian areas) are expected only along short sections of trail where the trail accesses the river. These relatively flat areas along the river bank are likely places where boaters would congregate; therefore, they could see clearing and trampling of vegetation, loss of the leaf litter layer, soil compaction and subsequent erosion. These areas would not be particularly prone to erosion due to flat surfaces, boulder and bedrock outcrops and well-drained alluvial soils; therefore with appropriate maintenance and mitigation, sedimentation should be minimized. Riparian corridors would continue to provide bank stability and sediment filtering to protect water quality as well as a source of large woody debris and shading to maintain stream temperatures.

Some temporary or intermittent increases in fecal coliform may be associated with people using the riparian area as a restroom if proper “Leave No Trace” techniques are not implemented. These increases, if present, would be primarily on-site and no measured change would be noticed in the Chattooga WSR.

Use at existing parking areas is likely to increase. Pollutants from parking areas would, in most circumstances, be undetectable or minor, although excessive leaks of automobile fluids could occur which has the potential to cause pollution. Soils would, in most cases, absorb, contain and filter contaminants and aid in their breakdown through bacterial or other means. U.S. Forest Service personnel and law enforcement would check for the occurrence of larger fluid leaks and spills at the sites during regular visits.

### **D. Alternative 2 – Cumulative Effects**

Past, present and reasonably foreseeable future projects are listed in Table 3.1-1. The activities listed are intended to: 1) maintain/restore and enhance ecosystems, reduce hazardous fuels, improve forest health, and improve wildlife habitat; 2) manage recreation uses and reduce recreation impacts on other resources; 3) improve resource management through land acquisitions; 4) reduce sediment, control erosion and improve aquatic resources; and, 5) maintain wildlife habitat.



Implementing Alternative 2 would have a positive cumulative effect where user-created trails would be stabilized by means of proper design or decommissioning. Newly constructed trails and river access sites would have the potential for increased erosion and sedimentation, but with the implementation of effective design measures, measurable adverse impacts to water quality would be avoided. These changes would be noticed at the particular access site but would not be detectable in the Chattooga WSR. The proposed project is not likely to create unacceptable cumulative impacts across the Chattooga WSR watershed since most impacts that are occurring in the drainage are coming from roads. Some of the projects specifically proposed or already being implemented in the drainage would continue to reduce erosion and sediment into the river.

### **3.4 Other Physical Resources**

#### **3.4.1 Soils**

##### **Affected Environment**

The soils were analyzed to determine impacts associated with construction, reconstruction, designation and maintenance of trails and boater put-in locations near Green Creek, Norton Mill Creek, Bull Pen Bridge, Burrells Ford Bridge and a boater take-out near Lick Log Creek. The primary impacts on soils in the analysis area are expected to be associated with erosion, soil stability, compaction and displacement. Erosion and sediment originating from user-created trails, dispersed campsites and areas with chronic erosion are minor when compared to the chief contributors such as existing roads, bridges and parking lots (VanLear, 1995).

The length of the access trails and the soil types were analyzed using a Geographic Information System (GIS); the information is contained in the project record. Trail segment lengths were intersected with soil types to determine an overall length for each soil type. The analysis area consists of specific trail and boater put-in and take-outs locations. Several soil types within the areas differ because of parent material, geology, slope, slope position and aspect. Soils vary in soil structure, horizon depths, texture and permeability due to the different conditions in which they formed. These soil characteristics determine soil series and their relativity to soil productivity, erodibility and stability.

Soils within the analysis area are generally well drained, but have a wide range of slope and landform conditions from nearly level to steep slopes. The relatively flat to gently sloping areas are characteristic of the relatively narrow floodplains and terraces. Side slopes range from gentle to steep sloping areas, with mostly narrow and irregular ridgetops. Many of the ridgetop and upper side-slope soils are formed from residual materials weathered from gneiss, schist rock and granite. In the mountains, many of these soils tend to be more stable depending on the physical make up, width of ridge and slope. Soils on steep upper slopes may be less developed, shallow and more eroded due to gravity and/or washing and past activities. These soils are highly to severely erodible if exposed.

Soils that have a very high content of mica are considered to be micaceous soil types. They erode easily because of the lack of clay to bond the soil materials together and generally exist in unstable conditions. The Fannin and Cashiers soil series make up the highest percentage of the soils in the analysis area. Soils are considered micaceous when 40 % of the soil by weight contains mica flakes. High levels of mica tend to be present throughout the area and tend to be very prominent near the

South Carolina and North Carolina border. Approximately 36 percent or 7,700 feet of trails in the analysis area are located on micaceous soils.

The upland soils (approximately 34 percent or 7,400 feet) are located on gently sloping to very steep ridges and side slopes. Most of the soils have a sufficient amount of clay and are stable on gently sloping terrain and have minimal impact on soil erosion and disturbance. Trails are suitable on upland areas with gentle slopes, but direct connections of these activities to streams should be avoided or mitigated.

Colluvial soils are developed from gravity transported materials from higher slopes that have accumulated on lower side-slopes or foot-slopes of hills or mountains. They are a large mass of soil materials or rock fragments deposited from steep slopes onto relatively flat slopes. They are often located at the base of the slope in a cove near stream terraces and floodplains. These colluvial soils can be unstable and sensitive to ground disturbance. Approximately 17 percent or 3,600 feet of trails are prone to slippage and slumpage of the hillside. These soils are sensitive to ground disturbing activities due to their severely erosive and unstable nature. Many of these soils are especially susceptible to failure from:

1. Removal of vegetation;
2. Added concentrated water flow from other activities;
3. Altering the toe slope support;
4. Changes in hydrology; or
5. Severe storm events that follow some form of severe vegetative disturbance (fire, wind, etc.).

Alluvial floodplain soils are formed from sediments that were transported and deposited from flowing water-streams. Soils within the Chattooga WSR floodplain are generally stable when undisturbed, but are susceptible to compaction and/or erosion. These soils are sensitive to ground-disturbing activities due to their erosive nature on slopes or areas with concentrated flow. Alluvial soils make up approximately 13 percent or 2,800 feet of trails in the analysis area.

Soils were grouped and rated by similar characteristics for analysis purposes and are displayed in Table 3.4.1-1. These ratings are based on bare soil conditions subjected to rainfall. Any of the soils subjected to concentrated flow will normally have a high (H) rating. The ratings are listed as low (L), moderate (M) and high (H). Group 1 consists of soils that are micaceous which include the Cashiers, Chandler and Fannin series. Soils in Group 2 developed in colluvial material and those series include the Brevard, Cullasaja, Tuckasegee, Whiteside and Tusquitee. Group 3 is the alluvial soils and consists of the Toccoa soil series. Group 4 is the upland and hillside stable soils with local gentle inclusions and consists of Chestnut, Cleveland, Edneyville, Evard, Plott, Walhalla and Rock Outcrops.

These soils have various levels of sensitivity to impacts from trails. Table 3.4.1-1 lists each activity and rates its potential effects on the soil resource. Impacts to soil resources include erosion, soil stability, compaction and displacement and are associated with trails and boater put-ins and take-outs. This analysis assumes that designated trails would be located on grades of less than 12 percent, with dips and other structures that limit concentrated flows.

**Table 3.4.1-1. Soil Ratings for Trails, Put-ins and Take-outs.**

Groupings	Trails	Put-Ins	Take-Outs
1	H		
2	H		
3	M	M	M
4	L-M		

L=low effects, generally acceptable but some mitigation may be needed

M=medium effects, mitigation likely needed

H=high effects, difficult to mitigate, avoid if possible

Current conditions listed below are specific to the five proposed access sites and trail locations.

- *Non-designated or user-created trails* have more potential for erosion and sediment entering the stream because of their location and lack of design and maintenance. As a result, they are periodically eroded during storm and flood events and become more entrenched over time, as well as more capable of eroding and delivering sediment. Currently, the non-designated trails at Burrells Ford Bridge are heavily used and are eroding in some locations. The trails at Green Creek, Bull Pen Bridge and Lick Log are not used very much and have minimal erosion.(refer to section 3.2.1)
- *The parking area* of concern in this analysis area is at the Burrells Ford access site. The parking area is contributing sediment to the river via the existing non-designated trails.

Environmental effects on the soil resources are discussed in the 2012 EA which is incorporated by reference in this EA.

#### **A. Alternative 1 – Direct and Indirect Effects**

Under this alternative, access to boater put-in and take-out sites would rely on the use of both designated and non-designated trails. Non-designated trail use would continue; therefore, impacts to soils would be more extensive than alternative 2 and erosion would be allowed to continue over time. There is a greater likelihood of more non-designated trail development in these locations with likely increased recreational use over time.

Non-designated trails may occur in areas that are unsustainable and they lack water control features (dips, water-bars, reverse grades, lead-outs, etc.). Water has a tendency to move down the non-designated trail causing increased soil erosion without these water control features. Over time, compaction and erosion leads to entrenchment of the trail. These trails can also transport soil particles directly to water sources. Soil compaction and disturbance combined with site-erosion can lead to declining vegetation conditions. When this is combined with periodic flooding (especially in the floodplain), it can eventually lead to accelerated erosion in areas of heavy trail concentration. Under this alternative, boater put-in and take-out access would be dispersed along the river bank with the potential for the sites to be in unsustainable locations.

## **B. Alternative 2 – Direct and Indirect Effects**

For the most part, this alternative would reduce the potential for impacts to soils and concentrate soil disturbance in designated locations. Overall, impacts to soils such as erosion and compaction would be reduced over time through mitigation of existing resource damage and application of forest plan standards and guidelines on the three national forests. However, at Norton Mill Creek, impacts to soils would be similar to the effects described in Alternative 1 within 300 feet of the confluence. Once the district establishes the put-in spot, long-term effects would be as follows:

### **Trails**

Closing and rerouting poorly located non-designated trails would reduce chronic erosion, especially from those located directly on top of stream banks and in riparian areas. It would also reduce soil disturbance and compaction leading to improved soil productivity especially in riparian areas. Fewer impacts on stream banks and limited access to the water's edge would improve bank stability and reduce erosion. The roots from trees, shrubs and grasses would begin to recover and would help hold the bank together. There would also be less chance for accelerated erosion during flooding in riparian areas.

New or reconstructed trails would cause disturbance by removing the litter and organic layer and compacting soil within the new trail tread area. However, new trails would be placed in better locations and would cause minimal disturbance. Hand tools would be used to construct the new trails and impacts from construction are expected to be minimal. There would be bare soil in some areas for a few months that would be susceptible to erosion. However, after the first leaf fall occurs the potential would greatly decrease.

Hiking on trails can lead to soil displacement, erosion and compaction to the soil surface. This can cause localized erosion and compaction that exposes roots of vegetation which can lead to a loss in vegetation along the trail. Designated trails are planned and designed to minimize the impacts to the soil resource by locating them on adequate grades with water diversion structures, proper slopes and stable soils. These design features protect the trail tread by getting the water off the trail which reduces erosion. System trails would receive periodic maintenance to minimize adverse effects from soil compaction, soil displacement, soil erosion and other disturbance activities.

Generally, colluvial soils should be avoided in trail design as they have a tendency to slump (hillside wash downhill) during intense rainfall. Under this alternative, 3,500 feet of trails already exists in the analysis area. The Chattooga River Trail, that is part of this analysis (1,600 feet), occurs on these same soil types and has remained stable over time. Green Creek and Norton Mill trails that would be designated occur on old road beds, of which 1,700 feet are located on these soil types and are relatively stable. Trail reconstruction and maintenance work would increase the stability of these trails. Below the road at Bull Pen Bridge, approximately 68 feet of the 300 feet of new trail construction would occur on colluvial soils. Therefore, construction effects would be minimal for activities occurring on these soil types. Periodic monitoring of these trails may lead to relocation or upgrading design or maintenance on portions of them should recreational activities result in resource damage.

The Green Creek designated trail would be located on an old road bed. Currently, erosion is occurring due to the design and location of the road bed. By designating this as a trail, current erosion issues would be addressed by implementing standards and guidelines. One location along the road bed is actively eroding into a tributary. This area would be rehabilitated and a small footbridge would be installed that would span the tributary, which would eliminate the erosion source.

At Burrells Ford on the Georgia side, erosion and sediment would be reduced by decommissioning two non-designated trails and by designating one of the current non-designated trails. Currently, water from the parking lot at Burrells Ford is being directed onto the two non-designated trails. Long-term erosion would be eliminated by decommissioning these two trails and reshaping the parking lot to turn water away from those trails. River bank and upland stabilization work would consist of, but not be limited to, installation or maintenance of proper surface drainage to control storm-water runoff; use of both live material (vegetation) and structural features (rock and logs) to stabilize and armor eroded areas and minimize off-site sediment. Designation of the access trail and access for user entry to the Chattooga WSR would create adverse soil effects. The anticipated effects of these treatments would be to control active erosion and sediment occurring at the existing sites, restore and stabilize upland areas along the river and minimize the loss of normal function of the riparian area.

Overall, traveling by foot on properly designed and maintained system trails usually causes minimal soil disturbance regardless of how many people are traveling at one time. Inevitably the more use a trail receives, the more compacted the path would become; however, this effect is minimal in scope because the disturbance usually stays within the trail path.

Over time, implementation of forest standards and guidelines in Alternative 2 would reduce existing levels of soil erosion and compaction although these improvements may be slowed by continuing increases in overall recreation use.

### **Boater Put-ins and Take-out Access Sites**

Impacts to soils at the proposed boater access sites would be minimal because these areas are mostly rock and gravel. However, the potential for soil resource impacts would increase in the area adjacent to the river on the flood plain where boaters would likely prepare equipment and/or rest before or after a float trip. Likewise, other recreation users (hikers, anglers, campers, etc.) may use these same sites to gain access to the river. These types of activities, depending on the amount of use, increase the potential for soil disturbance. Disturbance to the soil surface and compaction combined with erosion exposes roots of vegetation leaving them susceptible to damage. This leads to vegetation die-back or decline and the site expanding in size over-time. Disturbance to vegetation that exposes the soil to erosion is the most critical factor. Since these areas are located in the floodplain and slopes are relatively flat, erosion is most likely to take place during flood events. Under this alternative, use at the boater put-ins and take-outs would be more concentrated but the access points would be located in sustainable locations. Overall, the effects on soils are expected to be minimal due to the limited amount of boating use (refer to Table 3.2.1-2).

### **C. Cumulative Effects**

Cumulative effects were assessed for the specific locations of the five boater access points and associated trails. Cumulative effects were also assessed at the fifth level watershed scale. Past, present and reasonably foreseeable projects as identified in Table 3.1-1 were considered in the analysis. Private land use in the area is primarily homesites with small amounts of agriculture and timber harvest.

At the watershed scale, the cumulative effects for both alternatives 1 and 2 would be practically the same. The Chattooga WSR watershed is approximately 180,000 in size with about 67 percent in federal ownership and managed by the U.S. Forest Service. The majority of the watershed is forested and forest management is taking place on all three national forests within the drainage, though activities are a very small portion of the total forest environment.

Recreational activities that affect the soil resource within the watershed (camping, boating, fishing and hiking) use roads, parking lots, trail heads, trails and campsites. Most of these activities occur on national forest though some recreation use is occurring on private lands. Maintenance activities reduce resource impacts associated with water runoff and subsequent erosion from roads, parking lot/trailheads and trails.

#### *Alternative 1*

Under Alternative 1, recreational use would likely continue to expand in these five areas which would cause an increase in overall adverse effects on soils in these areas. There would be no decrease in the current levels of erosion on non-designated trails and there would be a potential for more non-designated trails to develop over time with likely increased recreational use. Non-designated trails typically have no maintenance to reduce or prevent erosion. Erosion occurring from non-designated trails is a minor source of erosion in the watershed when considered in context with other soil erosion sources, particularly that which is coming from existing roads. There would be no measureable cumulative increase in erosion and sediment delivery to river with implementation of this alternative. Some of the activities listed in Table 3.1-1 would result in decreased erosion and sedimentation to the river.

#### *Alternative 2*

Alternative 2 would close and rehabilitate two user-created trails at Burrells Ford that are not sustainable, rehabilitate erosion sources resulting from non-designated trail use and designate trails that are sustainable with proper maintenance. The parking lot at Burrells Ford would receive additional gravel and the water from the parking area would be diverted away from the river where possible. This would reduce active bank erosion that is occurring. This alternative would reduce user-created trail use thus, reducing adverse effects on soils within the watershed as a whole. Overall, reductions in erosion are likely under the proposed alternative with designated trails that receive proper maintenance, but it still would be minor when placed in context with contributions made from existing roads and other chronic sources of erosion in the watershed. There would be no measureable cumulative decrease in erosion and sediment delivery to river with implementation of this alternative when considered together with the activities described in Table 3.1-1.

### **3.4.2 Wetlands, Floodplains and Riparian Corridors**

#### **Affected Environment**

##### **1. Wetlands**

For the five proposed river access sites and their trails, the USDA Natural Resources Conservation Service (NRCS) Soil Survey identified soils as being non-hydric (or soils that are not sufficiently wet in the upper layer to develop anaerobic conditions during the growing season). Also, soils are largely well drained in these areas with the exception of soils at Green Creek and the Lick Log sites where they are considered excessively well drained and moderately well drained, respectively. The Lick Log site has the highest potential for wetlands in the Toccoa fine sandy loam soils, since this soil series is derived from river alluvium deposited during occasional flooding. However, wetlands were not found to occur in this area.

The natural lay of the land, such as steep hill slopes and well-drained forest soils, has resulted in few wetlands. There are likely small wetlands, like seeps and springs, in the general area that would not be impacted by proposed activities.

##### **2. Floodplains**

For the most part, floodplains tend to be narrow along the Chattooga WSR, in part due to channel entrenchment within the gorge, consistent with bedrock and boulder dominated Rosgen B and F type channels. However, local deposits of alluvial materials do occur where the narrow valley bottom widens to allow channel materials to deposit and form a floodplain feature. Floodplains are often stable features in the valley bottom because of abundant vegetation growth, but they can also be disturbed by large flood and debris flow events.

##### **3. Riparian Corridors**

The riparian areas along the Chattooga WSR are managed under the appropriate national forest's LRMP. Vegetative prescriptions in these areas benefit the establishment, maintenance and improvement of the stream ecosystem. The riparian prescription maximizes protection of streams bordering management areas to ensure good water quality and aquatic and riparian habitat throughout the forest.

Impacts associated with historic land use and activities are present in varying degrees of intensity across the landscape. The greatest impacts come from past ground-based logging that left a road network that often paralleled streams and occupied stream side areas. Most of these old legacy roads are currently stable due to vegetation growth and leaf cover over the past several decades, while some areas will continue to have long-term adverse impacts to the growth of vegetation because of soil loss and compaction. The Chattooga WSR was influenced by past splash-dams (structures used to float and transport logs in the rivers at the turn of the 20<sup>th</sup> century). This action likely had devastating impacts to the river's riparian corridor since it was likely a catastrophic event of logs and water flushing downstream with great force. This resulted in some loss of shade to the river, organic and large woody debris

inputs and bank instability. With the passage of nearly a century, the riparian corridor has reestablished and is largely healthy and functioning properly. Currently, the Chattooga River Trail runs along and near the river in places. Trail standards and regular maintenance minimize potential trail impacts.

Since farming practices stopped, much of the area has been regrowing within the riparian corridors. Trail and boater access locations are proposed within riparian areas where construction and maintenance BMPs would be implemented. The riparian ecosystems are typically an elevated terrace adjacent to the river. Implementation of the project would maintain sufficient overstory and understory cover to provide shade, maintain bank stability and protect water quality.

**A. Alternative 1 – Direct and Indirect Effects**

1. Wetlands

Alternative 1 would have no effect on wetlands because none are within the Chattooga WSR.

2. Floodplains

Localized seeps and springs would be unaltered and surface and sub-surfaces flows would continue. Floodplains would remain in their current state; stable and functioning properly.

3. Riparian Corridors

Riparian corridors would continue to provide habitat for riparian vegetation and terrestrial wildlife and aquatic species. In addition, riparian corridors would provide bank stability and sediment filtering to protect water quality as well as a source of large woody debris and shading to maintain stream temperatures.

**B. Alternative 1 – Cumulative Effects**

The upper segment of the Chattooga WSR is primarily forested, but has a minor component that includes a variety of land uses including highways, roads, urbanization associated with Cashiers and Highlands, NC, rural and home development, timber harvesting and thinning, golf courses, small pasture and rural farming, gardens, small dams, marketing and industry. Specific past, present and future activities that may have a cumulative effect are listed in Table 3.1-1. River access currently occurs on system and non system trails by means of road beds and user-created trails. Such trails are often not to Forest Service design standards and are often an erosion and sediment problem because of inadequate drainage.

Past actions within the watershed such as splash-dams, logging, skidding, cultivation, drainage, farming operations, and buildings have resulted in chronic erosion and loss of riparian areas in some areas on the Chattooga WSR. Reasonably foreseeable activities that could have the greatest impact include alteration of forest to developed land and associated roads, but would have little measurable impact to wetlands, floodplains and the riparian corridor. By continuing current management under this alternative, user-created trails would continue to be used to access the river. With a likely



increase in recreational use, this trail network could become more unstable and a source of sediment to the river.

### **C. Alternative 2 – Direct and Indirect Effects**

Trails accessing the Green Creek and Norton Mill Creek sites would require some reconstruction and minor realignment to produce a sustainable trail. The work on these new trails would improve their conditions and reduce impacts to water resources. At the Bull Pen Bridge and Lick Log sites another 300 and 500 feet of trail, respectfully, would be constructed to the river. At the Burrell's Ford Bridge site there are three user-created trails that access the river. Approximately 200 feet of one of these trails would be stabilized and become part of the maintained system trail network, while the remaining two trails would be decommissioned and stabilized, thereby eliminating their use and potential to produce sediment.

#### **1. Wetlands**

Alternative 2 would have no effect on wetlands because none are within the Chattooga WSR.

#### **2. Floodplains**

Potential impacts to floodplains and riparian corridors are expected only along short sections of trail where the trail accesses the river. These relatively flat areas along the river bank are likely places where boaters would congregate. These areas could see clearing and trampling of vegetation, loss of the leaf litter layer, soil compaction and subsequent erosion. These areas would not be particularly prone to erosion due to flat surfaces and well drained soils; therefore with appropriate maintenance and mitigation, sedimentation should be minimized and floodplain function would be sustained.

#### **3. Riparian Corridors**

Impacts on riparian corridor function would be minimal since the area of proposed disturbance would occur over an area less than an acre spread out over the five sites. Riparian corridors would continue to provide bank stability and sediment filtering to protect water quality as well as a source of large woody debris and shading to maintain stream temperatures.

Some temporary or intermittent increases in fecal coliform may be associated with people using the riparian area as a restroom if proper "Leave no Trace" techniques are not implemented. These increases, if present would be primarily on-site and no measured change would be noticed in the Chattooga WSR.

Use at existing parking areas is likely to increase. Pollutants from parking areas would, in most circumstances, be undetectable or minor, although excessive leaks of automobile fluids could occur which has the potential to cause pollution. Soils would, in most cases, absorb, contain and filter contaminants and aid in their breakdown through bacterial or other means.

U.S. Forest Service personnel and law enforcement would check for the occurrence of larger fluid leaks and spills at the sites during regular visits.

#### **D. Alternative 2 – Cumulative Effects**

The upper segment of the Chattooga WSR is primarily forested, but has a minor component that includes a variety of land uses including highways, roads, urbanization associated with Cashiers and Highlands, NC, rural and home development, timber harvesting and thinning, golf courses, small pasture and rural farming, gardens, small dams, marketing and industry. Specific past, present and future activities that may have a cumulative effect are listed in Table 3.1-1. River access currently occurs off system trails by means of user-created trails. Such trails are often not to U.S. Forest Service design standards and are often an erosion and sediment problem because of inadequate drainage.

Past actions within the watershed such as splash-dams, logging, skidding, cultivation, land drainage, farming operations, and buildings have had a substantial impact on the Chattooga WSR. Reasonably foreseeable activities that would have the greatest impact include alteration of forest to developed land and associated roads. Alternative 2 would have a positive cumulative effect where user-created trails are stabilized by means of proper design or decommissioning. Newly constructed trails and river access sites would have the potential for increases in erosion and sedimentation, but would not impact wetlands or floodplains. Loss of riparian function would occur in the areas dedicated to trail and river access, but adverse cumulative effects on riparian function would not be measurable, especially with the implementation of best management practices to minimize impacts.

### **3.4.3 Air**

#### **Affected Environment**

Air quality is monitored on the NNF, CONF and SNF to determine compliance with national ambient air quality standards set by the Environmental Protection Agency. This information is available in monitoring reports prepared by the three forests which are posted on each forest's website.

Prescribed burning and vehicular traffic are the primary sources of air pollution on the districts.

#### **A. All Alternatives – Direct and Indirect Effects**

Recreational use via vehicular access to the sites is expected to be about the same whether the boater access sites are designated or not. Recreation users would continue to use the existing parking facilities and existing trails. Dust and emissions from vehicles are expected to be low and would not have measurable effects on air quality.

#### **B. All Alternatives – Cumulative Effects**

The alternatives would not have any additional impacts to air quality when added to other past, present and foreseeable activities in the watershed as presented in Table 3.1-1. Private land uses are not expected to change much in this mostly forested landscape.

### **3.4.4 Climate Change**

#### **Affected Environment**

The US Global Changes Research Program published a report (USGCRP, 2009) on climate change in different regions. 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.

Human greenhouse gas (GHG) emissions, primarily carbon dioxide emissions (CO<sub>2</sub>), are the main source of accelerated climate change on a global scale. The Template for Assessing Climate Change Impacts and Management Options (TACCIMO, USFS, 2011) was used to assess differences among three general circulation models at Oconee County (SC). TACCIMO was used to create a report that summarizes the resulting climate change impacts. Climate change, especially climate change variability (droughts and floods), may alter hydrologic characteristics of watersheds with implications for wildlife, forest productivity and human use. This climate change variability may result in long-term and seasonal changes in temperature that could influence ecosystem health and function. These impacts result from both long-term warming and from shorter term fluctuations in seasonal temperature that may interrupt or alter temperature dependent ecosystem processes.

The Chattooga WSR watershed is mostly forested and thus provides a source for uptake and storage of carbon. At the watershed scale, this uptake is substantial but at the larger global scale it is not measureable.

Generally speaking, a warmer and drier climate would reduce cold water (trout) fishing opportunities while warm weather activities may increase (TACCIMO, 2011). As reported by Morris and Walls (2009), climate change impacts could exacerbate current natural disturbances including drought, wildfire, insect infestations and extreme weather. “Changes in vegetation and other ecosystem components (e.g., freshwater availability and quality) caused by droughts, insects and disease outbreaks, fires, and storms may alter the aesthetics, sense of place, and other cultural services that the public values” (Rouault et al., 2006). Increased tree mortality sets the stage for increased wildfires which also affects outdoor recreation.

“Weather and climate are key influences on the tourism sector worldwide (Smith 1993, Boniface and Cooper 1994, Perry 2007), affecting the length and quality of tourism seasons and the environmental resources that draw tourists to destinations....” (TACCIMO, 2011).

#### **Effects of Climate Change on Access Sites at Green Creek, Norton Mill Creek, Bull Pen Bridge, Burrells Ford Bridge and Lick Log Creek**

##### **A. All Alternatives – Direct and Indirect Effects**

A drier, warmer climate is not expected to result in measureable changes in use on trails and at the five access sites. As outlined in the 2012 EA, use by boaters and anglers is flow dependent; however,

warmer and drier conditions would favor those that prefer lower flows and drier conditions (campers and anglers for instance). It is unlikely that overall recreation use would decrease but it is more likely the types of recreation use would change. For example, in a drier year with lower flows, conditions would likely favor uses that are not flow dependent. Biophysical impacts would most likely be unchanged at the five access sites as all types of users would continue to use designated and user-created trails.

#### **B. All Alternatives – Cumulative Effects**

Other past, present and foreseeable future projects (listed in Table 3.1-1) do not overlap with this project to cumulatively affect use patterns at the five sites or impact biophysical resources. Use of designated and user-created trails and campsites would continue as disclosed in the 2012 EA. No specific actions on private lands are identified during scoping that may contribute with the effects of the alternatives and contribute to cumulative effects.

#### **Effects of the Access Sites at Green Creek, Norton Mill Creek, Bull Pen Bridge, Burrells Ford Bridge and Lick Log Creek on Climate Change**

#### **C. All Alternatives – Direct and Indirect Effects**

Current management and proposed management under alternative 2 would have no measureable effects on climate change.

#### **D. All Alternatives – Cumulative Effects**

Other past, present and foreseeable future projects (listed in Table 3.1-1) do not overlap with this project to cumulatively affect use patterns at the five sites or impact biophysical resources. Use of designated and user-created trails and campsites would continue as disclosed in the 2012 EA. No specific actions on private lands are identified during scoping that may contribute with the effects of the alternatives and contribute to cumulative effects.

### **3.5 Other Biological Resources: Vegetation**

#### **Affected Environment**

The vegetation assessment analyzes impacts to the following plant groupings: 1) ecological communities; 2) MIS; and 3) PETS and locally rare plant species. Potential effects on vegetation from Alternatives 1 and 2 are due to trampling of plants by recreation users, introduction of non-native invasive species (NNIS) and loss of plants during trail/boater access construction, reconstruction, maintenance and other connected actions.

#### **1. Ecological Communities**

Table 3.5-1 lists the dominant vegetation types at each of the boater access sites.

**Table 3.5-1. Dominant Vegetation Type at the Five Chattooga WSR Boating Access Sites.**

Access Site	Dominant Vegetation Type
Green Creek	Grading from rock chestnut oak- (northern red oak) - hickory/sourwood forest (basically a dry-mesic oak-hickory forest) to acidic cove forest and Eastern hemlock/rhododendron maximum with dead eastern hemlock along the Chattooga WSR
Norton Mill Creek	Fairly similar to Green Creek; also white pine-heath on the upper drier portions (a variant of dry-mesic oak-hickory)
Bull Pen Bridge	Acidic cove forest and alluvial bar
Burrells Ford Bridge	Acidic cove forest grading to Eastern hemlock/rhododendron maximum; all the hemlock are essentially dead now
Lick Log	Pine - oak (pitch pine-oak/heath forest) /heath forest; white pine-oak and mesic oak-hickory forest

## 2. Management Indicator Species (MIS)

MIS serve as the system to monitor forest plan implementation and effects on diversity and population viability of all native and desirable non-native plants and animals. At the project scale, MIS are used to focus the effects of proposed activities on habitat types. When these effects are evaluated within a forest-wide context, it is determined whether or not any trends for MIS would change. An assessment of habitat changes linked to MIS is documented in this section. The NNF is the only forest in the Chattooga WSR watershed to have MIS plants. Table 3.5-2 identifies the four plant MIS and the biological communities they represent.

**Table 3.5-2. Biological Communities and Associated MIS for the Nantahala National Forest.**

Biological Community	MIS Plant	Analyzed Further/Evaluation Criteria*
Fir dominated high elevation forests	Fraser fir	No further analysis/1
Northern hardwood forests	Ramps	No further analysis/1
Carolina hemlock bluff forests	Carolina hemlock	No further analysis/1
Rich cove forests	Ginseng	Further analysis/2

\*1 Biological community and its represented species do not occur in the activity area; therefore, this biological community will not be affected. Given no effects on the community, the alternatives will not cause changes to forest-wide trends or changes in population trends of species associated with this community.

\*2 Plant species seen along the access trail (Chattooga River Trail off Whiteside Cove Road); however, optimal suitable habitat for this species is not present within the activity area.

All plant MIS potentially affected by project activities were initially evaluated. Information about forest-wide MIS habitats and population trends is contained in the NNF MIS report, *“Management Indicator Species Habitat and Population Trends”* (USFS 2005b). One MIS plant, American ginseng (*Panax quinquefolius*), was located along the northernmost access trail (Chattooga River Trail) off Whiteside Cove Road. While this species was located within North Carolina along a single trail, the optimal habitat for this medicinal herb was not seen within the proposed activity area.

The estimated population trend for American ginseng is gradually decreasing across the Nantahala and Pisgah national forests primarily due to commercial harvest, both legal and illegal. The preferred habitat for American ginseng is rich cove forest with high soil nutrients

and calcium content. Ginseng population sizes are limited for this species within the Southern Appalachians, generally with fewer than 50 individuals (Kauffman, 2006). Populations are small because of annual harvest pressure and less suitable habitat with higher base content. Within the Chattooga WSR Corridor, habitat is very limited since most sites have acidic soils with limited nutrients and are marginal for *Panax quinquefolius*.

### 3. Federally Listed Plants

All federally threatened or endangered plant species that occur or could occur on the NNF, CONF or SNF were initially considered in this analysis. The list of federally listed species was compiled by reviewing: (1) USFWS county occurrence records for known and potential species, (2) North Carolina Natural Heritage Program EO records, (3) Georgia Nongame Conservation Section EO records, (4) SCDNR EO records and (5) U.S. Forest Service locally rare plant inventory records.

The initial list included 11 plants. Of these 11 species, one federally endangered plant species (*Gymnoderma lineare*) and two threatened plant species (*Isotria medeoloides* and *Trillium persistens*) are known to occur either on the NNF, CONF, or SNF within the Chattooga WSR Watershed.

GIS was used to examine the distribution of EOs on the three forests and general vicinity. These records and distribution maps were reviewed to determine areas of known populations of locally rare species within the proposed project area. Based on these information sources the potential affected rare species list for the upper Chattooga WSR project was filtered to derive those species with the greatest likelihood of occurrence. Species were eliminated based on range information such as only occurring at higher elevations in the NC or GA mountains, or in the foothills or Piedmont at lower elevations in SC or GA. For instance, *Trillium persistens* has a very restricted range in South Carolina and Georgia that is nowhere near the proposed activity areas. Other species were excluded from further analysis because proper habitat did not occur within the proposed activity area. These habitats included Southern Appalachian bogs, swamp forest bogs, high elevation rocky summits and basic mesic forest. Suitable habitat for *Isotria medeloides* is incompletely known and problematic to eliminate from project review. The species does not occur under dense *Rhododendron maximum* thickets which occurs over the vast majority of the proposed activity area. However open understory portions of the analysis areas could not be completely excluded. *Isotria medeloides* tends to occur in plant communities with three or more associated orchid species. Surveys for this species were intensified in areas with these conditions.

The final filtered list of federally listed species that occurs within the Chattooga WSR corridor that might be affected by the proposed project includes two plants, one nonvascular, *Gymnoderma lineare*, rock gnome lichen and one vascular, *Isotria medeloides*, small whorled pogonia. A field survey for these two species was completed at the project areas. *Gymnoderma lineare* species was located in 2007 within the main stem Chattooga WSR just north of the confluence with Fowler Creek. It does not occur within one aerial mile of all the proposed activity areas. It was searched for at all the proposed access sites. No new sites were located for this lichen. It would not be affected by Alternative 2. *Isotria medeloides* was

not located within any of the proposed sites with potential habitat. Thus, this species would not be affected by alternatives.

#### 4. Sensitive Plants

All Region 8 sensitive species that occur or could occur on the NNF, CONF or the SNF were initially considered in this analysis. The list of species was compiled by reviewing: (1) North Carolina Natural Heritage Program EO records; (2) Georgia Nongame Conservation Section EO records; (3) SCDNR EO records; and (4) U.S. Forest Service rare species inventory records.

GIS was used to examine the distribution of individual species occurrences within the Chattooga WSR watershed across the three states. These records and distribution maps were reviewed to determine areas of known populations of rare species within the proposed project areas. Based on these information sources, the potential affected rare species list for the upper Chattooga WSR boating access project was assessed to derive those species with the greatest likelihood of occurrence.

Species were excluded from further analysis because proper habitat did not occur within the proposed activity area. These habitats included Southern Appalachian bogs, swamp forest bogs, dry oak forest and rich cove forest. Some species were eliminated from further analysis if they were known to occur within the project area but unlikely to be impacted by any project activities. For instance, *Schlotheimia lancifolia* and *Cheilolejeunea evansii* are known to occur on the bark of hardwood trees and have been documented near the Chattooga WSR in NC and/or SC depending on the individual species (Davison et al., 1996). However the two bryophytes typically occur on the bark of older deciduous trees and are unlikely to be impacted by the proposed trail projects. Species such as *Hymeophyllum tayloriae*, *Pellia appalachiana*, *Platyhypnidium pringlei* and *Aneura maxima* are only known to occur in very wet grottoes or near spray cliffs (waterfalls). These four species were not located during the 2007 survey or prior surveys within easily accessible microsites that would tend to invite exploration by recreationists. Other rare plant species such as *Packera millefolium*, *Carex biltmoreana* and *Solidago simulans* are known to occur in nearby rock outcrops but they are either undetectable from the river or at a height on almost vertical rock that is essentially inaccessible to anyone except rock climbers. *Rhododendron vaseyi* is only known from North Carolina. While it occurs within the uppermost headwaters of the Chattooga River watershed, it has typically been located within Southern Appalachian bogs, wet meadows or northern hardwood forests, all which are not present within the proposed project area. Even though the very low likelihood of occurrence within the proposed project area, the species was searched for within the NC project area and not located.

Finally a few of the more readily discernible species were eliminated since they were not located within or near the project area during the more recent 2007 Chattooga WSR field review. For instance *Riccardia jugata*, a thalloid liverwort, has not been located within any of the southern escarpment gorges since 1961 despite this survey as well as other surveys. The final filtered list of 17 potentially affected species occurring within the Chattooga WSR corridor that could be affected by the proposed trail projects are included in Table 3.5-3.

These species with the greatest likelihood of occurrence within the project areas were searched for during the field review.

**Table 3.5-3. Regionally Sensitive Plant Species in the Chattooga WSR Corridor that could be Affected by any Alternative.**

Species	Species Ranking		Forest List (Occurrences)	Range and Habitat
	Global	State		
<b>**Acrobolbus ciliatus</b>	G3?	S1 (NC) SNR (GA) SNR (SC)	NNF (4) SNF (1)	Southern Appalachians within the Carolinas, TN and GA. Humid or moist rocks in steep gorges or shaded outcrops.
<b>**Cephalalozia macrostachya ssp. australis</b>	G4T1	S1 (NC)	NNF (1)	NC within Linville Gorge and Chattooga Gorge. Crevices of streamside rocks.
<i>Peltigera hydrothyria</i>	G4	S3 (NC)	NNF (70+)	Western NC, VA, PA, southeastern Canada and Pacific Northwest. Aquatic lichen generally found attached to rocks partially submerged on the edge of swift-flowing, steep-gradient streams.
<b>**Lejeunea blomquistii</b>	G1G2	S1 (NC) S1 (GA) S1 (SC)	NNF (2) CONF (1)	KY, TN, Carolinas and GA. Typically occur on horizontal rock, dry, and in partial sun.
<b>**Lophocolea appalachiana</b>	G1G2Q	S1 (NC) S1 (SC)	NNF (7) CONF (1)	KY, TN and Carolinas. Typically occurs on shaded wet rocks or seeps.
<i>Sweet Pinesap</i> <i>Monotropis odorata</i>	G3	S3 (NC) S1 (GA) S2 (SC)	NNF (6) CONF (4) SNF (10)	Broad range from DE and WV south to AL, GA, and FL; generally rare throughout; habitat generally acid humus under pines or ericaceous shrubs although also rich cove forest
<b>**Fraser's loosestrife</b> <i>Lysimachia fraseri</i>	G3	S3 (NC) S1 (GA) S3 (SC)	NNF (36) CONF (13) SNF (50)	Mountains of NC, SC, TN and GA, disjunct to AL, KY and IL. Found in a variety of habitats including acidic cove forest, mesic oak-hickory forest, montane oak-hickory forest, dry oak-hickory forest, wet rock outcrops, and river rocky shoals and islands.
<b>**Marsupella emarginata</b> <i>var. latiloba</i>	G5T1T2	S1 (NC)	NNF (2)	NC and VT. Typically occurs within damp shaded rock outcrops.
<b>**Plagiochila austinii</b>	G3	S1S2 (NC) SNR (GA)	NNF (5)	GA, NC and TN north to VT and Nova Scotia. Typically in damp shaded rock outcrops; occasionally associated with spray cliffs.
<b>**Plagiochila caduciloba</b>	G2	S2 (NC) S1? (GA) S1 (SC)	NNF (13) CONF (1) SNF (1)	KY, TN, NC, GA and SC. Shaded damp rocks on vertical rock walls or undersides of ledges; occasionally associated with spray cliffs.
<b>**Plagiochila sharpii</b>	G2G4	S2 (NC) S1? (GA) S1 (SC)	NNF (8) CONF (2) SNF (1)	Southern Appalachian mountains of TN, NC, GA and SC. Wet boulders and outcrops in river gorges.
<b>**Plagiochila sullivantii</b> <i>var. sullivantii</i>	G2T2	S2 (NC) SH (GA) S? (SC)	NNF (4) CONF (1)	WV south to the Carolinas. Deeply shaded overhung rock walls and ledges within gorges; can be associated with spray cliffs and shaded rock outcrops.
Carolina star moss <i>Plagiomnium carolinianum</i>	G3	S2 (NC) S2? (GA) S1 (SC)	NNF (3) CONF (4) SNF (1)	TN, NC, GA, SC. Wet, dripping rocks with a thin soil layer or wet humus in seepage areas.



Species	Species Ranking		Forest List (Occurrences)	Range and Habitat
	Global	State		
<b>**Radula sullivantii</b>	G3	S3(NC) SNR (GA) SNR (SC)	NNF (18) CONF (5) SNF (6)	Northern SC, northeastern GA, western NC, and eastern TN. Locally abundant within escarpment gorges on shaded rock outcrops near streams and rivers, most frequently collected rare liverwort in 2007 survey,
<i>Pink Shell Azalea</i> <i>Rhododendron</i> <i>Rhododendron vaseyi</i>	G3	S3 (NC)	NNF (15)	NC endemic present at the southern edge of its range in the Chattooga River watershed. Occurs in high elevations from closed canopy Northern Hardwood forests to partially open areas including seeps, boulder fields, meadows, and Southern Appalachian bogs.
<i>Southern Nodding</i> <i>Trillium</i> <i>Trillium rugellii</i>	G3	S3 (NC) S3 (GA) S2 (SC)	NNF (18) SNF (1)	Mesic forests of the mountains and Piedmont in the Carolinas, GA, TN, and AL; locally abundant in Ga and NC forests, less abundant in Chattooga River watershed
<i>Sweet White Trillium</i> <i>Trillium simile</i>	G3	S2 (NC) S2 (GA) S1S2 (SC)	NNF (3) SNF (7)	Southern App endemic from NC, TN, GA, and SC; typically in rich cove or mesic hardwood forest with mafic or calcareous rock influence

## 5. Locally Rare Plants

The three national forests, as well as the geopolitical boundaries, complicate the analysis for plants. There are 176 forest concern plant species with suitable habitat or occurrences on the NNF. Eighty-six (identified as locally rare) are possible on the CONF. The SNF does not track any forest concern/locally rare species. For simplicity and clarity in this document, both the NNF and the CONF species will be referred to as locally rare. Only 19 of the 242 total species are tracked both within the NNF and the CONF. Fifty-one of the species listed by the CONF are known to occur in western North Carolina on the NNF but are not considered rare enough to formally track. These 51 species are generally at the southern edge of their range. Sixteen of these 48 species are also tracked as rare by SCDNR but not tracked as locally rare by the SNF. Five of these plants, *Carex manhartii*, *Carex scabrata*, *Juncus gymnocarpus*, *Lygodium palmatum* and *Stewartia ovata*, are known to occur near the Chattooga WSR on the SNF. There is a single site for *Carex scabrata* located within the Chattooga WSR corridor but not near the proposed activity areas. The species is located in shaded seeps in areas not heavily impacted by recreational users and would not be impacted by the proposed project. Other South Carolina rare plant species (*Boykinia aconitifolia*, *Krigia montana*, *Circaea lutetiana ssp. canadensis*, *Aristolochia macrophylla* and *Stachys tenuifolia var. latidens*) have either been documented on boulders in the Chattooga WSR or on the adjacent floodplain in the SNF. The former two species appear to be locally common within the upper segment of the Chattooga WSR and were observed frequently during the 2007 field survey in NC, Ga and SC. None of these five species will be analyzed for the boater access project since they are not formally tracked by the SNF, the CONF or the NNF. An analysis by elimination of suitable habitat within the project areas was used to filter the potentially affected locally rare plant list (Table 3.5-4).

**Table 3.5-4. Nantahala and Chattahoochee NFs Locally Rare Plant Species with Potential Habitat within the Proposed Project Areas that could be affected by Alternative 2.**

Species	Species Ranking		Forest List (Occurrences)	Range and Habitat
	Global	State		
Sword moss <i>Bryoxiphium norvegicum</i>	G5?	S1 (NC)	NNF (3)	Widely distributed across the U.S but very rare across eastern states. Shaded moist rocks on ledges or sometimes overhanging water.
**Blue Ridge bindweed <i>Calystegia catesbeiana</i> ssp. <i>Sericata</i>	G3	S3 (NC) SNR(GA) SNR (SC)	CONF (18)	Carolinas and GA to the FL panhandle. Historically distributed within xeric openings in upland forests or associated with outcrops. Typically restricted to roadside edge, power lines or trails.
**Manhart's sedge <i>Carex manhartii</i>	G3G4	S3 (NC) S2 (GA) S2 (SC)	CONF (28)	Northern GA and eastern TN to southwestern VA and southern WV. Habitat ranges from moist montane oak-hickory forest to rich cove forest and open acidic cove forest.
<i>Chiloscyphus muricatus</i>	G5	S1 (NC)	NNF (2)	NC and TN. Rock outcrops within humid gorges
Lime Homalia <i>Homalia trichomanoides</i>	G5	S1 (NC)	NNF (3)	WA, WI, MI and VT south to TN and NC. Within outcrops in humid gorges or spray cliffs.
Seep rush <i>Juncus gymnocarpus</i>	G4	S3 (NC) S2S3 (GA)	CONF (18)	Eastern PA south to eastern TN, northeastern GA and northern SC. Abundant across escarpment gorges.
Kidneyleaf twayblade <i>Listera smallii</i>	G4	S4 (NC) S2 (GA) S1 (SC)	CONF (8)	PA south to TN, GA and SC. Occurs in mesic hemlock forest typically underneath rhododendron thickets.
Climbing fern <i>Lygodium palmatum</i>	G4	S3 (NC) S2 (GA) S3 (SC)	CONF (6)	MA west to MI south to KY, MS and FL. Moist thickets, islands and bogs.
<i>Pohlia lescuriana</i>	G4?	S1? (NC)	NNF (2)	Nova Scotia to WI south to NJ, TN and NC. Wet soil in open areas & on the banks of streams or ditches.
**Mountain camellia <i>Stewartia ovata</i>	G4	S2 (NC) S3 (GA) S2 (SC)	NNF (11) CONF (2)	VA and KY south to MS and FL. Acidic bluffs typically in rhododendron thickets.
Appalachian bristle fern <i>Trichomanes boschianum</i>	G4	S1 (NC) S1 (GA) S1 (SC)	NNF (3) CONF (3) SNF (2)	OH and WV south to the Carolinas. Vertical or overhanging rock outcrops, usually in deeply shaded grottos.
Dwarf filmy fern <i>Trichomanes petersii</i>	G4G5	S2 (NC) S2 (GA) S2 (SC)	NNF (7) CONF (2) SNF (3)	Western NC and eastern TN south to FL and LA and north to AR and IL. Vertical faces of acidic rocks; typically on drier rocks within humid gorges.

## **Surveys**

A field survey was completed by Gary Kauffman, National Forests in NC botanist, in September 2012 for the Green Creek, Norton Mill Creek and Bull Pen Bridge access sites. The access site at Burrells Ford was evaluated by Mike Brod, Chattahoochee zone wildlife biologist, in November 2012 and confirmed that the area did not provide suitable habitat for PETS species. Although the adjacent riparian zone could serve as suitable habitat for some PETS species, this habitat would not be affected by the proposed project activities. The Lick Log site was surveyed by Chris Holcomb, Andrew Pickens biological technician, during late summer/early fall 2012 and again in April 2014.

Other botanical field surveys have been conducted around the Chattooga River Trail and in these areas during the last 20 years. Gary Kauffman surveyed portions of the area during the late 1990s and early 2000s. Portions of the surrounding landscape have had previous bryological surveys by Dr. Paul Davison, University of North Alabama professor, while preparing for his bryology course at Highlands Biological Station. A team of U.S. Forest Service botanists/ecologists (Robin Mackie, SNF; David Danley, Pisgah NF; Dr. Wilson Rankin, NNF; and Gary Kauffman, National Forests in NC) and a botanical consultant, Dr. L. L. Gaddy, conducted surveys from mid- August to early October 2007. Much of the botanical field work concentrated on bryophytes in the river channel or the stream banks.

Botanical field surveys in 2007, 2012 and in 2014 indicate that NNIS plants are scattered across the corridor with greater concentrations within disturbed areas and in sandbars adjacent to the river. The potential exists for damage to locally rare species in sensitive settings along riparian zones. Interim boating access has been occurring at all the proposed access sites but at lower numbers than estimated in the 2012 EA. Effects analyzed compare interim use at the five access sites (Alternative 1) to the proposed action (Alternative 2).

American ginseng was located within the uppermost reach of the corridor along an access trail. However, optimal suitable habitat for this species was determined not to be present within the Chattooga WSR corridor.

The primary effects on vegetation from alternatives 1 and 2 would be trampling of plants and increased introduction of NNIS by likely recreational use increases on designated trails and at boater access sites. This effects analysis is based on recreation use of existing and proposed trails and boater put-in/take-out spots as described in Alternative 2.

### **1. Ecological Communities**

#### **A. Alternative 1 - Direct and Indirect Effects**

Alternative 1 is the current management approach and is considered the baseline or current condition for comparison among the two alternatives.

The primary impacts would be on riparian communities including Eastern hemlock-hardwoods, acidic cove, alluvial forest, alluvial island and rocky shoals. Alternative 1 would not result in the loss of any plant community. The almost complete death of Eastern hemlock within the corridor from hemlock wooly adelgid will result in more species composition and structural changes than in any of

the other plant communities. Eventually this community may more closely resemble acidic cove forest although the overstory canopy may be less dense depending on the ability of trees regenerating under the dense *Rhododendron maximum* shrub layer.

Another potential impact on ecological communities would be the continued introduction of additional NNIS from recreation users. NNIS were observed throughout the riparian areas of the river corridor, including *Microstegium vimineum*, *Paulownia tomentosa*, *Pueraria lobata*, *Ailanthus altissima*, *Rosa multiflora*, *Ligustrum sinense*, *Dioscorea polystachya*, *Miscanthus sinensis*, *Lespedeza bicolor*, *L. cuneata*, *Lonicera japonica*, *Albizia julbrissin* and *Elaeagnus umbellulata*. Generally, most outbreaks were small and did not dominate any one plant community. Review by personnel from all three forests in the late 2000's indicates *Miscanthus sinensis* may be on the increase. While little baseline data is available, anecdotal information suggests greater spread of NNIS within sandbars across the corridor. With the exception of *Miscanthus sinensis*, non-native invasive plant species tend to be more frequent within riparian areas and increase with greater flood frequency (Brown and Peet, 2003).

#### **B. Alternative 1 - Cumulative Effects**

Ground-disturbing activities, including timber harvest, road reconstruction and prescribed burning, have the potential to introduce non-native invasive plant species (see Table 3.1-1).

The continued introductions of non-native invasive plant species from recreation use on user-created trails and at the current boater put-in and take-out spots would be additive to non-native introductions that occur as a result of other management activities as well as possible introductions in the river from private property upstream. Projects to remove NNIS would subtract from these additions. One specific project focusing on control of *Miscanthus sinensis* (an NNIS) may result in decreases in this species across the Chattooga WSR watershed. However, it is likely that a net increase in introductions of other NNIS would occur over time with this alternative.

Past, present and reasonably foreseeable impacts to riparian communities including Eastern hemlock-hardwoods, acidic cove, alluvial forest, alluvial island and rocky shoals are unlikely. Most projects are located outside riparian communities.

#### **C. Alternative 2 - Direct and Indirect Effects**

The primary impacts would be on riparian communities including Eastern hemlock-hardwoods, acidic cove, alluvial forest, alluvial island and rocky shoals.

This alternative may result in fewer outbreaks of NNIS than Alternative 1 since trails and boater access sites would be designated. With designated trails and put-in and take out sites there would likely be less use of user-created trails. In addition, dying hemlock will eventually fall and begin to block some of these trails making cross country travel more cumbersome. Over time, these user-created trails would revegetate naturally and the dying hemlock will also help block use of some of these trails. Alternative 2 would result in minor new outbreaks of NNIS and would not substantially impact existing ecological communities.

This alternative would not result in loss of any ecological plant community. The almost complete decline of hemlock from hemlock woolly adelgid within hemlock-hardwood forest is already occurring and will not be increased or decreased by this alternative.

#### **D. Alternative 2 - Cumulative Effects**

Ground-disturbing activities, including timber harvest, road construction, and prescribed burning, have the potential to introduce NNIS (see Table 3.1-1). Past, present and reasonably foreseeable impacts to riparian communities including hemlock/ hardwoods, acidic cove, alluvial forest, alluvial island and rocky shoals are unlikely. Most existing projects and private land use activities are located outside of riparian communities.

The additional introductions of NNIS from designating, constructing, reconstruction and maintain recreation use of trails and boater put-in and take-out sites would be additive to non-native introductions that occur as a result of other management activities as well as possible introductions in the river from private property upstream. Projects to remove NNIS would subtract from these additions. One specific project focusing on *Miscanthus sinensis* (an NNIS) may result in decreases in this species across the Chattooga WSR watershed. However, it is likely that a net increase in introductions of other NNIS would occur over time with this alternative.

Past, present and reasonably foreseeable impacts to riparian communities including Eastern hemlock-hardwoods, acidic cove, alluvial forest, alluvial island and rocky shoals are unlikely. Most projects are located outside riparian communities.

### **2. MIS**

#### **A. Alternative 1 - Direct and Indirect Effects**

This alternative would not change the amount of suitable habitat for *Panax quinquefolius* within the Chattooga WSR Corridor. Habitat for this species is not high quality for the corridor. American ginseng is more abundant in soils with higher nutrients and calcium content.

A few individuals of American ginseng were located within an upland site in the Chattooga Cliffs Reach. There are no impacts to this species from current recreation. The greatest likelihood for collection of this species is in the fall since it is more visible when it bears red fruits. In the winter the plant would not be visible aboveground.

American ginseng is most impacted by commercial harvest of the roots. During the last several years there have been increases in harvest intensity as a consequence of either price increases or unemployment. Given that recreational use within the area is likely to increase, there is a greater likelihood of direct effects by collection of the roots, either during the legal harvest season or prior to the season.

The greatest likelihood of impacts to the small populations in the Chattooga Cliffs Reach is not anticipated from unpermitted opportunistic harvesters since this area is not a desirable area to collect

ginseng. This alternative does not propose any new recreational use in the area; therefore any impacts to this species should be minimal.

## **B. Alternative 2 – Direct and Indirect Effects**

This alternative would not result in any changes in the amount of suitable habitat for the species. The greatest likelihood for collection of this species is in the fall since it is more visible when it bears red fruits. Loss of the species from regular recreational users is less likely in spring and summer. Therefore, designation and construction of a trail at Green Creek and the boater access site would not directly impact the known American Ginseng population. Most people would stay on the designated trail system; this would reduce the potential to cause impacts to these plants. Over time, the continued use of user-created trails in the area would decrease as vegetation regrows and hemlock begins to fall, blocking access to some of these trails and reduce the potential for impacts to American Ginseng.

## **C. Alternative 2 and 3 – Cumulative Effects**

None of the past, present and reasonably foreseeable actions should impact the existing forest-wide downward trend for American ginseng populations (see Table 3.1-1 for a list of past, present and reasonably foreseeable management activities). These impacts are primarily associated with commercial harvest.

### **3. PETS and Locally Rare Plants**

All recreation users (hikers, anglers, backpackers, boaters) potentially could impact many of the plant species listed in Table 3.5-5 by trampling while walking on trails, rock slabs in and adjacent to the water, at grottos, spray cliffs and sand bars and scraping of rocks. Trampling of vegetation could occur within existing campsites and from boats traversing the river and portaging of boats around log jams are likely.

## **A. Alternative 1 - Direct and Indirect Effects**

Alternative 1 would have some direct and indirect effects on PETS and forest locally rare species associated with current recreational uses. Thirteen Regional Forester's sensitive plant species, *Acrobolbus ciliatus*, *Cephalalozia macrostachya* ssp. *australis*, *Marsupella emarginata* var. *latiloba*, *Peltigera hydrothyria*, *Lejeunea blomquistii*, *Lophocolea appalachiana*, *Lysimachia fraseri*, *Plagiochila austinii*, *Plagiochila caduciloba*, *Plagiochila sharpii*, *Plagiochila sullivantii* var. *sullivantii*, *Plagiomnium carolinianum*, and *Radula sullivantii* have been recently or previously located within the existing upper segment of the Chattooga WSR. There are 12 locally rare species that could be affected by existing recreational use: *Bryoxiphium norvegicum*, *Calystegia catesbiana* var. *sericata*, *Carex manhartii*, *Chiloscyphus muricatus*, *Homalia trichomanoides*, *Juncus gymnocarpus*, *Listera smallii*, *Lygodium palmatum*, *Pohlia lescuriana*, *Stewartia ovata*, *Trichomanes boschianum* and *Trichomanes petersii*.

**Table 3.5-5. Direct or Indirect Effects on PETS and Forest Locally Rare Plants by Alternative Y=Yes; N=No).**

Species	Forest Status	Alt. 1	Alt. 2	Potential Effects to Individuals
<i>Gymnoderma lineare</i>	endangered	N	N	Not likely to adversely affect
<i>Acrobolbus ciliatus</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Cephalalozia macrostachya</i> ssp. <i>australis</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Peltigera hydrothyria</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Lejeunea blomquistii</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Lophocolea appalachiana</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Lysimachia fraseri</i>	sensitive	Y	Y	Impacted on islands
<i>Marsupella emarginata</i> var. <i>latiloba</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Plagiochila austinii</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Plagiochila caduciloba</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Plagiochila sharpii</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Plagiochila sullivantii</i> var. <i>sullivantii</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Plagiomnium carolinianum</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Radula sullivantii</i>	sensitive	Y	Y	Impacts on rocks in river and river bank
<i>Bryoxiphium norvegicum</i>	locally rare	Y	Y	Impacts on rocks in river and river bank
<i>Calystegia catesbeiana</i> ssp. <i>sericata</i>	locally rare	Y	Y	Impacted by trail closures
<i>Carex manhartii</i>	locally rare	Y	Y	Impacted by portage trails, campsites
<i>Chiloscyphus muricatus</i>	locally rare	Y	Y	Impacts on rocks in river and river bank
<i>Homalia trichomanoides</i>	locally rare	Y	Y	Impacts on rocks in river and river bank
<i>Juncus gymnocarpus</i>	locally rare	Y	Y	Impacted on islands
<i>Listera smallii</i>	locally rare	Y	Y	Impacted by portage trails
<i>Lygodium palmatum</i>	locally rare	Y	Y	Impacted by campsites, portage trails
<i>Pohlia lescuriana</i>	locally rare	Y	Y	Impacts on rocks in river and river bank
<i>Stewartia ovata</i>	locally rare	Y	Y	Impacted by campsites, portage trails
<i>Trichomanes boschianum</i>	locally rare	Y	Y	Impacts on rocks in river and river bank
<i>Trichomanes petersii</i>	locally rare	Y	Y	Impacts on rocks in river and river bank

Direct effects would include trampling and/or manipulation of the shrub and herb layers while accessing current user-created trails and boat launching sites with interim access. Anglers, hikers and other users could also directly affect locally rare bryophytes and lichens by scraping occupied rocks and trampling streamside vegetation. Trampling and removal of vegetation associated with the creation of user-created trails would have an indirect effect on competition among associated understory species. Species such as *Juncus tenuis* or NNIS that favor compacted soils may increase and displace locally rare species such as *Carex manhartii*, *Lygodium palmatum* or other sensitive or locally rare species on the islands such as *Lysimachia fraseri* or *Juncus gymnocarpus*.

None of the current or anticipated use is expected to eliminate any of the populations or subpopulations from the Chattooga WSR Corridor. Species are persisting with the existing recreational use based on species collections during the 2007 survey, past surveys and in more difficult to reach microsites. Monitoring in 2013 indicated no decrease in the extent of *Gymnoderma lineare* along the Chattooga WSR and in Fowler Creek. In NC, no impacts to habitat from

recreational use was noted where four sensitive and three locally rare plant species had previously been located within the Chattooga WSR corridor. In GA, there were no impacts from recreational use to *Lejeunea bloomquistii*, *Lophocolea appalachiana* and *Listeria smallii* (2014 Monitoring Report). No stringers were located across the Chattooga WSR at any of these sites. There would be impacts to some individual sensitive and locally plant species from the existing recreational use. However, these plants would continue to exist in the river corridor and, though individual sensitive or locally rare plant species would be impacted it is not likely to cause a trend to federal listing or a loss of viability.

In the past 10-20 years, recreational use has increased on the trails and on the river within the wild and scenic corridor. This increased use has affected individual rare plants. Current recreational activities are anticipated to continue in the future in the most accessible portions of the river corridor.

## **B. Alternative 2 – Direct and Indirect Effects**

By designating trails and put-in and take-out sites, this alternative reduces the amount of user impacts on species compared to Alternative 1. Impacts on trails and at the put-in and take out sites would be reduced with Alternative 2 as there would be less reliance on user-created trails. Most users would rather travel a well maintained trail to the river than go cross-country. In addition, dead hemlock trees are beginning to fall making cross-country travel more difficult resulting in subtly directing recreation users on designated trails. Existing log jams in the river also increase the likelihood of portage trail needs. Current boater use numbers combined with recent plant monitoring indicates that portage trail use if occurring is very sporadic. The report, *Capacity & Conflict on the Upper Chattooga River* (Whittaker and Shelby 2007) states that most portages would likely occur within the river channel itself and only a limited number of trails would occur on the river bank. There would be impacts to some individual sensitive and locally rare plant species under Alternative 2. However, these plants would continue to exist in the river corridor. Therefore, this alternative would not likely cause a trend to federal listing or a loss of viability.

Within NC, two rare species were located. A new subpopulation of *Radula sullivantii*, a regional sensitive liverwort, was located downstream of Bullpen Bridge. It is possible *Plagiochilla sharpii* could have been missed in the survey downstream of the Bull Pen Bridge. Two locally rare plant species were either observed or suitable habitat is present at the Bull Pen site also. *Bryoxiphium norvegicum* was relocated upstream of the bridge. A previous occurrence of *Pohlia lescuriana* was located on the Chattooga River Trail near the bridge and may have been overlooked during the survey. It was determined the trail access site may directly impact individuals of three species (except *Bryoxiphium norvegicum*) by increased trampling either at the put-in by the water's edge or along the road at the trail start. These impacts could result in the death of these individuals. The potential for direct impacts to *Plagiochilla sharpii* is low since it more typically occurs on overhanging rocks which would be less likely to be trampled. For *Pohlia lescuriana*, it is not anticipated the species would be eliminated from the Chattooga WSR watershed with impacts from the proposed project since it has previously been located on the Chattooga WSR Trail and near Bull Pen Road east of the bridge. Given the preference of this species for non-specialized habitat, acidic bare soils within the piedmont and the mountains of North Carolina, it is doubtful the proposed trail project would result in a viability concern for this species across the Nantahala and Pisgah national



forests. *Radula sullivanii* was the mostly commonly encountered rare liverwort species within the Chattooga WSR watershed during the 2007 survey. Thus the possible loss of a few individuals would not result in the loss of viability for this species across the watershed or the NNF.

Near the boater take-out site at Lick Log, there are three sensitive liverworts *Radula sullivanii*, *Plagiochila caduciloba* and *Acrobolbus ciliatus* either at the confluence of Lick Log Creek and the Chattooga WSR or just north of the confluence. All three species were found during the 2007 survey. It is unlikely they would be impacted by Alternative 2 given their location away from the boater take-out site (approximately 400 feet) and trail construction. Suitable habitat was not found for these three species within the activity area. The Lick Log area was surveyed in the fall 2012 and again in April 2014 for two Trillium species, *T. rugelli* and *T. simile* and for *Monotropsis odorata*. The species were looked for again in spring 2014 since the previous survey was completed late and they could have been dormant. None of the three species were located during the 2014 spring survey. There would be no impacts to these species from Alternative 2.

### **C. Alternatives 1 and 2 – Cumulative Effects**

The cumulative effects (Table 3.1-1) from past, present and reasonably foreseeable actions on PETS and locally rare plant species within the corridor are not anticipated to result in the loss of any existing species but may contribute to a reduction in population size of individual species.

On private property in the corridor and the watershed, recent home development, road construction and reconstruction have contributed to the loss of suitable habitat for the forest-associated species and to a lesser extent to the river gorge-associated species. These cumulative effects associated with private property are expected to continue for the foreseeable future given the high land values across the watershed.

## **3.6 Social Environment**

### **3.6.1 Human Health and Safety**

#### **Affected Environment**

Safety issues related to boating were addressed in the 2012 EA. That document and the analysis completed are incorporated by reference in this EA. This assessment will focus on the human health and safety risks associated with the construction, reconstruction and maintenance of trails and the boater access sites. Trail construction, reconstruction and maintenance involve cutting trees, down logs, understory vegetation and leveling the surface to produce a level treadway. Risks during project implementation would be minimized by adhering to the U.S. Forest Service Health and Safety Code FSH 6709.11 and Occupational Safety and Health Administration (OSHA) regulations

### **A. Alternative 1 – Direct and Indirect Effects**

This alternative would have no effect on human health and safety beyond current management activities in the area. Trail construction, reconstruction work would not be done and maintenance work would be limited to existing designated trails. Trails would be closed temporarily and signed as

appropriate to protect the public during maintenance activities. Boaters would continue to use system and user-created trails and old road beds to access the river.

**B. Alternative 2 – Direct and Indirect Effects**

Felling trees and cutting up down woody material with chainsaws presents the greatest risk to workers. In accordance with U.S. Forest Service Health and Safety Code Handbook, all workers are required to wear personal protective equipment when performing certain work activities (such as using a chainsaw or Pulaski). Safety equipment includes items such as hard hats, gloves, eye and ear protection and chaps. Monitoring of compliance with these regulations would be accomplished through on-site inspections and reviews of accident reports (USDA, 1989b). Trails would be closed temporarily and signed as appropriate to protect the public during construction, reconstruction and maintenance activities to minimize or eliminate safety risks.

**C. Alternatives 1 and 2 – Cumulative Effects**

Past, present and foreseeable future activities (listed in Table 3.1-1) are not in the vicinity of the current access sites and would not result in cumulative adverse effects to human health and safety.

**3.6.2 *Social Impact Analysis***

**Affected Environment**

Six factors were considered in evaluating the social effects of the alternatives following direction contained in U.S Forest Service Handbook (FSH 1909.17, Chapter 30). Additional information is contained in the 2012 EA.

Information for the County Region is compared to the three-state area (Georgia, North Carolina and South Carolina) and to the U.S. Data was derived from the Economic Profile System-Human Dimensions Toolkit (EPS-HDT). This program produces detailed socioeconomic reports of counties, states and regions, including custom aggregations. The reports for this project are contained in the project file.

**Social and Economic Overview**

Table 3.6.2-1 provides a comparison of demographic, income and social structure in the County Region as compared to the three state areas and the US.

**Table 3.6.2-1. Profile of Demographics, Income and Social Structure – A Comparison of the County Region, Three-State Area and the U.S.**

Indicators		County Region	Three State Area	U.S.
Demographics	Population Growth (% change, 2000-2012*)	13.8%	18.0%	9.8%
	Median Age (2012*)	na	na	37.2
	Percent Population White Alone (2012*)	89.4%	65.6%	74.2%
	Percent Population Hispanic or Latino (2012*)	5.3%	7.9%	16.4%
	Percent Population American Indian or Alaska Native (2012*)	2.4%	0.6%	0.8%
	Percent of Population 'Baby Boomers' (2012*)	31.3%	27.8%	28.1%
Income	Median Household Income (2012*)	na	na	\$53,046
	Per Capita Income (2012*)	na	na	\$28,051
	Percent Individuals Below Poverty (2012*)	19.8%	17.2%	14.9%
	Percent Families Below Poverty (2012*)	13.0%	12.9%	10.9%
	Percent of Households with Retirement and Social Security Income (2012*)	63.3%	45.9%	46.0%
	Percent of Households with Public Assistance Income (2012*)	19.2%	19.2%	18.7%
Structure	Percent Population 25 Years or Older without High School Degree (2012*)	16.5%	15.6%	14.3%
	Percent Population 25 Years or Older with Bachelor's Degree or Higher (2012*)	23.0%	26.8%	28.5%
	Percent Population That Speak English Less Than 'Very Well' (2012*)	2.7%	4.9%	8.7%
	Percent of Houses that are Seasonal Homes (2012*)	21.4%	4.0%	3.8%
	Owner-Occupied Homes where Greater than 30% of Household Income Spent on Mortgage (2012*)	36.6%	33.6%	36.6%
	Renter-Occupied Homes where Greater than 30% of Household Income Spent on Gross Rent (2012*)	47.2%	46.5%	48.1%

Table 3.6.2-2 provides a summary comparison of population, prosperity, private versus public employment and employment in commodity sectors that have the potential to be tied to public lands and changes in residential development.

**Table 3.6.2-2. Summary Profile – A Comparison of the County Region, Three State Area and US.**

Trends	County Region	Three-State Area	US
Population % change, 1970-2011	89.8%	96.3%	52.9%
Employment % change, 1970-2011	105.8%	126.1%	92.6%
Personal income % change, 1970-2011	266.6%	268.1%	168.5%
<b>Prosperity</b>			
Unemployment rate, 2012	9.7%	9.2%	8.1%
Average earnings per job, 2011 (2013 \$s)	\$38,999	\$49,411	\$55,704
Per capita income, 2012 (2013 \$s)	\$33,204	\$37,727	\$44,391
<b>Economy</b>			
Non-Labor % of total personal income, 2012	50.5%	36.4%	35.4%
Services % of total private employment, 2011	78.7%	83.3%	85.0%
Government % of total employment, 2011	18.8%	15.6%	13.8%
<b>Use Sectors</b>			
Timber % of total private employment, 2011	1.1%	1.2%*	0.7%

<b>Trends</b>	<b>County Region</b>	<b>Three-State Area</b>	<b>US</b>
Mining % of total private employment, 2011	0.2%	0.1%*	0.6%
Fossil fuels (oil, gas, & coal), 2011	0.0%	0.0%*	0.5%
Other mining, 2011	0.2%	0.1%*	0.1%
Agriculture % total employment, 2011	2.1%	1.1%	1.5%
Travel & Tourism % total private emp., 2011	17.5%	15.6%*	15.2%
<b>Federal Land</b>			
Federal Land % total land ownership	36.5%	6.5%	28.8%
Forest Service %	35.0%	3.0%	8.4%
BLM %	na	na	11.1%
Park Service %	0.3%	0.5%	3.4%
Military %	1.2%	1.6%	1.1%
Other %	na	1.5%	4.7%
Federal land % Type A**	6.8%	30.9%**	38.5%
Federal payments % of gov. revenue, FY07	0.5%	0.0%	na
<b>Development</b>			
Residential land area % change, 2000-2010	-1.0%	4.2%	12.3%
Wildland-Urban Interface % developed, 2010	na	na	16.3%

\*Approximated

\*\*Federal public lands that are managed primarily for natural, cultural and recreational features

## Social Variables

The following six categories (Forest Service Handbook 1909.17, 30-34, 33.7) are identified and evaluated for each of the alternatives:

1. Values, beliefs and attitudes (VBAs);
2. Lifestyles;
3. Social organization;
4. Population characteristics;
5. Land-use patterns; and
6. Civil rights.

### 1. Values, Beliefs and Attitudes (VBAs)

VBAs are representative of feelings, preferences and expectations people have for forests and the management and use of particular areas. Values relate to people's view of nature and public land management and the types of opportunities or benefits that are viewed as most desirable. Beliefs refer to how a group perceives: the U.S. Forest Service; how the agency manages resources; and the consequences of the agency's actions. Attitudes indicate people's support for or opposition to management decisions and actions the agency takes. The following statements are summarized from the analysis of comments received during scoping for the proposed project:

- We support you designating and formalizing the existing trail at Green Creek for hiking (including relatively few paddlers hiking to the river).

- The access at Burrells Ford Bridge includes existing multi-use trails for anglers, swimmers, paddlers, and other visitors to access the Chattooga WSR. They are not solely paddling access trails.
- The upper Chattooga WSR Gorge, in the area of this project, is home to a large number of rare species, including several aquatic species in the river and a large number of rare bryophytes.
- Allowing boating from Greens Creek invites trespass onto private property. Newly created user-created and designated trails would result in trespass through the private segment.
- The proposed Greens Creek Trail should be abandoned. The trail will needlessly increase impacts to the riparian zone and to riparian habitat.
- The U.S. Forest Service should make clear through signage, permits and web-posting the external location of the national forest boundaries and where boating will remain prohibited.
- Nothing in the 2012 Decision gives the agency the legal right to locate or create new trails in order to facilitate boater access.
- The issue which has yet to be addressed is about the degradation of the Chattooga headwaters that will be the result of the new, heavier usage of the natural areas.
- The whitewater folks are slowly taking what they originally intended – their use of the upper Chattooga whenever and wherever they please.

## 2. Lifestyles

Lifestyles include patterns of work and leisure; customs and traditions; and relationships with family, friends and others. People's lifestyles may be affected by management actions on a national forest through a direct economic relationship such as special-use permits or through indirect economic effects where recreational use of the forest is the foundation for the local tourism industry.

Table 3.6.2-1 indicates that more than 63 percent of households in the County Region have incomes derived from retirement and social security which is much larger than the three-state area and the nation. Likewise, the percent of seasonal homes is more than five times as much as the three-state area and the nation.

## 3. Social Organization

Social organization includes things that satisfy human needs, such as family, school, businesses and city government. The communities that make up the analysis area are small cities and towns set in a mountainous and relatively isolated part of the three-state area.

## 4. Population Characteristics

The population in the County Region is growing much faster than the nation but is a little slower than the three-state area. The average earnings per job are lower when compared to the three-state area and the nation. The 45-64 year-old age group had the largest increase in

population; the 35-44 year-old age group had the largest decrease during the 2008-2012 period.

## 5. Land-use Patterns

The County Region is mostly forested (Table 3.6.2-3) and mountainous with NFS lands comprising about 35 percent of the area.

**Table 3.6.2-3. Land Use in the County Region.**

Type	Acres	Percentage
barren	2,987	0.23
cropland	1,063	0.08
forest	1,062,157	80.38
grassland/herbaceous	203,430	15.40
Herbaceous wetlands	153	0.01
urban	15,128	1.14
water	36,463	2.76
<b>Total</b>	<b>1,321,381</b>	<b>100</b>

## 6. Civil Rights and Environmental Justice

Civil rights imply fair and equal treatment under the law, both within the agency and in its relations with the public. The U.S. Forest Service participates in special programs to enhance opportunities for equal participation of women, minorities and individuals with disabilities. Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) 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 disproportionate adverse impacts to these target populations from proposed federal actions and to identify alternatives that might mitigate these impacts. 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 and safety risks that may disproportionately affect children; and ensure that policies, programs, activities and standards address disproportionate risks to children.

### **A. All Alternatives – Direct and Indirect Effects**

Current use levels are unlikely to change under either alternative based on analysis completed in section 3.2.1. All five access locations provide opportunities for all recreation users to gain access to the river including the new boating user group.

#### 1. Values, Beliefs and Attitudes (VBAs)

Some historical users likely remain opposed to allowing boating on the upper segment of the Chattooga WSR. They are concerned with biophysical and social impacts to remote sections of the river especially at Green Creek. Local landowners are concerned that improved access at Green Creek would increase the potential for trespass on private lands even though the

U.S. Forest Service has painted landline boundaries in some locations to make people aware of where private lands begin. These concerns are likely to continue.

Comments received from the public during scoping seem to indicate that, they are not as concerned with the County Line Trail boater access. This trail is viewed as “less sensitive” from a number of perspectives. Boaters are unlikely to use the County Line Trail access location based on scoping comments received and use data collected from the 2012 and 2013 boating season. However, County Line Trail does provide access for other kinds of recreational use (hikers, anglers, hunters, etc.) and links to the well-used Chattooga River Trail. Designating it as part of the trail system would help formalize maintenance and address some of the existing resource impacts.

All access locations provide entry points to the river whether trails are designated or not. Concerns with biophysical impacts from recreational use are best handled by identifying improvements needed to provide manageable access to the river. Directing users on sustainable trails should decrease reliance on some user-created trails.

The agency is implementing site-specific decisions based on the 2012 Forest Plans. Alternatives 1 and 2 are unlikely to alter people’s values, beliefs and attitudes about recreation use in the upper segment of the Chattooga WSR.

## 2. Lifestyles

The high number of retirees and seasonal homes (Table 3.6.2-1) likely account for the high percentage of employment in the travel and tourism sector. People are likely to retire and to have second homes in the area so they can enjoy the natural environment that is predominantly managed by the U.S. Forest Service. This would not change under either alternative. Alternative 2 would likely: improve access for some individuals; reduce some of the adverse biophysical impacts at the current access sites; and improve users’ experiences.

## 3. Social Organization

Communities in the County Region are likely close knit with a slower and less stressed pace of life. They provide more opportunity for family time; a feeling of increased safety; access to open spaces and nature; and a lower cost of living. The alternatives would have no effect on the social organization of the communities.

## 4. Population Characteristics

The data indicates that “baby boomers” are retiring in the area. The higher population growth along with other indicators (high number of seasonal homes and the large percentage of non-labor personal income) may indicate that public lands managed by the U.S. Forest Service play a role in stimulating growth in the area. NFS lands likely add to the quality of life by providing a variety of recreational opportunities and improved esthetic surroundings to people that live in the area. The alternatives would have no effect on changing population characteristics in the area.

## 5. Land Use

The landscape is predominantly forested with the next highest category being grassland/herbaceous area. Together these account for about 95 percent of the land base in the County Region. The alternatives would have no effect on changing land use in the area.

## 6. Civil Rights and Environmental Justice

Similar access is provided under either alternative to the five locations. The alternatives do not disproportionately affect the health or environmental conditions for minorities and/or individuals or families living below the poverty level. Therefore, additional Environmental Justice analysis is not required. The alternatives do not affect equal participation by women and minorities. Accessibility guidelines for trails are exempt under these alternatives because the trails and trailheads are limited by the physical terrain of the access locations and the natural features are protected under current federal law (Wilderness Act and WSRA). There would be no increased health and safety risks to children from the alternatives.

### **B. All Alternatives – Cumulative Effects**

Table 3.1-1 lists past, present and reasonably foreseeable actions planned in the Chattooga WSR watershed.

#### 1. VBAs

Past, present and foreseeable activities on federal (Table 3.2-1) and private lands are unlikely to change the VBAs of people who live in the area and those who come to the forests to enjoy the variety of recreational activities within the Chattooga WSR Corridor. Current U.S. Forest Service management that separates recreational users by reach, time and flow seems to be having the desired effect of protecting the ORVs and reducing user conflicts in the upper segment. Parking capacity would not change at the five locations and analysis (section 3.2.1) indicates that access sites to the river are unlikely to change current levels of use.

#### 2. Lifestyles

Past, present and foreseeable activities on federal (Table 3.2-1) and private lands would continue to provide outdoor recreation opportunities that draw people to retire and own seasonal homes in the area. The largely forested and scenic areas would continue to provide opportunities for work and leisure centered on families, friends and communities.

#### 3. Social Organization

Past, present and foreseeable activities on federal (Table 3.2-1) and private lands would have a minor effect on local job opportunities and nature-based tourism. Existing guiding opportunities would continue. There would be no additional demand on county services from the alternatives.



#### 4. Population Characteristics

Past, present and foreseeable activities on federal and private lands listed in Table 3.2-1 along with the alternatives are not expected to impact population characteristics.

#### 3. Land-use Patterns

Past, present and foreseeable activities on federal (Table 3.2-1) and private lands are not expected to impact land-use patterns. The County Region would continue to be mostly forested with a smaller component of open private land managed for agriculture and grazing.

#### 6. Civil Rights

Past, present and foreseeable activities on federal (Table 3.2-1) and private lands are not expected to impact civil rights. Similar access is provided under each alternative to the five access locations. Accessibility would not be impacted by any of the past, present or reasonably foreseeable management activities. The alternatives would not disproportionately affect the health or environmental conditions for minorities and/or individuals or families living below the poverty level. The alternatives do not affect equal participation by women and minorities. There would be no increased health and safety risks to children from the alternatives.

### **3.6.3 Economics**

#### **Affected Environment**

Trail construction, reconstruction and periodic maintenance is needed to develop a long-term sustainable trail system at the boater access sites. Estimated costs are displayed in Table 3.6.3-1.

##### **A. Alternative 1 – Direct and Indirect Effects**

No additional trail maintenance costs would be expended under this alternative.

##### **B. Alternative 1 – Cumulative Effects**

Projects listed in Table 3.1-1 do not overlap economically with current use to cause cumulative effects. No specific actions on private lands were identified during scoping that may combine with the effects of the proposed action and contribute to cumulative effects.

##### **C. Alternative 2 – Direct and Indirect Effects**

Trail reconstruction work consists of hardening the trails, trail drainage, installation of a footbridge at Green(s) Creek and some tree removal. New trails would be constructed at the Bull Pen Bridge access site below the road and at Lick Log. All trails would be maintained to U.S. Forest Service standards. Estimated costs are displayed in Table 3.6.3-1.

**Table 3.6.3-1. Cost to Construct, Reconstruct and Maintain Boater Access Sites and Trails.**

Access Site	Distances*	Total Cost Construction/Reconstruction	Yearly Maintenance Costs Expected
Green(s) Creek	0.28 miles	\$6,000	\$460
Norton Mill Creek - County Line Trail	1.2 miles	\$2,500	\$460
Bull Pen Bridge - above road	<100 feet	Only Maintenance	\$230
Bull Pen Bridge - below road	<300 feet	\$2,000	\$230
Burrells Ford Bridge**	200 feet	\$3,400	\$1,900
Lick Log	500 feet	\$2,780	\$230
Burrells Ford obliteration of undesignated trails	375 feet	\$1,050	

\*distances are approximate, \*\*harden route, widen, armor bank, remove hazard trees

#### **D. Alternative 2 – Cumulative Effects**

Projects listed in Table 3.1-1 do not overlap economically with this alternative to cause cumulative effects. No specific actions on private lands were identified during scoping that may combine with the effects of the proposed action and contribute to cumulative effects.

### **3.7 Wilderness and Roadless Areas**

This analysis focuses on the Ellicott Rock Wilderness and the Big Mountain Roadless Area (aka Rock Gorge Roadless Area). The four qualities of wilderness character are used as a framework for analysis and discussion of the Ellicott Wilderness include:

1. Untrammeled
2. Natural
3. Undeveloped; and
4. Outstanding opportunities for solitude or a primitive and unconfined type recreation.

This analysis also incorporates by reference the information contained in the 2012 EA.

The proposed action that constructs a designated trail and provides boater access to the Chattooga WSR just below the Lick Log confluence would not impact Big Mountain Roadless Area.

The Bull Pen access site and trail are located just a few hundred feet within the boundary of the Ellicott Wilderness in the upper segment of the Chattooga WSR Corridor. Current activities in the Ellicott Rock Wilderness include hiking, backpacking, wildlife viewing, fishing, swimming, boating and other land-based activities.

Big Mountain Roadless Area is located in Oconee County, South Carolina (2,332 acres) and Rabun County, Georgia (2,923 acres). The area is in a very remote section of both the CONF and SNF and is bisected by the Chattooga WSR.

## **Ellicott Rock Wilderness**

Existing impacts to the wilderness character of the Ellicott Rock Wilderness include:

1. Untrammeled

The alternatives would not affect the untrammeled quality of wilderness because no actions are being proposed that would intentionally control or manipulate ecological systems in the wilderness. Therefore, this quality is not discussed further in effects analysis.

2. Natural

User-created trails, campsite impacts and NNIS populations may be impacting the environment.

Indigenous plants and animals that are listed or of concern, non-native invasive plant and animal species, water quality and soil disturbance and erosion are discussed in detail in other sections of this document.

3. Undeveloped

User-created trails exist within the Ellicott Rock Wilderness.

4. Outstanding opportunities for solitude or primitive and unconfined recreation

The wilderness receives high visitation during the high-use season (June 1–Aug. 31). Opportunities for solitude may decrease during this time of the year compared to the winter, low-use times. However, current encounter levels during high-use times are consistent with median tolerances for trail/river encounters in higher use wilderness settings (Dawson and Alberga, 2003). Opportunities for primitive or unconfined recreation remain stable throughout the year.

## **Big Mountain Roadless Area**

Big Mountain Roadless Area is located in Oconee County, South Carolina (2,332 acres) and Rabun County, Georgia (2,923 acres). The area is steep with a mixed hardwood/pine forest with numerous perennial and intermittent streams.

## **Ellicott Rock Wilderness**

Table 3.7-1 summarizes likely effects on wilderness quality indicators from the alternatives.

**A. Alternative 1 – Direct and Indirect Effects**

1. Undeveloped

Recreationists would continue to use existing user-created trails to access the river. They would continue to detract from the undeveloped character of the wilderness. The current user-created access site is just inside the wilderness boundary near Bull Pen Road and bridge and involves a steep walk down to the river.

2. Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

This alternative has minimal impact on solitude or primitive and unconfined recreation since the access site is just inside the wilderness boundary near Bull Pen Road and bridge.

**B. Alternative 2 – Direct and Indirect Effects**

**Ellicott Rock Wilderness**

1. Undeveloped

Designating a trail and access site would likely reduce reliance on other user-created trails in the area and allow vegetation to recover and begin to cover up signs of human use. The positive effect is reduced somewhat given the fact that the access site is just inside the wilderness boundary near Bull Pen Road and bridge.

2. Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

This alternative has minimal impact on solitude or primitive and unconfined recreation since the access site is just inside the wilderness boundary near Bull Pen Road and bridge.

**Table 3.7-1. Wilderness Quality Indicators for Alternatives 1 and 2.**

Quality	Component	Indicator	Summary of Effects by Alternative	
			1	2
Untrammelled Wilderness is essentially unhindered and free from modern control or manipulation	Authorized actions that control or manipulate the “earth and its community of life”	Actions authorized by the Federal land manager that manipulate the biophysical environment	0	0
	Unauthorized actions that control or manipulate the “earth and its community of life”	Actions not authorized by the Federal land manager that manipulate the biophysical environment	0	0
Natural Wilderness ecological systems are substantially free from the effects of modern civilization	Terrestrial, aquatic and atmospheric natural species and physical resources.	Indigenous plant and animal species that are listed or of concern	S	S
		Non-indigenous invasive plant and animal species	S	S
		Water quality	S	S
		Soil disturbance and erosion	S	S
	Terrestrial aquatic, and atmospheric biophysical processes	No indicators identified	na	na
Undeveloped Wilderness retains its primeval character and influence, and essentially without permanent improvement or modern human occupation.	Development	Non-recreational structures and improvements	*	*
	Mechanization	Motorized equipment use	0	0
		Mechanical transport use	0	0
	Loss of statutorily protected resources	Disturbance to cultural sites	S	S
Solitude or Primitive and Unconfined Recreation Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation	Outstanding opportunities for solitude	Remoteness from sights and sounds of people inside the wilderness	*	*
	Outstanding opportunities for primitive and unconfined recreation	Management restrictions on visitor behavior	0	0
***	Significant negative effect: Effects are long lasting and have the potential to significantly degrade this quality of the wilderness character.			
**	Moderate negative effect: Effects are of moderate to long-term duration and have potential to appreciably degrade this quality of wilderness character.			
*	Slight negative effect: Effects are of short-term duration; the effect on this quality of wilderness character is deemed negative though minor in intensity.			
0	No discernable effect: Effects of Alternative 2 on this indicator are negligible in intensity and duration.			
+	Slight positive effect: Effects are of short-term duration; the effect on this quality of wilderness character is deemed positive though minor in intensity.			
++	Moderate positive effect: Effects are of moderate to long-term duration and have potential to appreciably improve this quality of wilderness character.			
+++	Significant positive effect: Effects are long lasting and have potential to significantly improve this quality of the wilderness character.			
S	Analysis for this indicator has not been completed in this section; other sections of this EA cover this analysis.			

**C. Alternatives 1 and 2 – Cumulative Effects**

The effects of other past, present or foreseeable activities (Table 3.1-1), when combined with the effects of these alternatives, would not result in any cumulative adverse impacts on the four qualities of wilderness character within the Ellicott Rock Wilderness since projects do not overlap.

**Big Mountain Roadless Area**

**A. Alternative 1 – Direct and Indirect Effects**

This alternative would have no effect on the roadless area as current use at the Lick Log site would continue.

**B. Alternative 2 – Direct and Indirect Effects**

This alternative involves construction of a trail that would involve clearing and minor excavation with hand tools. The number of trees felled within the roadless area would be less than 25, all less than 6” in diameter. This alternative would have no effect on the roadless area as current use at the Lick Log site would continue.

**C. Alternatives 1 and 2 – Cumulative Effects**

The effects of other past, present or foreseeable activities (Table 3.1-1), when combined with the effects of these alternatives, would not result in any cumulative adverse impacts on the quality or predispose the Big Mountain Roadless Area to another use since projects do not overlap.

## **Chapter 4 – List of Preparers and Agencies/Persons Consulted**

### **Interdisciplinary (ID) Team**

- Mike Brod – Wildlife Biologist (CONF)
- Brady Dodd– Hydrologist (NC)
- Jason Jennings – Soil Scientist (FMS)
- Gary Kauffman – Botanist (NC)
- Jeff Magniez – Wildlife Biologist (FMS)
- Jason Farmer– Fisheries Biologist (NNF)
- Jim Knibbs – IDT Leader (FMS)

### **Core Team**

- Michelle Burnett –GISPPA Staff Officer (FMS)
- Tony White – SHIRE Staff Officer (FMS)

### **Steering Team**

- Betty M. Jewett – Forest Supervisor (Chattahoochee-Oconee National Forests)
- John Richard Lint – Forest Supervisor (Francis Marion and Sumter national Forests)
- Kristin M. Bail – Forest Supervisor (North Carolina National Forests)
- Mike Wilkins – Nantahala Ranger District (Nantahala Ranger District)
- Mike Crane – Andrew Pickens Ranger District (Andrew Pickens Ranger District)
- Ed Hunter – Chattooga River Ranger District (Chattooga River Ranger District)
- R8 – Planning

### **Specialist Input/Consulted**

- Doug Whittaker, Confluence Research and Consulting
- Thom Saylor, NC Recreation Staff
- Jim Bates, FMS Archaeologist,
- Rodney Snedeker, NC Archaeologist
- Andrew Triplett, NC Archaeologist
- James Wettstaed, CONF Archaeologist
- Mark Garner, FMS Wildlife Biologist
- Sheryl Bryan, NC Wildlife Biologist
- April Punsalan, NC Botanist/Ecologist
- Joe Robles, FMS Recreation Staff
- Robbin Cooper, FMS Landscape Architect
- Dick Rightmyer, CONF Soil Scientist
- Michelle Burnett, writer/editor

## **Other Agencies**

NC Department of Administration - Crystal Best  
NC Department of Cultural Resources - Renee Gledhill-Earley  
NC Department of Environment and Natural Resources - Lyn Hardison  
NC Department of Environment and Natural Resources - Michael Schafale  
NC Department of Environment and Natural Resources, Office of Conservation and Community Affairs  
NC Department of Public Safety - Kenneth W. Ashe  
NC Department of Transportation - Carrie Atkinson  
NC Division of Emergency Management - Carolyn Penny  
NC Division of Water Quality - Susan A. Wilson  
NC Wildlife Resource Commission - David G. McHenry  
SC Department of Natural Resources - Tom Swaynham  
US Fish and Wildlife Service – Georgia, North Carolina, South Carolina  
Tribal Historic Preservation Office of the Eastern Band Cherokee Indians - Yolanda Saunooke  
SC Archives and History Center, State Historic Preservation Office  
GA Department of Natural Resources, Historic Preservation Division  
NC Department of Cultural Resources, State Historic Preservation Office



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