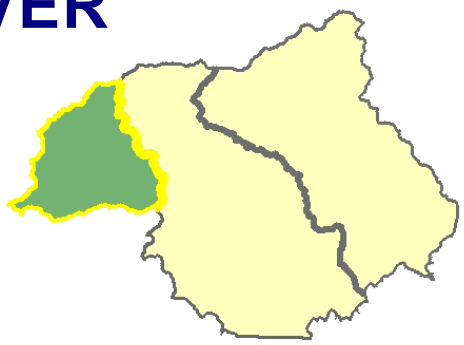
Lower Tennessee River Subbasin

HUC 06010204

Includes: Tulula Creek, Snowbird Creek, Santeetlah Creek & Cheoah River



Watershed at a Glance

Counties:
Cherokee, Graham, Swain

Municipalities:
Robbinsville, Santeetlah

EPA Level IV Ecoregions:
High Mtns., Southern Metasedimentary Mtns.

Population:
2000: 7,012
2010: 7,480

Area 274 mi²

2006 Land Cover:
Open Water.....2%
Developed.....3%
Forested.....93%
Agriculture.....2%

Permitted Facilities:
NPDES
Wastewater Discharge.....9
Wastewater Nondischarge....1
Stormwater.....3
Trout Farms.....1

Figure 1-1: NLCD 2006 Land Cover

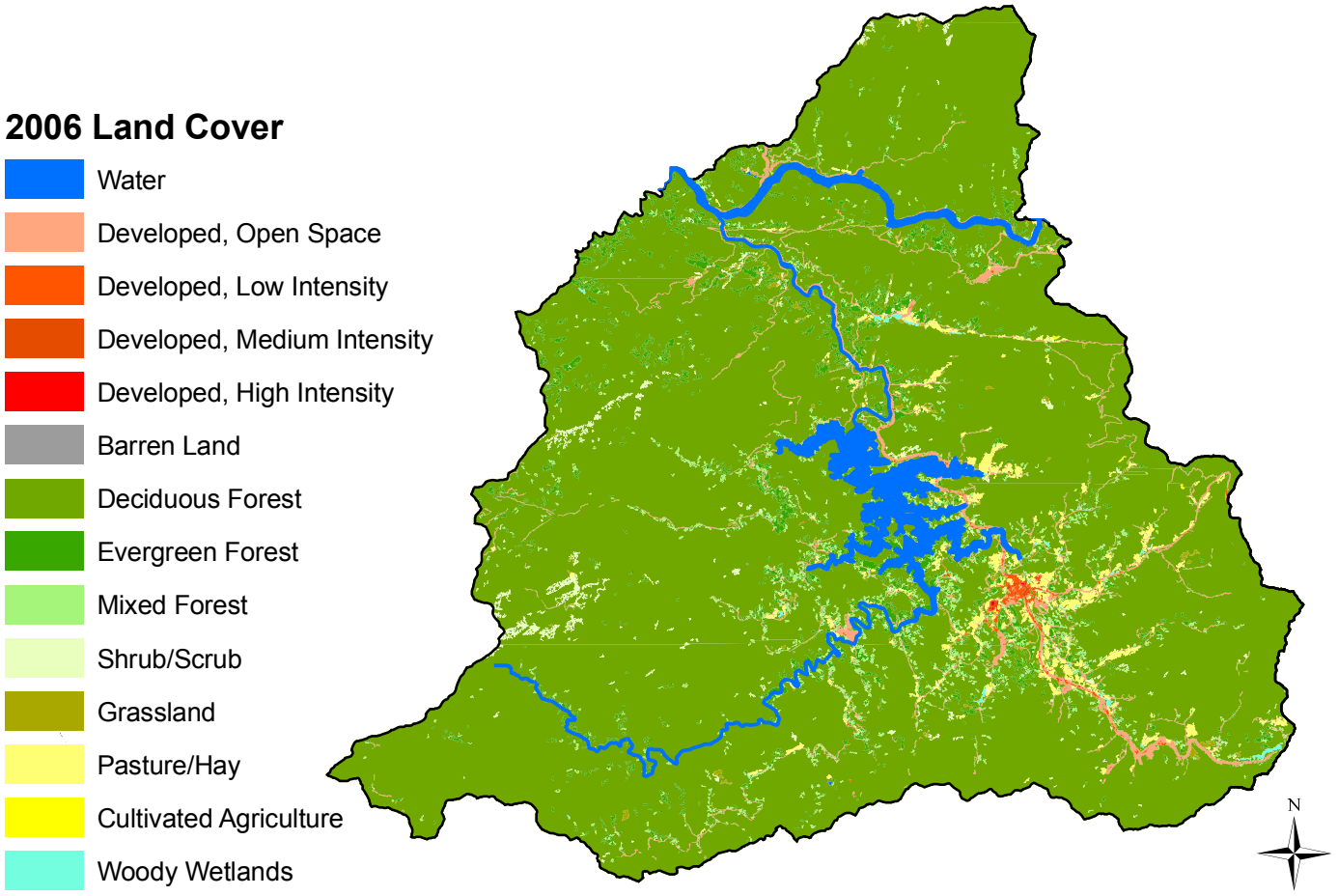
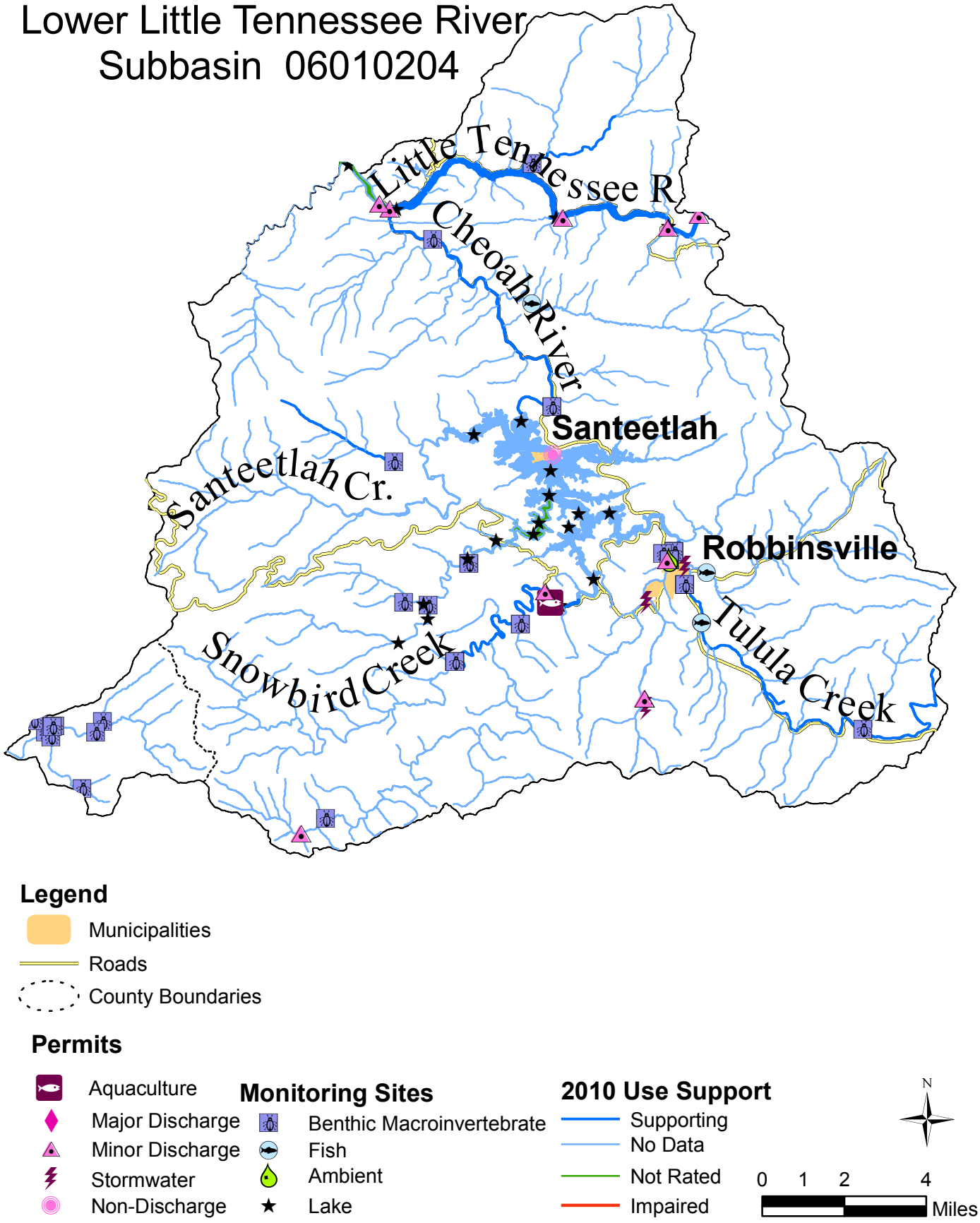


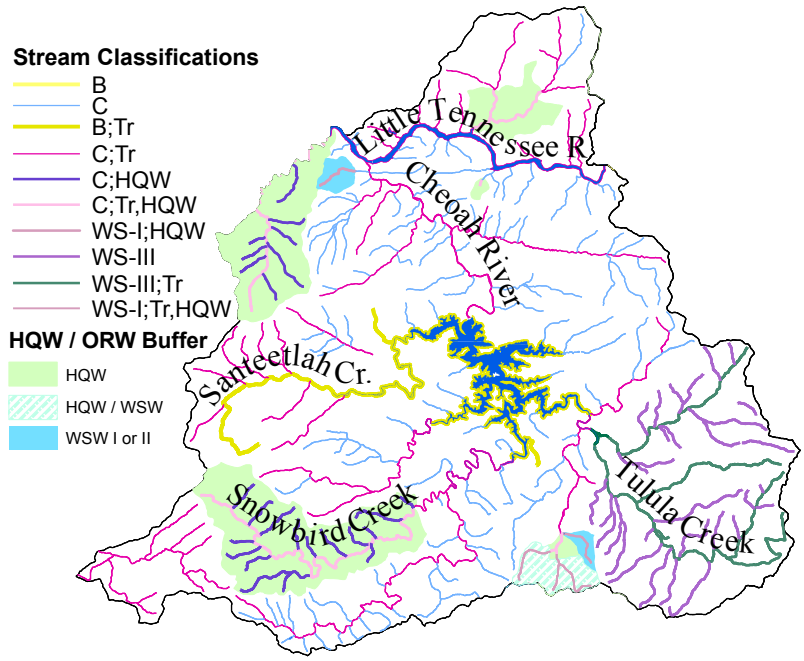
Figure 1-2: Lower Tennessee River Subbasin Map (HUC 06010204)



Water Quality Overview

The Lower Little Tennessee River Subbasin, hydrologic unit 06010204, was represented in previous Basin Plans as Subbasin 04-04-04. This subbasin covers 274 sq. miles and is 93% forested; containing portions of Nantahala National Forest and Joyce Kilmer Wilderness Area. (Figure 1-1). There are approximately 980 reservoir acres and ~420 classified stream miles, not including the numerous unnamed tributaries. Several tributaries flow into Santeetlah Lake, an impoundment on the Cheoah River. The Cheoah River drains into the Little Tennessee River (Cheoah Lake) just before the Tennessee / North Carolina border. A map of the subbasin showing Impaired streams, monitoring and permit locations is shown in Figure 1-2.

Figure 1-3: Stream Classifications

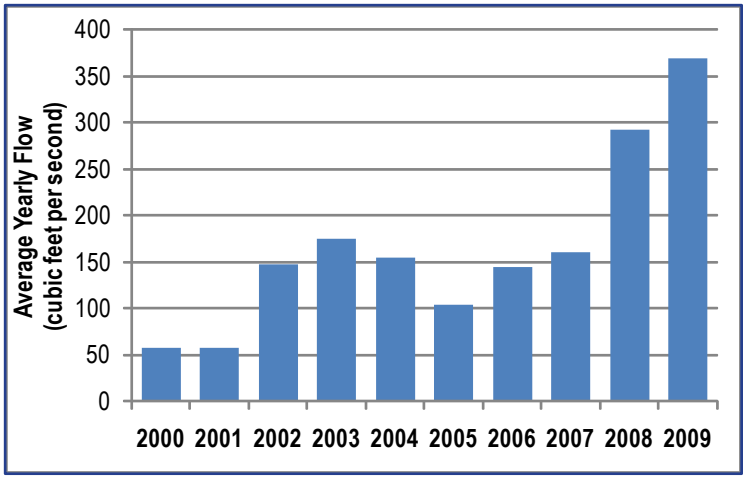


This subbasin contains high quality waters and supports numerous trout streams (Figure 1-3). Water quality issues of concern in this subbasin include agricultural runoff, stream bank erosion, and individual onsite wastewater failures. There are no waterbodies on the 2010 303(d) list of Impaired waters, although the 2012 303(d) will include a portion of the Cheoah River because of high turbidity levels. A fish advisory was issued in 2008 for Lake Santeetlah due to the potential mercury content in walleye. Water quality improvements were made in West Buffalo Creek with the removal of four trout farms that were contributing nutrients to Santeetlah Lake, in the Cheoah River with the improved management of water releases from Santeetlah Dam to support aquatic habitat, and in the Tellico River watershed resulting from the restoration of forest and stream conditions impacted from off-highway vehicle recreation.

Stream flow

Stream flow is monitored at US Geological Survey gaging stations. Flow, often abbreviated as "Q", is measured in terms of volume of water per unit of time, usually cubic feet per second (cfs). There is one gaging station in this subbasin. Figure 1-4 provides an example of average stream flow over a 10 year period and gives an idea of which years received heavier precipitation. The flow rate in a stream can impact the measurement of physical and chemical parameters. For more information about instream flow see DWR website: http://www.ncwater.org/About_DWR/Water_Projects_Section/Instream_Flow/welcome.html.

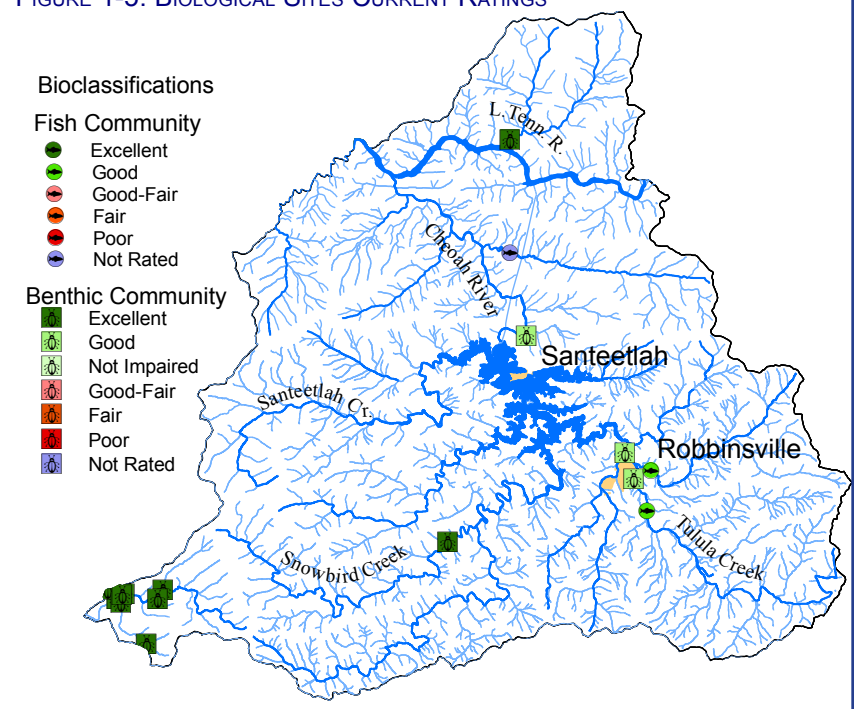
Figure 1-4: Stream flow at USGS 0351706800 Cheoah River near Tapoco
(Yearly Average based on Daily Means)



Stream flow conditions were assessed between 2005-2009 and detected drought conditions in 2006, 2007 and 2008 (see page 16 AMS Report). In particular, droughts can have major effects on parameters such as dissolved oxygen, turbidity, pH, and others by reducing stream flow.

Biological Monitoring

Figure 1-5: Biological Sites Current Ratings



Biocriteria have been developed using the diversity, abundance, and pollution sensitivity of the organisms that inhabit flowing waterbodies in NC. One of five bioclassifications are typically assigned to each water body sampled: Excellent, Good, Good-Fair, Fair and Poor. Not Impaired and Not Rated designations are reserved for samples that were not eligible to be assigned one of the five typical bioclassification categories. Typically, a "Not Impaired" rating is equivalent to a Good-Fair or better bioclassification and a "Not Rated" designation is equivalent to a Fair or worse bioclassification. The reasons for not being able to assign one of these five typical bioclassifications may be a lack of appropriate bio-criteria or atypical sampling conditions (e.g., drought). These bioclassifications are used to assess the various impacts of both point source discharges and nonpoint source runoff. The resulting information is used to document both spatial and temporal changes in water quality, and to complement water chemistry analyses, ambient toxicity data, and habitat evaluations. In addition to assessing the effects of water pollution, biological information is also used to define High Quality or Outstanding Resource Waters, support enforcement of stream standards, and measure improvements associated with management actions. Biological samples were collected during the spring and summer months of 2004 and 2009-10 by the DWQ-Environmental Sciences Section as part of the five-year basinwide sampling cycle. Four benthic macroinvertebrate sites and three fish community sites were evaluated in 2009-10. Each basinwide biological station monitored during the current cycle is shown in Figure 1-5 and color coded based on its current rating. As seen on the map, the majority of benthic macroinvertebrate samples taken in this watershed received an Excellent or Good ratings. Two fish community sites rated Good and one resulted in a Not Rated status, due to the absence of criteria for rating high gradient mountain trout waters. There were 10 samples taken at new locations.

Figure 1-6: Benthic Macroinvertebrate Sample Status

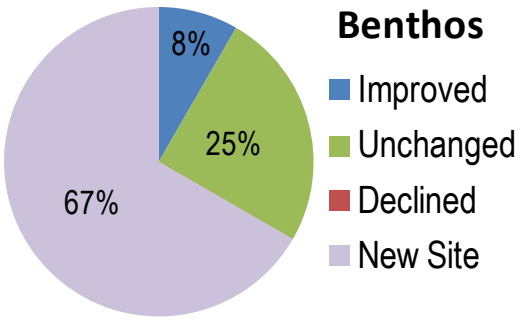
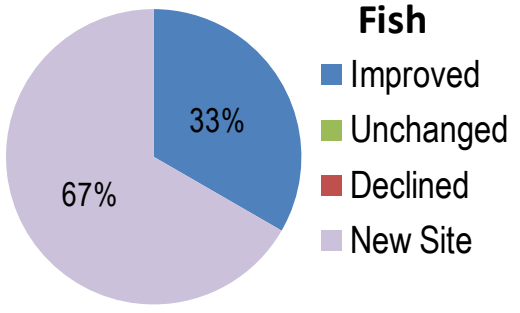


Figure 1-7: Fish Community Sample Status



Benthos

Among the benthic macroinvertebrate sample sites, one site improved, and three retained the same bioclassification in 2009-2010 as observed in 2004 (Figure 1-6). There were an additional eight benthic samples taken to support special studies.

Fish Among the three fish community sites, one improved from 2004 while the other two represent new sample locations (Figure 1-7).

For more information about biological data in this watershed, see the 2010 Little Tennessee River Basinwide Assessment Report. Detailed data sheets for each sampling site can be found in Appendix 1-B.

Long Term Ambient Monitoring

The DWQ's Ambient Monitoring System (AMS) is a network of stream stations strategically located for the collection of physical and chemical water quality data. There is one AMS station (G9550000) in this subbasin; data has been collected from this site since 1973. The following discussion of ambient monitoring parameters includes concentration value graphs for AMS station G9550000 over a 11 year period (2000-2010). Each major parameter is discussed, even if no current impairment exists. The graphs are not intended to provide statistically significant trend information, but rather an idea of how changes in land use or climate conditions can affect parameter readings over the long term. The difference between median and mean results indicate the presence of outliers in the data set. Box and whisker plots of individual ambient stations were completed by parameter for data between 2005 and 2009 by DWQ's Environmental Sciences Section (ESS) and can be found in the Little Tennessee River Basin Ambient Monitoring Report.

pH

As seen in Figure 1-8, which represents the data window for the 2010 303(d) list, ambient site G9550000 had at least one sample that fell below the pH standard of 6su. Over these 11 years (Figure 1-9) there were three incidences of pH dropping below the minimal standard of 6 su in the samples collected by DWQ. Figure 1-9 shows are decline in pH values with a jump in 2010.

Figure 1-8: Percentage of Samples Exceeding the pH <6 Standard between 2004-2008

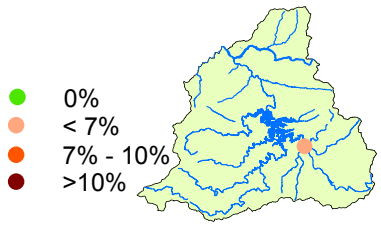
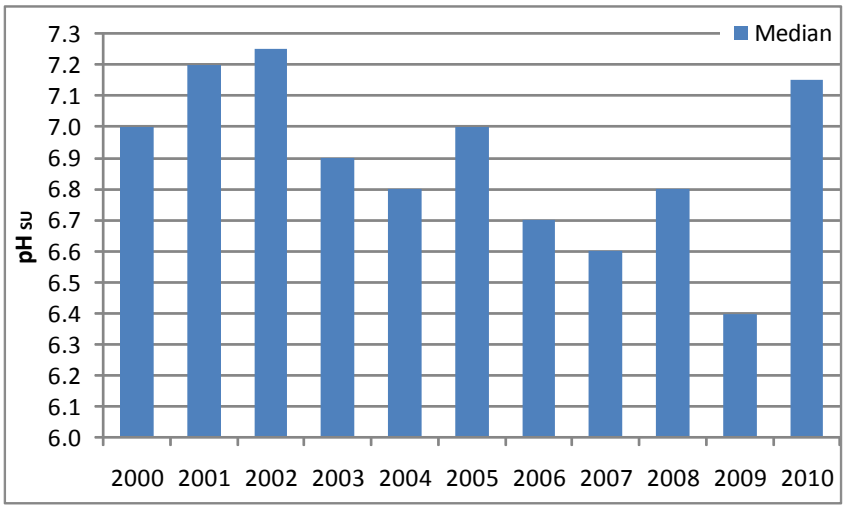


Figure 1-9: Summarized pH data at AMS G9550000 site between 2000-2010.



Dissolved Oxygen

Over the past 11 years (Figure 1-10), no samples were collected with dissolved oxygen levels below 6mg/l standard for trout waters. As seen in Figure 1-11, which represents the data window for the 2010 303(d) list, AMS station G9550000 did not have any exceedances of its DO standards.

Figure 1-11: Percentage of Samples Exceeding the DO <6 Standard between 2004-2008

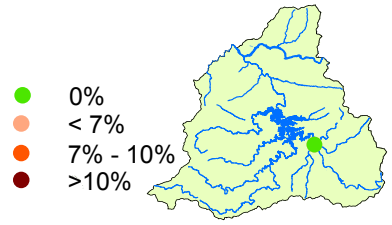
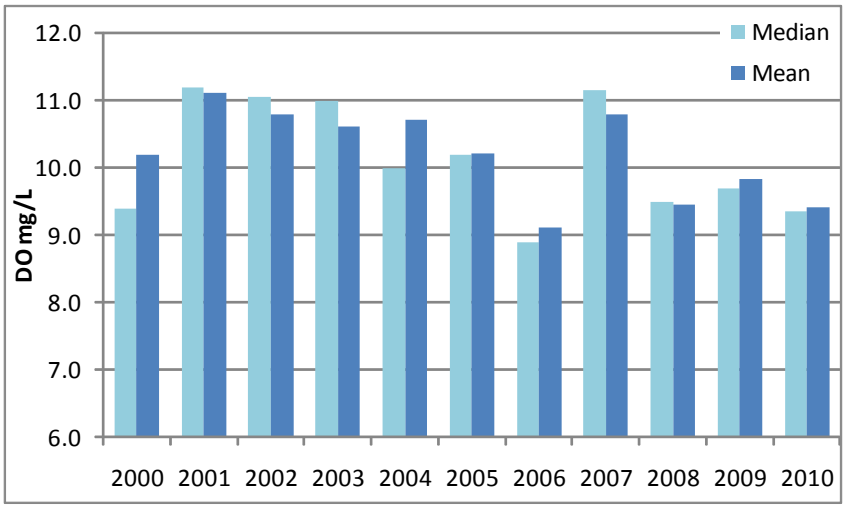


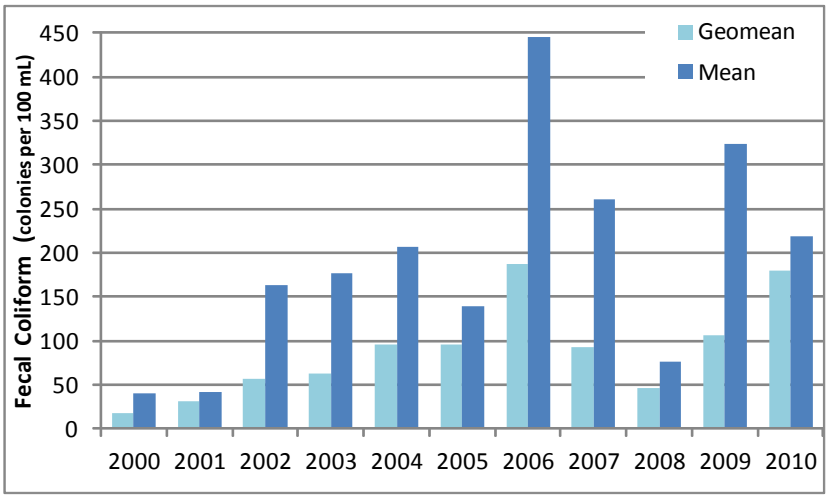
Figure 1-10: Summarized DO data at AMS G9550000 site between 2000-2010.



Fecal Coliform Bacteria

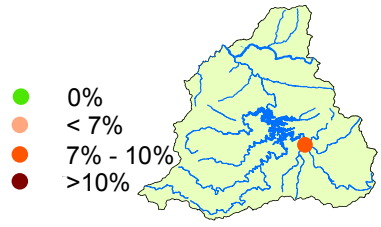
Fecal coliform bacteria occurs in water as a result of the overflow of domestic sewage and from other nonpoint sources of human and animal waste, including pets, wildlife and farm animals. The fecal coliform bacteria standard for freshwater streams is not to exceed the geometric mean of 200 colonies/100 ml or 400 colonies/100 ml in 20% of the samples where five samples have been taken in a span of 30 days (5-in-30). Only results from a 5-in-30 study are to be used to indicate whether a stream is Impaired or Supporting. Waters with a use classification of B (primary recreational waters) receive priority for 5-in-30 studies. Other waters are studied as resources permit.

Figure 1-12: Summarized Fecal Coliform Bacteria data at AMS G9550000 site between 2000-2010.



There were several incidences of high bacteria counts as indicated by several peaks in mean values, shown in Figure 1-12. Over 11 years there were 10 samples with bacteria colony counts over 400/100ml. As seen in Figure 1-13, which represents the data window for the 2010 303(d) list, ambient station G9550000 did have samples that recorded high bacteria levels.

Figure 1-13: Percentage of Samples Exceeding the Fecal Coliform Bacteria >400 Standard between 2004-2008



Turbidity

Over 11 years (Figure 1-14) there were seven samples with that exceeded the 10 NTU standard for water classified for trout protection. As seen in Figure 1-15, which represents the data window for the 2010 303(d) list, ambient site G9550000 had at least one sample that was >10NTUs, but did not exceed the standard in 10% or more of the samples.

Figure 1-15: Percentage of Samples Exceeding the >10 Turbidity Standard between 2004-2008

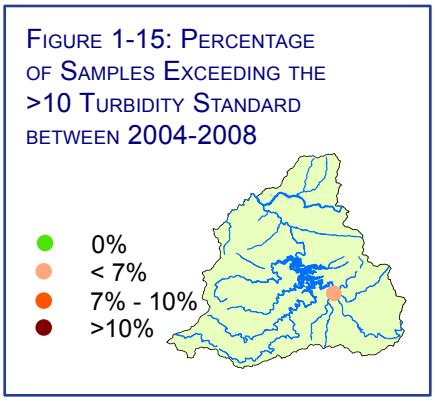
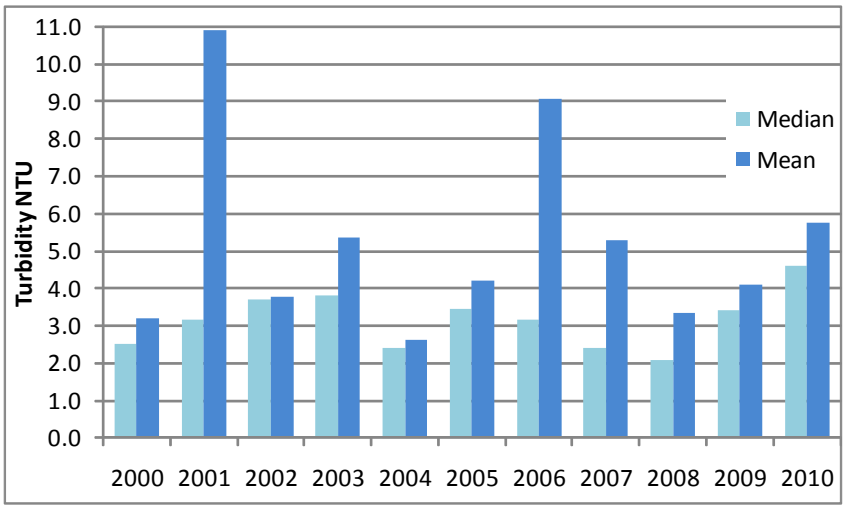


Figure 1-14: Summarized Turbidity data at AMS G9550000 site between 2000-2010.

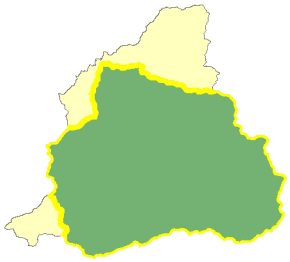


Protection and Restoration Opportunities

The following section provides more detail about specific streams where special studies have occurred or stressor sources information is available. Within this document, biological sample site IDs ending in an "F" denote fish community and a "B" denote macroinvertebrate community. Specific stream information regarding basinwide biological samples sites are available in Appendix 1B. Use support information on all monitored streams can be found in Appendix 1A. Detailed maps of each of the watersheds are found in Appendix 1C or by clicking on the following small maps.

To assist in identifying potential water quality issues citizens, watershed groups and resource agencies can gather and report information through our Impaired and Impacted Stream/ Watershed survey found here: http://portal.ncdenr.org/web/wq/ps/bpu/about/impactedstreamssurvey.

Cheoah River Watershed (HUC 0601020401)



This watershed encompasses 137,710 acres and has an estimated 2010 population of 7,332 people. There are six subwatersheds that drain into Santeetlah Lake, which then flows into Cheoah River and eventually the Little Tennessee River.

NPDES Permits within the Cheoah River Watershed

Permit #	Permit Type	Outfall location	Facility Name
NC0083071	WTP	Rock Cr	Town of Robbinsville WTP
NC0025879	WWTP	Long Cr	Town of Robbinsville
NCG180053	Stormwater	Long Cr	Stanley Furniture Comp.
NCG200437	Stormwater	Atoah Cr	Graham Co. Recycling Facility
NC0079090	Wastewater	Snowbird Cr	Coldwater Farms, Inc.
NCG530076	Wastewater	Little Snowbird Cr	Hemac Inc- Fish Farm
NCG140260	Stormwater	Chedah R	Southern Concrete Materials
WQ0031396	Non-discharge	reuse	Santeetlah Lakeside

Tulula Creek [AU# 2-190-2-(0.5)] (WS-III; Tr) subwatershed drains ~18,300 acres within the southeastern corner of Graham County. The whole watershed is classified as a WS-III and the headwaters drain Nantahala National Forest. For much of its length, US 129 and a railroad parallel the creek as it courses down the valley before flowing through the urban areas in and around Robbinsville. Land use in the headwater portions are generally forested, but the mainstem valley is mostly agriculture and residential. Tulula Creek was sampled in 2009 and received a Good benthos (GB22) and fish (GF29) ratings. Biologists noted bluegreen algal mats with the possibility of upstream straight-piping or nonpoint-source erosion contributions of nutrients, but also noting the stream supports its supplemental designation as trout waters.

Sweetwater Creek [AU# 2-190-3-(0.5)] (WS-III; Tr) drains ~9,000 acres. The entire subwatershed is classified as WS-III with headwater portions in Nantahala National Forest and much of the rest of the drainage is used for hay production. Sweetwater Creek was sampled (GF36) by DWQ fish biologists for the first time in 2009 resulting in a Good Bioclassification rating. Water quality conditions support its supplemental designation as trout waters. The Graham County Soil and Water Conservation District is aware of streambank stability problems and has assisted landowners along the creek with planning and installing BMPs. The District plans to continue to devote conservation resources to this watershed but will require landowner participation.

Snowbird Creek [AU#s 2-190-9-(0.5) & 2-190-9-(15.5)] (C;Tr) subwatershed is ~29,950 acres. Snowbird and Little Snowbird Creeks are supplementally classified as trout waters, with the upper portion of Snowbird Creek, within the boundary of Nantahala National Forest, also being classified as HQW. The 2009 benthos sample (GB25) in Snowbird Creek resulted in an Excellent Bioclassification. There is one permitted (NC0079090) trout farm with a discharge into Snowbird Creek.

West Buffalo Creek [AU# 2-190-12a] (C;Tr) drains ~10,625 acres. The creek is classified as trout waters and as it flows into Santeetlah Lake it becomes classified for primary recreation also. The last benthic samples taken in this subwatershed were during the 1990's and all resulted in Excellent Bioclassifications.

West Buffalo Creek Arm of Santeetlah Lake [AU# 2-190-12b] (B;Tr) is Not Rated due to inconclusive temperature and DO data. However, it was on the 303(d) list (289 acres) of impaired waters due to nutrient enrichment (chlorophyll *a*) based on special studies conducted by the DWQ in 1993 and 1999. Nutrient concentrations were especially high immediately downstream of trout farms on West Buffalo Creek. The Clean Water Management Trust Fund awarded $1.25 million dollars to support the buyout of the four trout farms on the West Buffalo Creek arm responsible for the largest contributions of nutrients to the creek. The four farms were fully decommissioned by the end of March 2004.

During the spring, summer, and fall of 2005, the Division of Water Quality conducted a special study of West Buffalo Creek and the West Buffalo Creek arm of Santeetlah Lake. This study was conducted to document changes or improvements to the water quality of Buffalo Creek following the de-population and dismantling of the trout farms. The study examined both physical, chemical and biological water quality parameters on West Buffalo Creek and Santeetlah Lake to determine the degree of nutrient reduction obtained from the trout farm removal. Results from that study indicate that the nutrient reduction strategy was effective. Nutrient loading into the West Buffalo Creek arm of the lake was reduced up to 92 percent and algal blooms were diminished.

Santeetlah Creek [AU# 2-190-19] (B;Tr) drains ~20,900 acres, all of which is in Nantahala National Forest. Three Significant Natural Heritage Areas are also located in this subwatershed including: Stratton Meadows, Santeetlah Bluffs and Joyce Kilmer Wilderness Area.

Santeetlah Lake subwatershed drains ~22,450 acres. Within the subwatershed, Long Creek [AU# 2-190-4-(5)] drains from tributaries classified as WS-I, Tr, HQW and flows into the Cheoah River. Downstream of Robbinsville, DWQ, in 2009, collected a benthos sample in the Cheoah River [AU# 2-190-(3.5)] (C;Tr) at site GB133 resulting in a Good Bioclassification. Turbidity data collected at AMS G9550000 through 2010 show exceedances in turbidity levels causing the Cheoah River from the Town of Robbinsville's proposed water supply intake to Mountain Creek [AU# 2-190-(3.5)] to be Impaired on the 2012 303(d) list.

The Robbinsville WWTP (NC0025879) discharges into Long Creek and is old and outdated, has limited capacity and for years has failed to meet compliance criteria. Robbinsville proposed a relocation of the existing WWTP to a larger 12-acre site on the Cheoah River, approximately 0.2 mile downstream of the present location on Long Creek. DWQ conducted a water quality study of the Cheoah River Arm of Santeetlah Lake to assess current water quality conditions near the site of the proposed relocation and expansion of the Robbinsville WWTP and outfall. DWQ field staff sampled sites located upstream and downstream of the current Robbinsville WWTP outfall on Long Creek, upstream of the confluence of Long Creek and the Cheoah River, at the vicinity of the proposed new outfall on the Cheoah River and upstream of US Hwy 129 on the Cheoah River. Study results indicated that the current discharge does affect nutrient concentrations in Long Creek, but its effect appears to be negligible downstream in the Cheoah River and in the lake (Memorandum 20100105). In 2011, the Town of Robbinsville received ~$4.6 million grant to build a new WWTP facility that will relocate the discharge from Long Creek into the Cheoah River.

Santeetlah Lake [AU# 2-190-(5)] (B;Tr) is owned by the Aluminum Company of America (ALCOA) and is used to generate hydroelectric power as well as for recreational purposes. Santeetlah Lake is classified for the protection of primary recreation and propagation of trout (B; Tr). Santeetlah Lake is a deep lake with a maximum depth of 213 feet and a mean depth of 56 feet with an average retention time of 161 days. Santeetlah Lake continues to demonstrate low biological productivity (oligotrophic).

In September 2008, a fish consumption advisory was announced for Santeetlah Lake due to high levels of mercury found in walleye fish. Santeetlah Lake is also under the statewide consumption advisory for largemouth bass – also associated with elevated levels of mercury found in this fish.

In August, 2008, the Asheville Regional Office reported an algal bloom in the Cheoah River arm of Santeetlah Lake downstream of the US Hwy 129 bridge. An analysis of a phytoplankton sample from the bloom indicated that the dominant algae were filamentous blue greens *Anabaena plantonica*, *Anabaena spirodes* and/or *Anabaena circinalis*. Filamentous blue-green algae form significant blooms that discolor the water and produce taste and odor problems in drinking water. In 2009, no surface blooms of *Anabaena* sp. were observed in the Cheoah River by DWQ staff.

Santeetlah Dam is located on the Cheoah River [AU# 2-190-(22)a] (C;Tr) in Graham County. The Santeetlah Development was completed in 1928, and consists of a dam, pipeline/tunnel, and powerhouse. Santeetlah Dam creates Santeetlah Reservoir, which has a normal full pool area of approximately 2,881 acres and a drainage area of 176 square miles. The normal full pool elevation of Santeetlah Reservoir is 1,940.9 feet (USGS).

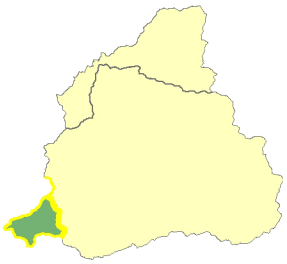
The Santeetlah powerhouse is located on the left bank of the Little Tennessee River (Cheoah Reservoir) about five miles upstream of Cheoah Dam. Water is withdrawn from Santeetlah Reservoir through an intake in the Santeetlah Dam and is passed through a 5-mile tunnel and pipeline to the powerhouse located on the Little Tennessee River.

The Santeetlah Development is operated as a storage impoundment in accordance with an annual operating curve, which establishes target seasonal reservoir levels. The current operating curve was adopted in 2004 as part of the Tapoco Project Relicensing Settlement Agreement. Under the current operating guide, Santeetlah Reservoir is operated to maintain high recreational elevations during the summer months, followed by fall drawdown to allow for collection of rainfall and runoff during the late fall, winter, and early spring. The current operating curve was developed to also provide protection and enhancement for a variety of other resources and uses, including aquatic species and habitat, water quality, reservoir wetlands, archaeological sites, and scenic appearance throughout the year. During the period April 1 to November 1, the maximum drawdown at Santeetlah Reservoir is 4-5 feet. The reservoir is filled during the month of March at such a rate that by April 1 the maximum drawdown is 5 feet. During the period December 1 to March 1, the maximum drawdown is 10 feet. During the month of November, the reservoir is drawn down at such a rate that by December 1 the maximum drawdown is 10 feet. Prior to the Relicensing Settlement Agreement, there were no regular flow releases from Santeetlah Dam into the Cheoah River. Water from Santeetlah Reservoir was diverted to the powerhouse located on the Little Tennessee River upstream of Cheoah Dam. The drainage area for the Cheoah River below Santeetlah Dam was made up of leakage from the dam, tributary inflow and occasional spills from the dam. The lack of flow severely impacted the benthic community (GB15) in this reach and resulted in Impairment in the aquatic life category from Santeetlah Dam to Rock Creek (3.4 miles). Beginning September 1, 2005 as part of the Relicensing Settlement Agreement, Tapoco began releasing minimum flows designed to enhance and protect the biologic community in the Cheoah River below the dam. The benthic community at site GB15 was resampled in 2008 resulting in a Good Bioclassification and the river is no longer Impaired.

As an additional enhancement, Tapoco established a fund intended to improve resource management in the river. The fund provides monetary support to the North Carolina Wildlife Resources Commission, North Carolina Department of Environment and Natural Resources, US Forest Service, Eastern Band of Cherokee Indians, and U. S. Fish and Wildlife Service. These agencies may use the fund to monitor biology and habitat in the river, add large woody debris (habitat), manage gravel and vegetation (bank stabilization), and other natural resource stewardship activities including threatened and endangered species recovery efforts, exotic species control, and environmental outreach and education directly related to segments of the Cheoah River and Little Tennessee River affected by dam operation. The complete consensus agreement can be found in the Tapoco (FERC #2169), Final License Application filed with FERC. These and other associated documents can be obtained at: http://www.ferc.gov.

Yellow Creek [AU# 2-190-29] (C;Tr) was sampled for the first time in 2009 at site GF37 and was given a Not Rated status. No reproducing populations of trout were detected in this trout classified stream, however there was no evidence of water quality impairments.

Tellico River Watershed (HUC 0601020403)



This watershed encompasses 20,771 acres and has an estimated 2010 population of 12 people. Land use in this general area is composed of large tracts of relatively undisturbed forest associated with the Nantahala National Forest. Streams here are high gradient with heterogeneous rocky substrates and well-developed riffle-pool sequences.

The US Forest Service (USFS) manages a large Off-Highway Vehicle (OHV) recreation area located within the upper Tellico River watershed in northern Cherokee County. According to the USFS, the use of the OHV area has resulted in water quality issues to nearby waterbodies. In an effort to determine possible impacts from the OHV system DWQ sampled 12 streams for benthic macroinvertebrates in 2009. The data generated from these collections suggest adverse impacts to many of the streams in the OHV despite the Excellent bioclassification ratings. The smallest of the streams sampled for this study showed the most noteworthy impacts to the benthic communities relative to reference sites. Adverse sediment-mediated effects on the benthos communities in Jenks Branch, and the two lower reaches of Tipton Creek were noted. The specifics of this study are available in requesting BAU memorandum 20090817, from DWQ.

Tellico River [AU# 2-195] (C;Tr) samples at sites GB181, GB183 & GB182 resulted in Excellent benthos bioclassifications

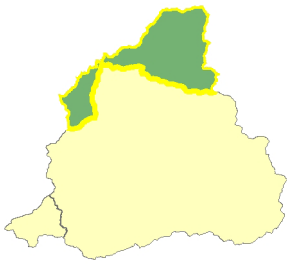
Peckerwood Creek [AU# 2-195-4] (C;Tr) sample at site GB180 resulted in an Excellent benthos bioclassification

Tipton Creek [AU# 2-195-5] (C;Tr) samples at sites GB177, GB178 & GB179 resulted in Excellent benthos bioclassifications

Jenks Branch [AU# 2-195-5-2] (C;Tr) sample at site GB185 resulted in an Excellent benthos bioclassification

In October 2009, the USFS closed the Upper Tellico OHV trail system due to sediment loading to the Tellico River and its tributaries. Many of the trails were located adjacent to streams, on steep slopes and were highly eroding. The USFS was violating its own standards of preventing visible sediment from reaching perennial and intermittent stream channels and state water quality turbidity standards of 10 NTUs. Field surveys sited 1,889 sources of visible sediment along the 34 miles of trails, which was negatively impacting brook trout habitat. In 2010, the USFS Tusquitee Ranger District obliterated ~26 miles of degraded trails and completed restoration activities to allow natural forest regeneration to occur. DWQ surveyed the area in 2011 and noted that water quality issues have been resolved and stream banks are stable.

Upper Tellico Lake Watershed (HUC 0601020404)



This watershed encompasses 65,629 acres and has an estimated 2010 population of 72 people.

NPDES Permits within the Upper Tellico Lake Watershed

Permit #	Permit Type	Outfall location	Facility Name
NC0027341	Wastewater	Little Tenn. R	TVA Fontana Hydro Plant
NCG500050	Wastewater	Little Tenn. R	Alcoa Santeelah Powerhouse
NCG500049	Wastewater	Little Tenn. R	Alcoa Cheoah Powerhouse
NC0023086	WWTP	Little Tenn. R	Fontana Village Resort
NC0023281	WWTP	Little Tenn. R	Tapoco Lodge Inc.

Little Tennessee River (Cheoah Lake/Calderwood Lake) [AU# 2-(167)a] (C;Tr) is a narrow, deep impoundment of the Little Tennessee River on the North Carolina/Tennessee border. Inflow to this Lake is dominated by the hypolimnetic discharge from Fontana Lake, located directly upstream. The upstream portion of the Lake flows swiftly in response to this discharge and temperatures in the Lake are generally low. The Lake was monitored by DWQ field staff monthly from June through August 2009. Surface water temperatures were cool in this Lake, ranging from 7.8 C to 21.1 C. Surface dissolved oxygen ranged from 8.4 mg/L to 9.9 mg/L and were elevated to the low water temperatures which allowed more oxygen to dissolve into the water. Surface pH values ranged from 6.6 s.u to 7.5 s.u. Secchi depths, which ranged from 1.8 meters on an overcast day following a rain event to 7.6 meters, indicated that the water clarity was very good. Lake Cheoah continues to have very low biological productivity (oligotrophic) since 1988.

Twentymile Creek [AU# 2-178-(4)] (C;Tr,HQW) was sampled in 2010 at site GB2 resulting in an Excellent benthos bioclassification. Twenty Mile Creek lies within and drains North Carolina's western portion of Great Smoky Mountain National Park (GSMNP) and ultimately joins the Little Tennessee River (Cheoah Lake) downstream of Fontana Dam. It has an undeveloped (hiking trails aside) and forested catchment. The habitat of this picturesque stream is as expected for a stream in a natural setting and consists of a series of cascades, riffles, and plunge pools. Typical of undisturbed mountain streams, the specific conductance was very low.

Notable Waters

Table 1-1 lists waterbodies identified as needing additional protection and potential restoration actions. The fourth and fifth columns of this table list potential stressors and sources that may be impacting a stream based on in-field observations, monitoring data, historical evidence, permit or other violations, and other staff and public input. In many cases, additional study is needed to determine exact source(s) of the impact. The last column includes a list of recommended actions.

Stream Name	AU#	Class.	Stressor	Source	Status	Actions Needed
Little Tenn. River (Cheoah Lake)	2-(167)b	C;Tr	turbidity	unknown	IM	P, BMPs
Tulula Creek	2-190-2-(0.5)	WS-III; Tr	nutrients	non-point source runoff, straight pipes	S	P, BMPs
West Buffalo Creek Arm of Santeetlah Lake	2-190-12b	B;Tr	temperature, DO, nutrients	trout farms	IP	P
AU # = Assessment Unit # or stream segment/reach						
Class. = Classification (e.g., C, S, B, WS-I, WS-II, WS-III, WS-IV, WS-V, Tr, HQW, ORW, SW, UWL)						
Stressor = chemical parameters or physical conditions that at certain levels prevent waterbodies from meeting the standards for their designated use.(e.g., low/high DO, nutrients, toxicity, habitat degradation, etc.)						
Status = I=Impaired, IM= Impacted, S=Supporting, IP= Improving,						
Actions Needed = R= restoration, P= protection, SC= stormwater controls, SS= stressor study, E= education, LO= local ordinance, BMPs, SSP= species protection plan, F= forestry BMPs, Ag= Agriculture BMPs, NMC= nutrient mgnt controls, S&E= sediment and erosion controls						

References & Useful Websites

Federal Energy Regulatory Commission (FERC)
http://www.ferc.gov/industries/hydropower.asp

NC Department Health and Human Services
Fish Advisory- http://epi.publichealth.nc.gov/fish/current.html

NC Division of Water Quality
Biological Assessment- http://portal.ncdenr.org/c/document_library/get_file?uuid=de0dbb2d-3417-44c4-9736-1710d2e18d43&groupId=38364
Ambient Report- http://portal.ncdenr.org/c/document_library/get_file?uuid=ac3b7afe-e2f1-4d1e-93df-c2ba9d897888&groupId=38364
Lakes & Reservoir Assessment- http://portal.ncdenr.org/c/document_library/get_file?uuid=0b586b2a-6851-4783-a4e1-a7f58b2549f4&groupId=38364
303(d) List- http://portal.ncdenr.org/web/wq/ps/mtu/assessment
Impaired & Impacted Survey- http://portal.ncdenr.org/web/wq/ps/bpu/about/impactedstreamssurvey

NC Division of Water Resources
Flow- http://www.ncwater.org/Permits_and_Registration/Instream_Flow/