

## Section 3.2.3 Aquatic Species and Habitat

**Table 3.2-21. Forest Listed Locally Rare Aquatic Species For The CONF And NNF.**

Species	Species Ranking				Forest List	Habitat
	Global	State	AFS	Forest		
Hellbender <i>Cryptobranchus alleganiensis</i>	G3G4	GA-S2 NC-S3 SC-SNR		LR	NNF	Rocky, clear creeks and rivers, usually where there are large shelter rocks.
Oconee crayfish ostracod <i>Cymocythere clavata</i>	GNR	NC-S2?		LR	NNF	Symbiotic on crayfish in mountain streams and rivers in the Savannah River system.
Whitewater crayfish ostracod <i>Dactylocythere prinsi</i>	GNR	NC-S1		LR	NNF	Symbiotic on crayfish in mountain streams and rivers in the Savannah River system.
A caddisfly <i>Rhyacophila amicus</i>	G2	NC-S2 SC-SNR		LR	NNF	Mountain rivers and creeks.
A caddisfly <i>Matrioptila jeanae</i>	G4	GA-SNR NC-S3 SC-SNR		LR	NNF	Streams and rivers.
A caddisfly <i>Micrasema burksi</i>	G4G5	GA-SNR NC-S3 SC-SNR		LR	NNF	Mountain streams.
A caddisfly <i>Micrasema sprulesi</i>	G5	NC-S3 SC-SNR		LR	NNF	Streams and rivers.
Ski-tipped emerald <i>Somatochlora elongata</i>	G5	GA-S1 NC-S2S3		LR	NNF	Slow to moderate streams
Zebra clubtail <i>Stylurus scudderi</i>	G4	GA-S1 NC-S3? SC-SNR		LR	NNF	Creeks and rivers of moderate gradient in gravel or sandy substrates.
Habrophlebiodes mayfly <i>Habrophlebiodes spp.</i>	GNR	NC-S2		LR	NNF	Very small streams.
Williams' rare winter stonefly <i>Megaleuctra williamsae</i>	G2	NC-S1 SC-SNR		LR	NNF	Streams and rivers.
Redeye bass <i>Micropterus coosae</i>	G5	GA-S5 NC-S1	CS	LR	NNF	Clear upland creeks and small to medium rivers in rocky pools and runs. May move to small tributary streams for spawning.
Yellowfin shiner <i>Notropis lutipinnis</i>	G4Q	GA-S4 NC-S1 SC-SNR	CS	LR	NNF	Clear rocky pools of headwaters, creeks and rivers.
Turquoise darter <i>Etheostoma inscriptum</i>	G4	GA-S4 NC-S1 SC-SNR	CS	LR	NNF	Rocky riffles of large creeks and small to medium rivers
Whitetail shiner <i>Cyprinella galactura</i>	G5	GA-S3S4 NC-S4 SC-SNR	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 NC-S5 SC-SNR	CS	LR	CONF	Pools and runs of cool, usually clear creeks and small to medium rivers with gravel-rubble substrate.

Additional AFS status rank (Warren et al. 2000) in this table: CS (currently stable) 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.

### Aquatic MIS and Management Indicator Communities

Table 3.2-22. Aquatic MIS And Communities For The NNF And SNF.

Aquatic Management Indicator Species and Communities	Forest	Habitat
Management Indicator Species		
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.
Management Indicator Communities		
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 brook trout, rainbow trout, brown trout and blacknose dace populations across the Nantahala and Pisgah national forests have remained stable during the last ten years (National Forests in North Carolina FY 2006 Monitoring and Evaluation report).

The Chattooga River and its tributaries contain cool to cold water aquatic communities from the headwaters to the downstream reaches. The aquatic community serves as a management indicator (Table 3.2-22) that is monitored to indicate the effects of management on riparian resources. Fish, crayfish, aquatic insects and mollusks are all components of the community. Tables 3.2-23, 3.2-24 and 3.2-25 address the aquatic community and provide list of fish species from surveys conducted in the Chattooga River watershed by the Forest Service, SCDNR and GADNR.

## Section 3.2.3 Aquatic Species and Habitat

Table 3.2-23. Fish Species Sampled In The Chattooga River Watershed.

Scientific Name	Common Name
<b>Catostomidae</b>	<b>Suckers</b>
<i>Catostomus commersoni</i>	White sucker
<i>Hypentelium nigricans</i>	Northern hogsucker
<i>Scartomyzon rupiscartes</i>	Striped jumprock
<b>Centrarchidae</b>	<b>Sunfishes</b>
<i>Lepomis auritus</i>	Redbreast sunfish
<i>Lepomis macrochirus</i>	Bluegill
<i>Micropterus coosae</i>	Redeye bass
<b>Cottidae</b>	<b>Sculpins</b>
<i>Cottus bairdi</i>	Mottled sculpin
<b>Cyprinidae</b>	<b>Carps and Minnows</b>
<i>Campostoma anomalum</i>	Central stoneroller
<i>Clinostomus funduloides funduloides</i>	Rosyside dace
<i>Cyprinella nivea</i>	Whitefin shiner
<i>Hybopsis rubrifrons</i>	Rosyface chub
<i>Luxilus coccogenis</i>	Warpaint shiner
<i>Nocomis leptocephalus leptocephalus</i>	Bluehead chub
<i>Notropis leuciodus</i>	Tennessee shiner
<i>Notropis lutipinnis</i>	Yellowfin shiner
<i>Notropis spectrunculus</i>	Mirror shiner
<i>Rhinichthys atratulus</i>	Blacknose dace
<i>Rhinichthys cataractae</i>	Longnose dace
<i>Semotilus atromaculatus</i>	Creek chub
<b>Ictaluridae</b>	<b>Bullhead Catfishes</b>
<i>Ameiurus brunneus</i>	Snail bullhead
<i>Noturus leptacanthus</i>	Speckled madtom
<b>Percidae</b>	<b>Perches</b>
<i>Etheostoma inscriptum</i>	Turquoise darter
<b>Salmonidae</b>	<b>Trouds</b>
<i>Oncorhynchus mykiss</i>	Rainbow trout
<i>Salmo trutta</i>	Brown trout
<i>Salvelinus fontinalis</i>	Brook trout

The aquatic community includes four forest-listed locally rare fish species: *Micropterus coosae*, *Notropis leuciodus*, *Notropis lutipinnis* and *Etheostoma inscriptum*. The fish species diversity of the Management Indicator Community in the Chattooga River watershed has not changed in more than 20 years of sampling the main stem of the river (SCDNR unpublished data). All of the fish species in the community have been assigned a Global Rank of either G4 (apparently secure) or G5 (secure) by NatureServe.

*Salvelinus fontinalis* is ranked by the SC Natural Heritage Program as S2. Management efforts throughout the watershed have increased over the last decade to identify existing Southern brook trout populations, increase the species distribution, and enhance habitat in brook trout streams. Most populations are now isolated in headwater tributaries. Brook trout restoration, which is most successful in tributaries to the Chattooga River, has already occurred in one tributary and is planned in two additional tributaries.

## Section 3.2.3 Aquatic Species and Habitat

*Ameiurus brunneus* is listed as vulnerable by the AFS (Jelks et. al. 2008). This indicates that the species is in imminent danger of becoming threatened throughout all or a significant portion of its range due to present or threatened destruction, modification, or reduction of its habitat or range. The remaining fish species in the community are ranked as CS (currently stable) by the AFS (Warren et al. 2000).

Eversole et al. (2002) conducted crayfish surveys in the Chattooga River watershed. Crayfish species known to occur are listed in Table 3.2-24.

Table 3.2-24. Crayfish Species That Are Known To Occur In The Chattooga River Watershed.

Scientific Name	Common Name
<i>Cambarus asperimanus</i>	Mitten crayfish
<i>Cambarus bartonii</i>	Common crayfish
<i>Cambarus chaugaensis</i>	Chauga crayfish
<i>Procambarus spiculifer</i>	White tubercled crayfish

The aquatic community includes one forest sensitive crayfish: *Cambarus chaugaensis*. All other crayfish are rated as G4 or G5 by NatureServe and currently stable by AFS (Taylor et. al. 2007). In addition, *Cambarus asperimanus* is ranked as S1 by the SC Natural Heritage Program, S2 by the GA Natural Heritage Program, and S3? by the NC Natural Heritage Program.

Alderman (2004) found three species of mussels during surveys in the Chattooga River: *Alasmidonta varicosa*, *Elliptio angustata* and *Elliptio producta*. In addition to the species reported by Alderman, Roghair et al. (2005) reported finding a relic shell of *Elliptio complanata* in the Chattooga River (see Table 3.2-25).

Table 3.2-25. Mussel Species That Are Known To Occur In The Chattooga River Watershed.

Scientific Name	Common Name
<i>Alasmidonta varicosa</i>	Brook floater
<i>Elliptio angustata</i>	Carolina lance
<i>Elliptio complanata</i>	Eastern elliptio
<i>Elliptio producta</i>	Atlantic spike

The aquatic community includes 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 currently stable by the AFS.

Alderman (2004) reported that *Alasmidonta varicosa*, *Elliptio angustata* and *Elliptio producta* were reproducing and have viable populations in the Chattooga River. Of the mussel species found on the Andrew Pickens Ranger District, the brook floater (*Alasmidonta varicosa*) population within the Chattooga River is of global significance. From Georgia through at least Maryland, this is the best extant population within this range (Alderman, 2008). Until recently, surveys indicated that mussel populations were restricted to the section of the river from the

vicinity of Highway 28 and downstream. Relic shells of *Elliptio* sp. were found during recent surveys 6.5 miles upstream the Highway 28 bridge.

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

### **Aquatic Habitat**

Stream habitat surveys using Basinwide Visual Estimation Technique (Dollof et al. 1993) were conducted in six South Carolina tributaries to the Chattooga River 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 instream habitat complexity is in part associated with a low percentage of LWD within the streams. Presence of LWD 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.

Aquatic habitat enhancement through the addition of LWD has recently been implemented in one tributary to the Chattooga River. The project was designed to increase habitat complexity for brook trout, though other aquatic species will also benefit from the addition of wood to the stream.

No complete habitat assessment has been conducted in the main channel of the Chattooga River. During the week of November 12, 2007, personnel from the U.S. Forest Service Southern Research Station's Center for Aquatic Technology Transfer (CATT), Francis Marion and Sumter National Forests and CONF conducted an inventory of dead and down LWD on 32.2 miles of streams in the upper Chattooga River, West Fork Chattooga River and two tributaries of the West Fork Chattooga River. Crews counted all wood larger than one meter long and 10 cm in diameter that had the potential to influence stream channel shape and function (Table 3.2-26); in practice this meant all wood that impinged on the bankfull channel. Total LWD loads ranged from a low of 193 pieces per mile in Overflow Creek to a high of 529 pieces per mile in Holcomb Creek (Table 3.2-27). Although overall LWD loads were near to or greater than the desired condition of 200 pieces per mile (Sumter NF LRMP), several reaches contained lower amounts of LWD (Figure 3.2-1). Also, the largest size class of LWD (size 4) was less than two percent of total LWD in each stream (Figure 3.2-2).

## Section 3.2.3 Aquatic Species and Habitat

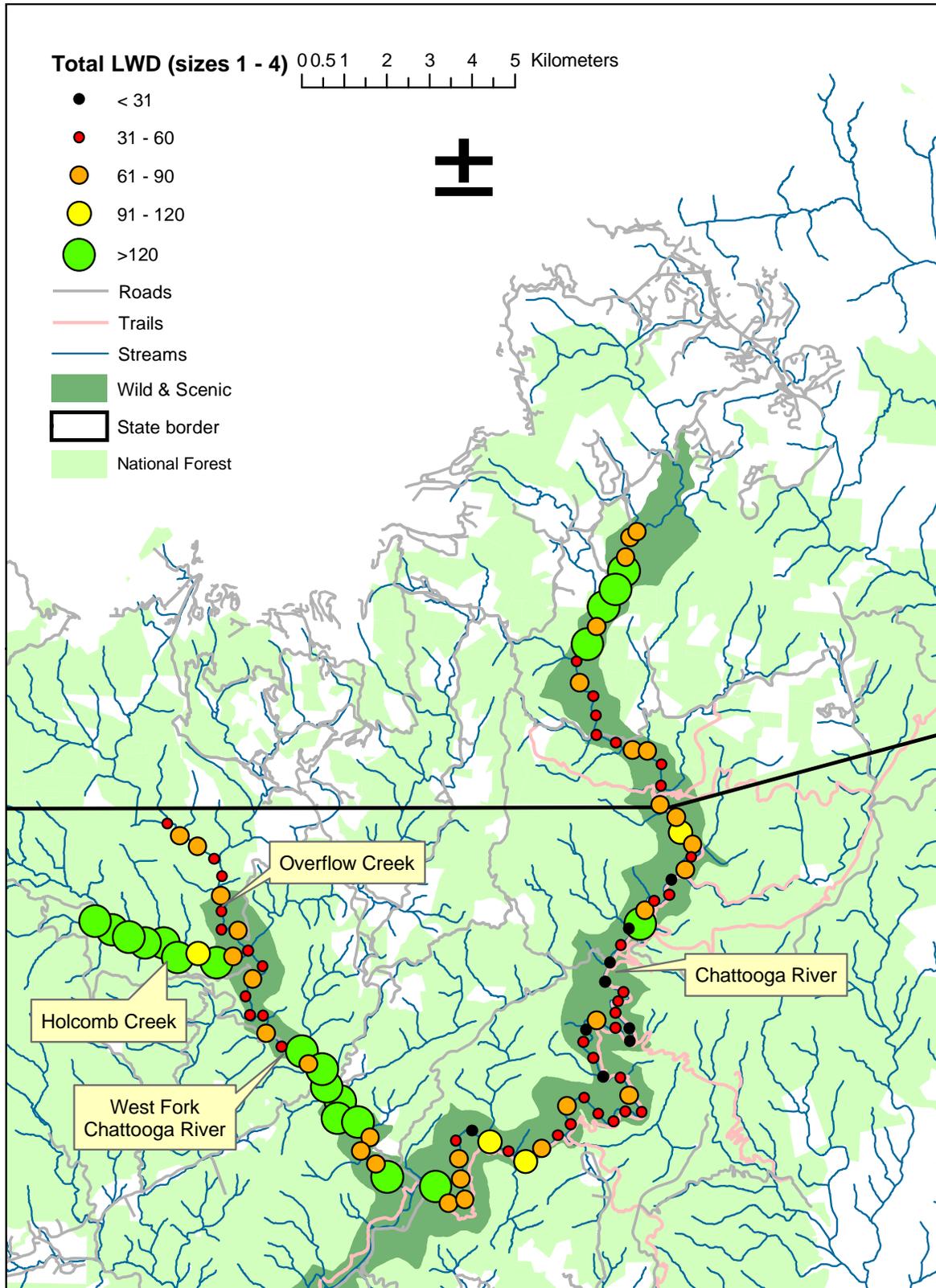
**Table 3.2-26. Size Categories Used For LWD Inventories In The Chattooga River Watershed, November 2007. All LWD Within The Bankfull Channel Were Recorded. Table Modified From Dolloff Et Al. (2008).**

Size Class	Length (m)	Diameter (cm)
1	1 - 5	10 - 55
2	1 - 5	> 55
3	> 5	10 - 55
4	> 5	> 55

**Table 3.2-27. Total LWD Counts From Streams Inventoried In November 2007. Table Modified From Dolloff Et Al. (2008).**

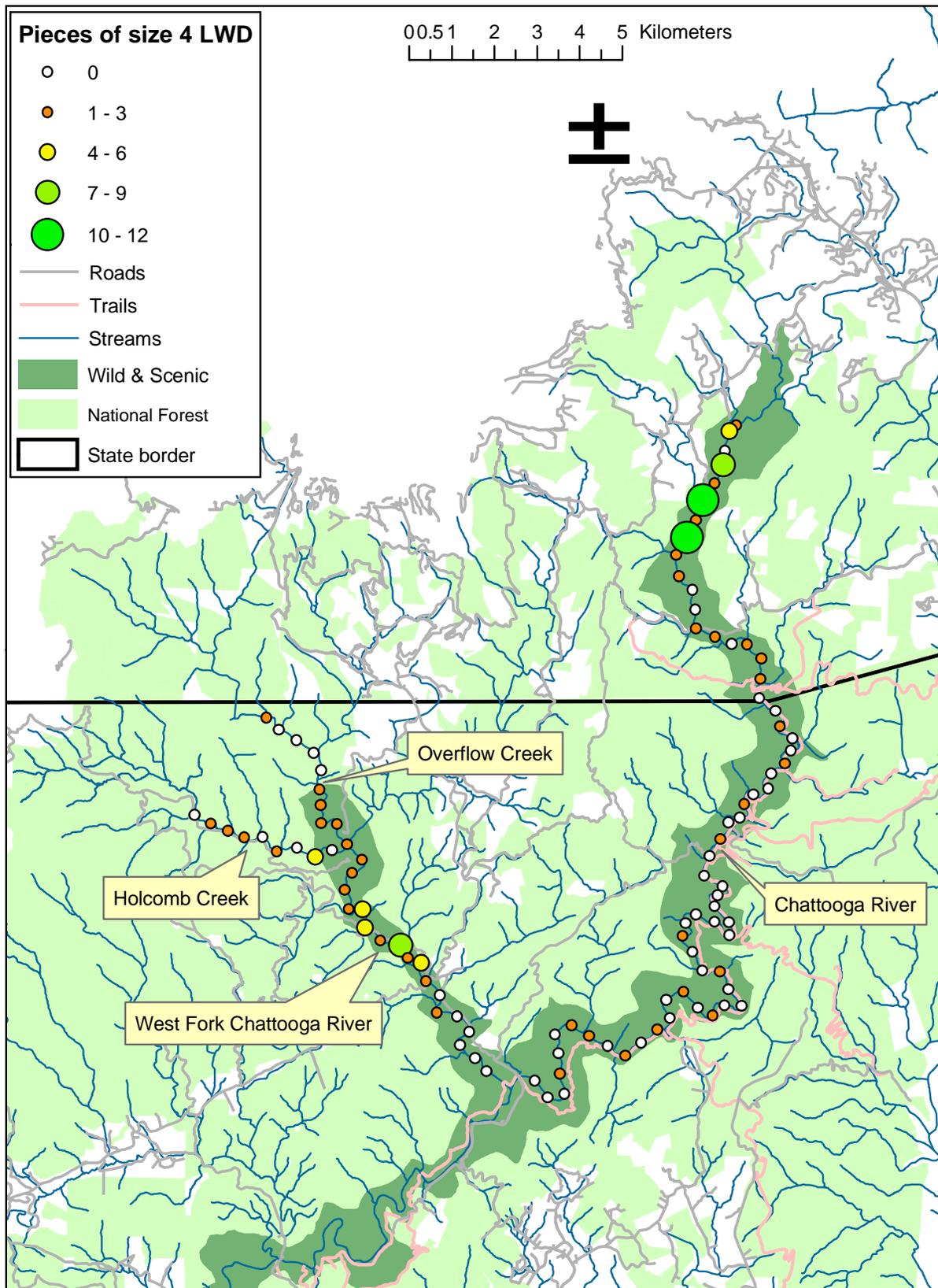
River	Start Location	Length (miles)	Total LWD	LWD per mile
Chattooga	confluence with West Fork Chattooga	20.4	4171	205
West Fork Chattooga	confluence with mainstem Chattooga	6.0	2154	357
Holcomb Creek	Three Forks	2.7	1446	529
Overflow Creek	Three Forks	2.9	551	193

**Figure 3.2-1. Total LWD Counts From 500 M Reaches In The Chattooga River Watershed, November 2007. Figure Modified From Roghair Et Al. (2008). Reaches With Less Than 60 Total Pieces Are Below The SNF Desired Future Condition For LWD.**



Section 3.2.3 Aquatic Species and Habitat

**Figure 3.2-2. Size 4 LWD (Longer Than Five Meters, Greater Than 50 Cm Diameter) Counts From 500 M Reaches In The Chattooga River Watershed, November 2007. Figure Modified From Roghair Et Al. (2008).**



### **Effects of the Alternatives on Aquatic Species and Habitat**

This analysis addresses proposed activities that may contribute sediments or otherwise impact aquatic habitat. 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 fish 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 River watershed were associated with open graveled and unsurfaced roads. The users of these roads contribute to their degradation through heavy traffic 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 of the Chattooga River contributes relatively little new sediment. Recreational trails and facilities accounted for 2.6 percent of the total number of sediment sources in the Chattooga River watershed during the study 12 years ago. Reducing recreational impacts in the watershed will be the focus of this aquatic analysis. Whittaker and Shelby (2007) suggest recreation use in the Chattooga corridor is likely to increase approximately 20 percent over the next decade, increasing the use of roads, trails and campsites.

Species conservation status and known population trends and aquatic habitat conditions are discussed above in Affected Environment. The 2004 Final Environmental Impact Statement (FEIS) for the Sumter LRMP acknowledges that effects to 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 River watershed. Trail erosion and sediment input and turbidity were identified as an existing impact issue on the river by Whittaker and Shelby (2007). Whittaker and Shelby (2007) also note that campsites within 20 feet of the river pose great erosion risks. Current management (Alternative 1) in the Sumter LRMP requires camping more than 50 feet from streams and those campsites contributing sediments in the Chattahoochee and Nantahala national forests would be closed and rehabilitated. Alternative 2 allows no more than one campsite per 0.25 miles of river. For alternatives 2, 3, 4, 5, 8, 9 and 10, campsites are allowed within 50 feet of the river and no new user-created campsites are allowed.

Where resource damage can be mitigated and campsites maintained, some existing user-created campsites would be designated as official campsites. Unstable sites would be rehabilitated and closed. Fire ring locations would be designated and campsite size (total bare ground per campsite) would be limited to space for three tents. Current management for trails in all three forests provides standards to improve existing conditions and reduce impacts to aquatic resources. For alternatives 2, 3, 4, 5, 8, 9 and 10, trail closure and new trail construction would be implemented to mitigate resource damage and minimize erosion to the river. Mitigation refers to no visible movement of sediment into waters and that trails and campsites are located off the stream bank.

LWD is an important component of the aquatic ecosystem. It provides habitat diversity for aquatic species by increasing pool habitats and providing cover and refuge. It also provides a substrate for macroinvertebrates and nutrients to the stream system. Removal of LWD may result in the loss of pool habitat and complexity and lower fish density, average size and biomass (Dolloff 1994). Substantial mortality of the eastern hemlock is expected to provide increased

amounts of LWD in the Chattooga River in the future. The eastern hemlock is of great value as LWD due to slow decay and large size which promotes aquatic habitat stability and organic matter retention over a longer period of time. Once the hemlock component of the riparian corridor is gone, there are no other hemlocks to replace them. Over time, recruitment of hemlock to the river will diminish. There is no other tree that will replace the performance of hemlock within mountain stream systems.

During the 2007 LWD survey, it was noted that LWD has been actively removed in the Chattooga River in SC. This removal was primarily associated with dispersed campsites. LWD removal was also evident in Overflow Creek, which is a popular boating destination. LWD is removed from river sections downstream Highway 28 for boating and from Overflow Creek by boaters ([www.boatertalk.com/forum/BoaterTalk/1381138](http://www.boatertalk.com/forum/BoaterTalk/1381138)). Boater message board comments ([www.boatertalk.com/forum/BoaterTalk](http://www.boatertalk.com/forum/BoaterTalk)) indicate that LWD has been removed by boaters from rivers to clear passage for boating. In addition, an article on the American Whitewater Web site (Colburn 2001) describes circumstances where it is proper or improper to remove logs for boating passage. Evidence from the current inventory and other sources show that LWD removal is likely where camping and boating are allowed. For all the alternatives, LWD removal is permissible only in limited cases and is evaluated on a case-by-case basis by Forest Service personnel. In alternatives 4, 5, 8, 9 and 10, no LWD would be removed solely to accommodate recreation within the river or stream banks on the upper Chattooga River or its tributaries.

Direct, indirect and cumulative impacts to aquatic resources in this analysis are based on the actions in the proposed alternatives and the future monitoring of those actions.

For all alternatives, there are no federally listed or proposed aquatic species within the analysis area. Under all alternatives, there would be no direct or indirect impacts to forest listed sensitive aquatic species or locally rare aquatic species and no risk to aquatic population viability across the forests for Management Indicator Species and Communities.

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

In all three forests, current management for trails provides standards to improve existing conditions and reduce impacts to aquatic resources. Campsites are not allowed within 50 feet of streams within the SNF and should be located outside the ephemeral stream zone in the CONF. The CONF and NNF standards address the permanent closure and rehabilitation of campsites affecting the aquatic resource.

Under Alternative 1, trail and campsite conditions contributing sediments would be improved and potential aquatic impacts minimized. Campsites within 50 feet of streams in the SNF and those contributing sediments in the CONF and NNF would be closed and rehabilitated. During a recent survey of the Chattooga River (Whittaker and Shelby 2007), it was determined that the majority of campsites were located in the SNF. LWD recruitment would be maintained with current LRMP direction for each forest. The Chattooga River tributaries are not included for boating under this alternative; therefore, user-created trails would not be created for the purpose of boating access along these streams. Protection of stream banks and recruitment of LWD is crucial in these tributaries that are managed for brook trout and the restoration of brook trout populations.

**Alternative 2 - Direct and Indirect Effects**

Under Alternative 2, trail and campsite conditions contributing sediments would be improved and potential aquatic impacts minimized. Campsites would be allowed within 50 feet of the river and designated throughout the watershed. The intent of designated campsites is to minimize resource impacts. There would be four designated campsites per mile along the Chattooga River under this alternative which is slightly less than the number of existing campsites. The closure of roadside parking at Burrells Ford Bridge may decrease some sediment input. LWD recruitment would be maintained with current LRMP direction for each forest. Impacts to the Chattooga River tributaries are protected as in Alternative 1.

**Alternative 3 - Direct and Indirect Effects**

Under Alternative 3, trail and campsite conditions that are contributing sediments would be improved and potential aquatic impacts minimized. Campsites would be allowed within 50 feet of the river and designated throughout the watershed. The intent of designated campsites is to minimize resource impacts. Impacts of new parking restrictions are the same as in Alternative 2. LWD recruitment would be maintained with current LRMP direction for each forest. Impacts to the Chattooga River tributaries are protected as in Alternative 1.

**Alternative 4 - Direct and Indirect Effects**

Under Alternative 4, trail and campsite conditions that are contributing sediments would be improved and potential aquatic impacts minimized. Impacts from parking are the same as Alternative 1. Campsites would be allowed within 50 feet of the river and designated throughout the watershed. The intent of designated campsites is to minimize resource impacts. LWD recruitment would be maintained with current LRMP direction for each forest and no LWD removal would occur to accommodate recreation within the river or stream banks on the upper Chattooga River.

Alternative 4 proposes boating on the main stem of the Chattooga River for approximately seven miles from the confluence of Norton Mill Creek in North Carolina to Burrells Ford Bridge in South Carolina. It is in these sections of the river where new access and portage trails may be created and the potential for the loss of LWD increased. However, in Alternative 4, no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga River. Impacts to the Chattooga River tributaries are protected as in Alternative 1.

**Alternative 5 - Direct and Indirect Effects**

Under Alternative 5, impacts and actions for trails, camping, parking and LWD remain the same as Alternative 4. However, the number of access and portage trails may increase more than in Alternative 4 because Alternative 5 provides six additional miles of boating.

Alternative 5 proposes boating on the main stem of the Chattooga River for approximately 13 miles from Bull Pen Road in North Carolina to Lick Log Creek in South Carolina. It is in this section of the river where new access trails and portage trails may be created and the potential

for the loss of LWD increased. However, in Alternative 5, no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga River. Impacts to the Chattooga River tributaries are protected as in Alternative 1.

#### **Alternative 8 - Direct and Indirect Effects**

Under Alternative 8, impacts and actions for trails, camping, parking and LWD remain the same as Alternative 5. The number of access and portage trails may be greater than in alternatives 4 and 5 because Alternative 8 provides the most miles open to boating.

Alternative 8 proposes boating on the main stem of the Chattooga River for approximately 20 miles from below the private property in North Carolina to the Highway 28 bridge. It is in this section of the river where new access trails and portage trails may be created and the potential for the loss of LWD increased. However, in Alternative 8, no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga River. Impacts to the Chattooga River tributaries are protected as in Alternative 1.

#### **Alternative 9 - Direct and Indirect Effects**

Under Alternative 9, impacts and actions for trails, camping, parking and LWD remain the same as alternatives 5 and 8. However, the number of access and portage trails may be less than those in alternatives 4, 5 and 8.

Alternative 9 proposes boating on the main stem of the Chattooga River for approximately six miles from below the private property in North Carolina to the East Fork Trail in South Carolina. It is in this section of the river where new access trails and portage trails may be created and the potential for the loss of LWD increased. However, in Alternative 9, no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga River. Impacts to the Chattooga River tributaries are protected as in Alternative 1.

#### **Alternative 10 - Direct and Indirect Effects**

Under Alternative 10, impacts and actions for trails, camping, parking and LWD remain the same as alternatives 5, 8 and 9. However, the number of access and portage trails may be more than in alternatives 4, 5 and 9 and compare to those in Alternative 8.

Alternative 10 proposes boating on the main stem of the Chattooga River for approximately 20 miles from below the private property in North Carolina to the Highway 28 bridge. It is in this section of the river where new access trails and portage trails may be created and the potential for the loss of LWD increased. However, in Alternative 10, no LWD would be removed to accommodate recreation within the river or stream banks on the upper Chattooga River. Impacts to the Chattooga River tributaries are protected as in Alternative 1.

#### **Cumulative Effects for All Alternatives**

Under the 2004 Plan Revision for the Sumter National Forest, a watershed condition rank was assigned to 5<sup>th</sup> level watersheds across the forest. The Chattooga River watershed (Tugaloo

## Section 3.2.3 Aquatic Species and Habitat

Reservoir to headwaters) received a rank of below average in comparison to other watersheds on the forest, which denotes that the potential to adversely affect aquatic resources is high on a scale of low, moderate and high. Forest objectives in high ranked watersheds include maintaining and improving aquatic health through the implementation of the riparian corridor prescription, conducting watershed assessments at the project level, pre-project monitoring efforts to determine biota health, and maintaining and restoring watershed health and aquatic systems on a project level. Sediment was determined to be a risk factor for aquatic species viability in the Chattooga River watershed. Van Lear (1995) found that the wild and scenic corridor of the main stem of the Chattooga River contributes relatively little new sediment. All proposed alternatives address sediment issues in the Chattooga River corridor upstream of Highway 28, through trail and campsite condition improvements.

The 2004 FEIS for the Sumter National Forest LRMP also addresses watersheds and aquatic habitats. This section of the FEIS recognizes that while direct and indirect adverse effects to aquatic communities are minimized by the riparian corridor prescription and the forest wide direction standards, these effects are not eliminated from the entire watershed. Campsite areas, trails and roads all contribute sediment to the Chattooga River watershed. The LRMP FEIS analysis of aquatic viability is based on present LRMP standards. As noted under the Aquatic PETS discussion, the Aquatic Viability Outcome for the aquatic forest listed sensitive species is that they are potentially at risk from sediment in the Chattooga River watershed; however, the Forest Service may influence conditions in the watershed to keep the species well distributed. Therefore likelihood of maintaining viability is moderate. Forest objectives listed above associated with the Watershed Condition Rank were designed to eliminate this risk.

As stated under Aquatic Species and Habitat Affected Environment, the fish species diversity in the Chattooga River watershed has not changed in more than 20 years of sampling the main stem of the river (SCDNR unpublished data). Also, Alderman (2004) reported that mussel species were reproducing and have viable populations in the Chattooga River. Of the mussel species found on the Andrew Pickens Ranger District, the brook floater (*Alasmidonta varicosa*) population within the Chattooga River is the best extant population within its range from Georgia through at least Maryland (Alderman, 2008). In addition, aquatic insect surveys were conducted in the Chattooga River from 1986-89 by English (1990) and in 1994 by Weber and Isely (1995). Analysis of macroinvertebrate data in the 1990 report indicated the water quality in the Chattooga River watershed was good. The 1995 report concluded that water quality in the Chattooga River basin was good to excellent using macroinvertebrates as biological indicators of water quality.

Cumulative impacts pertain to the entire Chattooga River watershed from Tugaloo Reservoir upstream into the headwaters. Refer to Table 3.1-9. for a complete list of past, present and future projects.

The trails, campsites and erosion points within 100 feet of the river and its tributaries are most likely contributing sediments and degrading the integrity of the stream bank. As a part of this proposal, these sediment issues would be addressed through trail and campsite condition improvements. Graveled and unsurfaced roads and their use are the major sediment source to the Chattooga River. Since the 1995 Van Lear report, sections of two roads have been paved in the

## Section 3.2.3 Aquatic Species and Habitat

upper watershed. Other recent past activities in the watershed include prescribed burning, road reconstruction and timber management. Present ongoing activities include brook trout restoration and habitat enhancement, wildlife opening maintenance, road maintenance and recreational activities. Brook trout restoration and habitat enhancement have a positive impact on aquatic populations. LWD is removed from river sections downstream of Highway 28 for boating passage (Joe Robles personal communication September 2007) and from Overflow Creek by boaters ([www.boatertalk.com/forum/BoaterTalk/1381138](http://www.boatertalk.com/forum/BoaterTalk/1381138)). LWD is also actively removed from river sections upstream of Highway 28 in association with dispersed campsites. LWD recruitment would be maintained with current LRMP direction for each forest. LWD monitoring is included in Chapter 2.1 of this EA. Possible future activities include prescribed burning, timber management, invasive plant management and road reconstruction.

LRMP directions and standards are designed to minimize adverse impacts from any of these activities. There will be an overall net reduction in sediment when watershed improvement projects are implemented in the Chattooga River watershed. These include treatment and maintenance of trails, campsites, erosion sources, and roads. Refer to Section 3.1.1 Water and Riparian Corridor Cumulative Effects for discussion on sediment impacts.

There is the potential for the spread or introduction of new NNIS by recreation visitors to the Chattooga River and its tributaries. Aquatic NNIS, such as didymo (*Didymosphenia germinana*) or zebra mussel (*Dreissena polymorpha*) have been identified in numerous streams in the Southeastern United States. Humans can be vectors of these aquatic NNIS and the NNIS could be spread by fishing or boating equipment. The risk of spread of aquatic NNIS would increase as the number of forest visitors increases.

There are no federally listed or proposed aquatic species within the analysis area. Under all alternatives, there would be no adverse cumulative impacts to forest listed sensitive aquatic species or locally rare aquatic species and no risk to aquatic population viability across the forests for MIS and Communities under any of the alternatives.

### **3.3 SOCIAL RESOURCES**

#### **3.3.1 Recreation**

##### **AFFECTED ENVIRONMENT**

##### **History of Recreation Management on the Chattooga River**

In the late 1960s, recreation use on the Chattooga was generally light and largely “local,” with most use associated with fishing and camping at several road-accessible locations. The river was identified as a study river in the 1968 Wild and Scenic Rivers Act; the study began in 1969 and was completed in 1971 following public meetings in 1969 and 1970 before substantial boating use had occurred. Trout fishing on the Chattooga has historically been better upstream of Highway 28. Trout stocking was generally heavier on the upper compared to the lower river, although stocking occurred from the headwaters down to Highway 76 into the early 1970s (Whittaker and Shelby 2007).

Use on the river began to increase dramatically after the study was completed, but it was also catalyzed by the 1972 movie “Deliverance” which was partially filmed on the Chattooga. The highest use increases came from boaters; levels increased from an estimated 800 floaters per year in 1971 to more than 20,000 by 1975 (Whittaker and Shelby 2007). Most of the boating use increases occurred on the lower Chattooga which had more reliable boatable flows and less challenging rapids than reaches above Highway 28. Some higher skilled kayakers and canoeists apparently ran the upper Chattooga reaches on occasional days when flows were favorable, but this use was very low (Whittaker and Shelby 2007). The floaters largely were not from immediate communities and their use affected locals who used the river for fishing, swimming and picnicking. By 1974, some lower river anglers were probably displaced due to the lack of solitude. Anecdotal evidence shows that responses from anglers to boaters in the 1970s included aggressive displays of frustration over change, shouting, raft-slashing, rock throwing, fistfights and gunplay (TetraTech, Inc., 2006). During public meetings in 2005 and 2006 and a public hearing in 2007, some of those same anglers and local users expressed frustration about what happened in the 1970s and their continued fear that history would repeat itself should the Forest Service allow boating on the upper Chattooga.

By 1974, the Chattooga River’s outstandingly remarkable geology, biology, recreation, scenery and history values were recognized by Congress when it designated the Chattooga a wild and scenic river. Within one year, the Forest Service was mandated to establish boundaries, classify sections for the river and prepare an administrative management plan. This led to more proactive recreation management yet, with a particular focus on removing or minimizing development in the corridor.

When developing the 1976 river management plan for the Chattooga, Forest Service staff report considering a spectrum of recreation settings and opportunities that included prohibiting boating above Highway 28. By this time, staff were apparently discouraging inexperienced boaters from using the more challenging upper river as part of a broad safety initiative; they believed the number of boaters capable of safely running the upper segments was small. In addition, road

closures made stocking the lower river difficult, and due to warmer water temperatures chances of developing a wild fishery there was marginal; the upper river was much better suited for stocking and fishing. New trails were being planned to open additional land-based access to the upper river, and managers were concerned that increased boater use and conflicts might “migrate” upstream with them. Taken together, this led them to an overarching management concept that encouraged boating (among other uses) on the lower river and encouraged angling and hiking (among other uses) on the upper river (Whittaker and Shelby 2007).

In the initial management plan (printed in the Federal Register in 1976, p. 11819), the river was divided into geographic zones based on different use patterns and characteristics. Zoning by type of recreation setting (using the Recreation Opportunity Spectrum) was the dominant recreation planning framework in use at that time. Language in the 1976 plan clearly indicates interest in “providing a range of recreation opportunities characteristic of, and in harmony with, the nature of individual river segments.” As part of the zoning effort, the segment above Highway 28 was to be closed to boating (TetraTech, Inc., 2006). Limited written documentation of the specific reasons for the prohibition exist, but the “Classification, Boundaries, and Development Plan” provided in the March 22, 1976 Federal Register includes statements that suggest three possible reasons: boating safety, lack of reliable boating flows and the following language regarding conflict.

“Very little fishing is done from floatable craft. Most fishing is done either from the bank or by wading in the stream. The recent increase in floaters using the river has had a detrimental effect on the fishing experience. Conflicts have developed on certain sections of the river where floaters and fishermen use the same waters...This area [Nicholson Fields] remains a favorite spot for trout fishing. This location is the source of some of the best trout fishing in both South Carolina and Georgia. Floating will be prohibited above Highway 28 which includes the Nicholson Fields area.”

Federal Register, March 22, 1976

The implicit notion underlying prohibiting boating above Highway 28 was to ensure that these conflicts did not migrate to the upper river. At the time, the upper river had less use, a better trout fishery due to geological and biological characteristics and lower water temperatures, a more primitive setting, and few boaters because of lower water levels, less specialized boating equipment and more difficult whitewater. The idea was to ensure that local anglers had a segment to fish where encounters with floaters would not take place.

On conflict/experience issues, protecting fishing experiences was an important rationale. Interviews with Forest Service personnel indicate that the boater/angler conflict was the driving force behind the 1978 prohibition. The decision to limit boating to below Highway 28 was a joint decision between the Forest Service and DNRs in Georgia, South Carolina and North Carolina (TetraTech, Inc., 2006).

Even after the boating prohibition (43 FR 3706, Jan. 27, 1978; later codified at 36 CFR 261.77) in 1976, the boater/angler or local/non-local conflicts may still have lingered to some degree.

The Handbook for River Guides (Wildwater 1980) includes a section on “community relations” that describes the issue in terms of locals vs. outsiders, and warns of past “acts of destruction and harassment.” The substantial changes in use and access due to the movie, and the river’s wild and scenic status clearly made some local people feel that “their” river had been taken away. These frustrations may have played a role in the conflict incidents that apparently occurred (TetraTech, Inc. 2006). Public meetings between 2005 and 2007 and a public hearing in 2007 have shown that locals are concerned that similar frustrations and the resulting conflict may recur if boaters are allowed to float the upper Chattooga.

A later study of floating on the Chattooga concurs with these reasons, asserting that the first 26 miles of the river were closed to boating because that portion of the river is “generally too small for floating during most water levels,” which is distinct from the pure safety concern. This document also suggests the prohibition provided an area where people could “fish and hike without encountering boating traffic” (Craig et al. 1979).

Reducing the impact of boats on anglers was further discussed in the 1985 forest plan revision, which states “The Chattooga is considered to be the best trout stream in South Carolina and is one of the best in Georgia. It has the size and volume to permit quality fly fishing in a very attractive setting. This is especially true on the undeveloped section north of the Highway 28 bridge where floating use is not permitted to provide quality trout fishing. The upper portion has colder water that is more conducive to natural regeneration.”

For the last 30 years, some recreationists in the upper Chattooga corridor have come to expect a boat-free recreation experience and a place where they may be able to find a sense of solitude. In addition, the state natural resource agencies have pursued active fisheries management above Highway 28 by annually stocking the river with trout to enhance the angling experience. Below Highway 28, the river has become a destination for self- and commercially-guided whitewater boating experiences, including creek boating outside the main stem on Overflow Creek.

### **Existing and Potential Recreation Opportunities**

Individuals who currently visit the upper Chattooga and those who wish to float the river above Highway 28 appreciate different characteristics of the upper river. When citing reasons for wanting to visit the upper Chattooga, the public’s desired experience consists of remoteness and solitude in a spectacularly scenic setting with little evidence of other humans. Table 3.3-1 summarizes existing recreation uses on the upper Chattooga, where and when they occur, and the characteristics of the public’s desired experience. Table 3.3-2 describes potential recreation opportunities that are currently prohibited, where and when they might occur, and the characteristics of the public’s desired experience.

## Section 3.3.1 Recreation

Table 3.3-1. Existing Recreation Opportunities In The Upper Chattooga River Corridor

Type	Location	Opportunities/Important Features	Season	Characteristics
Frontcountry Recreation (occurs within ¼ mile of access roads and bridges)	Grimshawes Bridge	Swimming. Water quality, scenery, a functioning "sliding rock," small beaches	Mostly spring, summer, fall	"Social recreation" setting where solitude is less important.
	Bull Pen Bridge	Vehicle-based sightseeing, short walks, swimming, picnicking, sunning/relaxing.	Mostly spring, summer, fall	More remote than other bridges so solitude is probably more important.
	Burrells Ford Bridge	Picnicking, sunning/relaxing, swimming, short walks, camping. Water quality, scenery an availability of uplands sites near wading/swimming or angling locations	Mostly spring, summer, fall	"Social recreation" setting where solitude is less important.
	Hwy 28 Bridge	More popular for frontcountry angling and camping or as the starting point for backcountry angling and hiking. Scenic views and some swimming holes.	Mostly spring, summer, fall	"Social recreation" setting where solitude is less important.
Frontcountry Angling (within ¼ mile of access roads and bridges)	Grimshawes Bridge	Limited fishing opportunity. Fly, spin or bait anglers fish for rainbow and brown trout.	Mostly cooler months/ dawn/dusk in the summer	Frontcountry anglers focus on harvest while the scenery and social setting may be less important.
	Bull Pen Bridge	Limited fishing opportunity. Fly, spin or bait anglers fish for rainbow and brown trout.	Year-round	
	Burrells Ford Bridge	Stocked May to October. Provides best frontcountry angling opportunity. Bait and spin anglers are more common here; some anglers wade, while others fish from the bank.	Year-round	
	Hwy 28 Bridge	Stocked May to October. This area is regulated by delayed-harvest (DH) Nov. 1 – May 15 (artificial lure, catch and release only). Bait, spin and fly fishing occur here the rest of the year.	Year-round	
Backcountry Angling (more than ¼ mile away from access roads and bridges)	Chattooga Cliffs reach/Ellicott Rock reach	"Wild" trout fishery. Higher proportions wade rather than fish from the bank and use flies rather than spinning gear or bait. Relatively fewer anglers compared to downstream reaches. Ellicott Rock is a congressionally designated wilderness area.	Year-round; best in spring, early summer and fall	Fish in small groups (1 to 4 anglers). Generally interested in solitude, sense of remoteness and an environment with few signs of human use.
	Burrells Ford to Reed Creek	Stocked May to October including helicopter stocking in the fall. More anglers here than in Chattooga Cliffs/Ellicott Rock reaches but less than in DH reach.	Year-round; best in spring, early summer and fall	Value water quality and clarity, scenery, insect hatches, "wild" or "naturalized" fishery.

Section 3.3.1 Recreation

Type	Location	Opportunities/Important Features	Season	Characteristics
Backcountry angling (continued)	Reed Creek to Hwy. 28	Stocked May – October. This area is regulated by DH Nov. 1 – May 15 (artificial lure, catch and release only). Bait, spin and fly fishing occur here the rest of the year.	Year-round	
Day Hiking	Throughout the corridor	Major recreation use. Most heavily used trails are from Burrells Ford to Ellicott Rock, the East Fork Trail (all within the Ellicott Rock Wilderness) and the Foothills Trail. In the upper Chattooga, about 26% of designated trails and 51% of user created trails are within 100 feet of the river.	Year-round; more popular in spring, summer and fall	Sense of remoteness/solitude, spectacular scenery, few signs of human use and lack of motorized, mountain bike and horse use. Views and enjoyment of the river
Backpacking/ Camping	Throughout the corridor	Distinguished from day hiking by overnight use but uses the same trail system. Of the 97 sites on the Upper River, about 26 (27%) are within 20 feet of the river	Same as day hikers w/ lower winter use	Similar to day hikers but more interested in solitude/ sense of remoteness, particularly at destinations. Prefer to camp out of sight and sound of others. Major component is camping along the river.
Hunting	Along user-created trails	Light use. Bear, deer, hog and turkey are available game species but none are thought to be abundant.	Defined fall season.	Solitude, remote and scenic setting, game availability. Unlikely to interact with other users.

Table 3.3-2. Potential Recreation Opportunities In The Upper Chattooga River Corridor

Type	Location	Opportunities/Important Features	Season	Characteristics
Whitewater Oriented Boating  (Class IV-V whitewater kayaking, canoeing or rafting on the upper Chattooga's steeper segments by highly skilled boaters)	Chattooga Cliffs reach	Most creek-like whitewater boating opportunity (steeper gradient, more technical rapids)	Mostly winter and spring; sometimes summer during higher flows.	Sense of remoteness, spectacular scenery and few traces of human use. Focused on the challenge of running whitewater. For some whitewater-oriented boaters, solitude is likely to be important; for others, high-quality boating can occur in a more "social" higher density setting.  Boaters are generally likely to travel in small groups of two to five (based on use data from the Lower Chattooga).
	Ellicott Rock reach	Offers the most whitewater for its length.		
	Rock Gorge reach	Longer trip with several good Class IV-V rapids; longer stretches of flat water. Many Rock Gorge trips would include travel through the Class I Nicholson Fields reach too.		

## Section 3.3.1 Recreation

Type	Location	Opportunities/Important Features	Season	Characteristics
Scenic Oriented Boating (Class I-II opportunities on the lower gradient reaches that may be used for access to the area, boat- or tube-based fishing or during "water play")	Nicholson Fields reach	This reach is accessible by trail with a take-out at Hwy. 28 or the Section II boat launch, about a mile and a half downstream. Some people might be interested in tubing short sections of this reach in the summer.	Available more frequently through the year because lower flows are required.	A sense of remoteness, scenery, lack of signs of human use. Running challenging whitewater is probably less important to these boaters while solitude might be important to some. Social component is more important to this group.
Horse Riding Mountain Biking Commercial Boating	Throughout the UC corridor	These activities are mentioned for completeness but are not a focus of additional analysis and have not been contested during the recent Sumter Forest Plan revision.	Year-round	

### Background Information for the Recreation Analysis

When the Chattooga River was designated a wild and scenic river, recreation was determined to be one of the river's ORVs. Specifically, the recreation ORV was described as follows:

The recreation values of the river and corridor are outstanding along its 57-mile course. The river offers a wide variety of activities in a high-quality setting. Activities range from swimming to hiking and horseback riding with spectacular scenery to excellent trout fishing and nationally recognized white-water rafting opportunities. Other activities include backpacking, photography and nature study. Most of these activities take place in largely unmodified natural surroundings with many opportunities for remoteness and solitude.

Section 10(a) of the Wild and Scenic Rivers Act (Act) establishes a nondegradation and enhancement policy for the values for which a river is added to the National System. These values are the river's free-flowing condition, water quality and its specifically identified ORVs. The Interagency Wild and Scenic Rivers Coordinating Council (IWSRCC) provides further interpretation of the protective framework of the Act. When recreation is an ORV (as on the Chattooga), it must be managed to protect the attributes that made it regionally or nationally significant while also protecting free-flow, water quality and nonrecreation ORVs (IWSRCC 2007 draft p. 5). This guidance recognizes the need to balance recreation with other values through the Comprehensive River Management Plan (currently incorporated into the revised Sumter LRMP). The river-administering agency is required to "address...user capacities" consistent with protecting the desired recreation experience and other nonrecreation values (Whittaker and Shelby 2007).