Chapter 4
Little Tennessee River Subbasin 04-04-04
Including the: Cheoah River Watershed and Santeetlah lake

4.1 Subbasin Overview

Subbasin 04-04-04 at a Glance

Land and Water Area

Total area:	221 mi²
Land area:	220 mi²
Water area:	<1 mi²

Population Statistics

2000 Est. Pop.:	5,995 people
Pop. Density:	27 persons/mi²

Land Cover (percent)

Forest/Wetland:	94.0%
Surface Water:	2.1%
Urban:	0.5%
Cultivated Crop:	0.2%
Pasture/ Managed Herbaceous:	3.2%

Counties

Cherokee and Graham

Municipalities

Santeetlah and Robbinsville

Monitored Streams Statistics

Aquatic Life

Total Streams:	314.3 mi
Total Supporting:	29.0 mi
Total Impaired:	3.4 mi
Total Not Rated:	281.9 mi

Recreation

Total Streams:	1.4 mi
Total Supporting:	1.4 mi

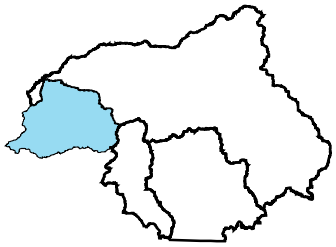
This subbasin contains the Cheoah River and all of its tributaries. Significant sections of most tributary catchments are within the Nantahala National Forest and are minimally impacted. These tributaries are typically high-gradient streams capable of supporting trout populations. However, lower reaches of some tributaries and corridors along Tulula Creek, Sweetwater Creek, Little Snowbird Creek, Yellow Creek, and the Cheoah River are not in the national forest. Thus, they are more likely to be impacted by land disturbing activities. Tulula Creek flows through the Town of Robbinsville, where the stream becomes the Cheoah River at its confluence with Sweetwater Creek. Ninety four percent of the subbasin is forested.

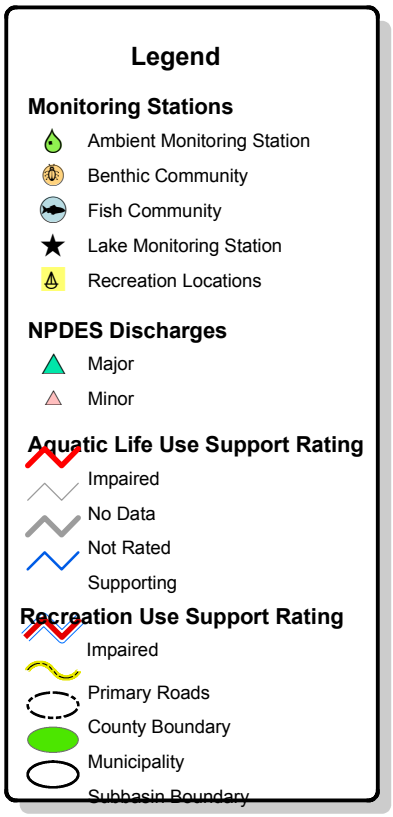
Robbinsville is the only urban area in this subbasin. There are only three NPDES permitted dischargers in this subbasin. The Robbinsville Wastewater Treatment Plant (WWTP), a minor municipal discharger releases 0.63 MGD into Long Creek, a tributary of the Cheoah River. The town's water treatment plant discharges 0.1 MGD to Rock Creek, a headwater tributary to Long Creek. Wide Creek Trout Sales has an unlimited discharge to Snowbird Creek, a tributary to Lake Santeetlah. None of these facilities is required to monitor whole effluent toxicity.

A map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 9. Table 12 contains a summary of assessment unit numbers (AU#) and lengths, streams monitored, monitoring data types, locations and results, along with use support for waters in the subbasin. Refer to Appendix VIII for more information about use support methodology.

The Cheoah River is dammed below Robbinsville to form Santeetlah Lake. Tapoco, Inc. manages the flow in the river and in the impoundment to provide hydroelectric power for the Aluminum Company of America. The de-watered tailwater reach is approximately nine river miles in length prior to its confluence with the Little Tennessee River below Cheoah Dam.

Figure 9 Little Tennessee Subbasin 04-04-04





Miles

Planning Section
Basinwide Planning Unit
May 22, 2006

Table 12 Little Tennessee Subbasin 04-04-04

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment					Recreation Assessment			Stressors	Sources
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result		
Cheoah River													
2-190-(22)a	C;Tr	3.4 FW Miles		I					ND			Habitat Degradation	Impoundment
	From Santeetlah Dam to Rock Creek				GB15	F	2004						
2-190-(22)b	C;Tr	5.9 FW Miles		S					ND				
	From Rock Creek to Calderwood Lake, Little Tennessee River				GB12	E	2004						
2-190-(3.5)	C;Tr	1.4 FW Miles		S	GA6	NCE			S	GA6	NCE		
	From the Town of Robbinsville's proposed water supply intake, to Mountain Creek				GB21	G	2004						
Cheoah River, Santeetlah Lake below elevation 1940 MSL													
2-190-(5)	B;Tr	1.9 FW Miles		NR	GL25	ID			ND				
					GL27	ID							
					GL26	ID							
	From Mountain Creek to Santeetlah Dam												
Little Santeetlah Creek													
2-190-19-7	C;Tr	3.3 FW Miles		S					ND				
	From source to Santeetlah Creek				GB18	G	2004						
Snowbird Creek													
2-190-9-(15.5)	C;Tr	5.6 FW Miles		S					ND				
	From Polecat Branch to Santeetlah Lake, Cheoah River				GB25	E	2004						
Tulula Creek													
2-190-2-(0.5)	WS-III;Tr	12.8 FW Miles		S					ND			Habitat Degradation	Unknown
	From source to a point 0.5 mile upstream of mouth				GF29	GF	2004					Nutrient Impacts	Unknown
					GB22	G	2004						

Table 12 Little Tennessee Subbasin 04-04-04

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment					Recreation Assessment				
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	Stressors	Sources
West Buffalo Creek Arm of Santeetlah Lake													
2-190-12b	B;Tr	280.0 FW Miles	From SR 1148 to Santeetlah Lake, Cheoah River	**NR**					ND				

Use Categories:
AL - Aquatic Life
REC - Recreation

Monitoring data type:
GF - Fish Community Survey
GB - Benthic Community Survey
GA - Ambient Monitoring Site
GL- Lake Monitoring

Results:
E - Excellent
G - Good
GF - Good-Fair
F - Fair
P - Poor
NI - Not Impaired

Use Support Ratings 2006:
S - Supporting, I - Impaired
NR - Not Rated
NR*- Not Rated for Recreation (screening criteria exceeded)
ND-No Data Collected to make assessment

Miles/Acres
FW- Fresh Water

m- Monitored
e- Evaluated

Results
CE-Criteria Exceeded > 10% and more than 10 samples
NCE-No Criteria Exceeded
ID- Insufficeint Data Available

Aquatic Life Rating Summary

S	m	29.0	FW Miles
NR	m	281.9	FW Miles
I	m	3.4	FW Miles
ND		306.9	FW Miles

Recreation Rating Summary

S	m	1.4	FW Miles
ND		619.7	FW Miles

Fish Consumption Rating Summary

I	e	615.3	FW Miles
I		5.9	FW Miles

The upper half of the Snowbird Creek watershed, along with several tributaries to Long Creek, is classified High Quality Waters (HQW). Other portions of the Long Creek watershed (Town of Robbinsville's water supply) are classified WS-I, which are HQW by definition. Several other streams would likely meet the criteria for reclassification to HQW or Outstanding Resource Waters. Refer to Chapter 5 for further information. Additionally, the Cheoah River floodplain is considered a significant natural heritage area by the state because of the rare and endangered species it contains.

There were six benthic macroinvertebrate community and one fish community samples collected during this assessment period. Data were also collected from one ambient monitoring station. Data collected from the ambient station has historically indicated good water quality. However, there were occasional periods when turbidity exceeded the state standard for Trout waters during this assessment cycle. These exceedances occurred in only four percent of the measurements, and therefore do not indicate impairment. Refer to the *2005 Little Tennessee River Basinwide Assessment Report* at http://h2o.enr.state.nc.us/esb/Basinwide/LTN2005.pdf and Appendix IV for more information on monitoring.

Waters in the following sections and in Table 12 are identified by an assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, list 303(d) Impaired waters, and is used to identify waters throughout the basin plan. The AU# is a subset of the DWQ index number (classification identification number). A letter attached to the end of the AU# indicates that the assessment is smaller than the DWQ index segment. No letter indicates that the AU# and the DWQ index segment are the same. For example, index number 11-3-(14) might be split into two assessment units 11-3-(14)a and 11-3-(14)b.

4.2 Use Support Assessment Summary

Table 13 Summary of Use Support Ratings by Category in Subbasin 04-04-04

Use Support Rating	Aquatic Life	Recreation
Monitored Waters		
Supporting	29.0 mi	1.4 mi
Impaired*	3.4 mi (1%)	0.0
Not Rated	281.9 mi	0.0
Total	**314.3 mi**	**1.4 mi**
Unmonitored Waters		
No Data	306.9 mi	619.7 mi
Total	**306.9 mi**	**619.7 mi**
Totals		
All Waters**	**621.2 mi**	**621.1 mi**

* The noted percent Impaired is the percent of monitored miles/acres only.
** Total Monitored + Total Unmonitored = Total All Waters.

All surface waters in the state are assigned a classification appropriate to the best-intended use of that water. Waters are regularly assessed by DWQ to determine how well they are meeting their best-intended use. For aquatic life, an Excellent, Good, Good-Fair, Fair, or Poor bioclassification are assigned to a stream based on the biological data collected by DWQ. For more information about bioclassification and use support assessment, refer to Appendices IV and IX, respectively. Appendix IX provides definitions of the terms used throughout this basin plan.

In subbasin 04-04-04, use support was assigned for the aquatic life, recreation, fish consumption and water supply categories. Waters are Supporting, Impaired, Not Rated, and No Data in the aquatic life and recreation categories on a monitored or evaluated basis. Waters are Impaired in the fish consumption category on an evaluated basis based on fish consumption advice issued by the Department of Health and Human Services (DHHS). All waters are Supporting in the water supply category on an

evaluated basis based on reports from Division of Environmental Health (DEH) regional water treatment plant consultants.

Refer to Table 13 for a summary of use support for waters in subbasin 04-04-04.

4.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2002) or are newly Impaired based on recent data. If previously identified as Impaired, the water will either remain on the state's 303(d) list or will be delisted based on recent data showing water quality improvements. If the water is newly Impaired, it will likely be placed on the 2008 303(d) list. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Information regarding 303(d) listing and reporting methodology is presented in Appendix VI.

4.3.1 Cheoah River [AU# 2-190-(22)a]

Current Status
Santeetlah Dam is located on the Cheoah River 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.

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, U. S. 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

2007 Recommendations
DWQ will resample site GB15 to evaluate improvements expected in the benthic population after minimum flows take effect. Additionally, local efforts are needed to reduce the impact of increased recreational use on water quality, especially around stream accesses and parking areas.

4.3.2 West Buffalo Creek Arm of Santeetlah Lake [AU# 2-190-12b]

Current Status
The West Buffalo Creek arm of Santeetlah Lake is on the 303(d) list (289 acres) for impairment due to nutrient enrichment (chlorophyll *a*) based on special studies conducted by the Division of Water Quality 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. This 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. Phytoplankton species shifts also occurred. *Anabaena spiroides, a* filamentous blue-green alga responsible for blooms and complaints in 1993 and 1999, was not present in samples analyzed in 2005. While problematic species were still present, densities were more than 50 percent lower in 2005 than in previous years.

Additionally, feedback from local citizens was very positive regarding the appearance of the West Buffalo Creek arm of Santeetlah Lake. Citizens commented that 2005 was the first year in recent memory that they did not see the "pea soup" appearance they had witnessed in years past. However, an insufficient number of samples (<10) were available to assign a use support rating to this segment.

2007 Recommendations
It is clear that management efforts and nutrient reductions have restored this body of water to fully supporting its designated uses. DWQ recommends the West Buffalo Creek arm of Santeetlah Lake be removed from the Impaired Waters List. The Graham County Soil and Water Conservation District has current plans with other agricultural produces along this stream to fence out cattle from West Buffalo Creek to further enhance the conservation efforts on this creek. DWQ supports Graham County SWCD in this effort.

4.4 Status and Recommendations for Waters with Noted Impacts

The surface waters discussed in this section are not Impaired. However, notable water quality problems and concerns were documented for these waters during this assessment. Attention and resources should be focused on these waters to prevent additional degradation and facilitate water quality improvements. DWQ will notify local agencies of these water quality concerns and work with them to conduct further assessments and to locate sources of water quality protection funding. Additionally, education on local water quality issues and voluntary actions are useful tools to prevent water quality problems and to promote restoration efforts. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Nonpoint source program agency contacts are listed in Appendix VII.

4.4.1 Sweetwater Creek

Current Status
The Sweetwater Creek watershed is almost entirely in private ownership, and much of the land is used for growing hay. 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. The North Carolina Department of Transportation has plans to widen NC 143 near the stream.

2007 Recommendations
DWQ supports Graham County SWCD's efforts in the watershed and encourages local landowners to participate in their efforts.

4.4.2 Tulula Creek [AU# 2-190-2-(0.5)]

Current Status
The Tulula Creek watershed lies within the southeastern corner of Graham County. 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. In 2004, DWQ sampled the fish and benthic communities at sites GF29 and GB22. While not impaired, both samples indicated degradation. The benthic community declined from Excellent in 1999 to

Good in 2004 and the fish community rated only Good-Fair. Habitat degradation and nutrient enrichment are stressors likely causing the declines.

2007 Recommendations
Sources of nutrient enrichment should be identified and corrected. Property owners can use a variety of techniques to reduce pollution caused by runoff from their property. Residents should refer to Chapter 6 and the document "Improving Water Quality in Your Own Backyard." This pamphlet is available free of charge through the Division of Water Quality. The impacts from agricultural operations can be reduced through use of agricultural best management practices. There are a variety of funding sources that can be used to make installation of these improvements more affordable to farm owners. Chapter 9 describes many of these programs. The Graham County Soil and Water District and local NRCS staff can assist farm owners with choosing appropriate BMPs and identifying funding.

4.5 Additional Water Quality Issues within Subbasin 04-04-04

The following section discusses general issues that may threaten water quality in the subbasin that are not specific to particular streams, lakes or reservoirs. The issues discussed may be related to waters near certain land use activities or within proximity to different pollution sources.

Those surface waters given an Excellent bioclassification may be eligible for reclassification to a High Quality Water (HQW) or Outstanding Resource Water (ORW). These streams are shown in Table 12. For more information about water quality standards and reclassification, see Chapter 5.

4.5.1 Management Strategies for Water Quality Protection

Municipalities and smaller outlying communities are being pressured to expand and this involves construction and/or development in areas of pristine waters along the Little Tennessee River and its tributaries. High Quality Water (HQW) and Outstanding Resource Water (ORW) are supplemental classifications to the primary freshwater classification(s) placed on a waterbody. Management strategies are associated with the supplemental HQW and ORW classifications and are intended to protect the current use of the waterbody. Below is a brief summary of these strategies and the administrative code under which the strategies are found. More detailed information can be found in the document entitled *Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina* (NCDENR-DWQ, 2004). This document is available on-line at http://h2o.enr.state.nc.us/admin/rules/. Definitions of the primary and supplemental classifications can be found in Chapter 5.

HQW is intended to protect waters with water quality higher than the state's water quality standards. In the Little Tennessee River basin, waters classified as ORW and waters designated by the NC Wildlife Resources Commission (WRC) as native (wild) trout waters are subject to HQW rules.

New discharges and expansions of existing discharges may, in general, be permitted in waters classified as HQW provided that the effluent limits are met for dissolved oxygen (DO), ammonia/nitrogen levels (NH_3-N), and the biochemical oxygen demand (BOD_5). More stringent limitations may be necessary to ensure that the cumulative effects from more than one discharge

of oxygen-consuming wastes will not cause the dissolved oxygen concentration in the receiving water to drop more than 0.5 milligrams per liter (mg/l) below background levels. Discharges from single-family residential structures into surface waters are prohibited. When a discharge from an existing single-family home fails, a septic tank, dual or recirculation sand filters, disinfection, and step aeration should be installed (Administrative Code 15A NCAC 2B .0224).

In addition to the above, development activities which require an Erosion and Sedimentation Control Plan under the NC Sedimentation Control Commission or an approved local erosion and sedimentation control program are required to follow stormwater management rules as specified in Administrative Code 15A NCAC 2H .1000 (NCDENR-DWQ, 1995). Under these rules, stormwater management strategies must be implemented if development activities are within one mile of and draining to waters designated as HQW. The low-density option requires a 30-foot wide vegetative buffer between development activities and the stream. This option can be used when the built upon area is less than 12 percent of the total land area or the proposed development is for a single-family residential home on one acre or greater. Vegetated areas may be used to transport stormwater in the low-density option, but it must not lead to a discrete stormwater collection system (e.g., constructed). The high-density option is for all land disturbing activities on greater than one acre. For high-density projects, structural stormwater controls must be constructed (e.g., wet detention ponds, stormwater infiltration systems, innovative systems) and must be designed to control runoff from all surfaces affected by one inch or more of rainfall. More stringent stormwater management measures may be required on a case-by-case basis where it is determined additional measures are needed to protect and maintain existing and anticipated uses of the water (Administrative Code 15A NCAC 2H .1006).

ORWs are unique and special surface waters that have some outstanding resource value (e.g., outstanding fish habitat and fisheries, unusually high levels of water-based recreation, special ecological or scientific significance). No new discharge or expansions on existing discharges are permitted. Rules related to the development activities are similar to those for HQW, and stormwater controls for all new development activities requiring an Erosion and Sedimentation Control Plan under the NC Sedimentation Control Commission or an approved local erosion and sedimentation control program are required to follow stormwater management rules as specified in Administrative Code 15A NCAC 2H .1000 (NCDENR-DWQ, 1995). In addition, site-specific stormwater management strategies may be developed to protect the resource values of these waters.

Many of the streams in this subbasin are also classified as trout (Tr) waters, and therefore, are protected for natural trout propagation and maintenance of stocked trout. There are no watershed development restrictions associated with the trout classification; however, the NC Division of Land Resources (DLR), under the NC Sedimentation and Pollution Control Act (SPCA), has requirements to protect trout streams from land disturbing activities. Under G.S. 113A-57(1), "waters that have been classified as trout waters by the Environmental Management Commission (EMC) shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the twenty-five percent of the buffer zone nearest the land-disturbing activity, whichever is greater." The Sedimentation Control Commission, however, can approve land-disturbing activities along trout waters when the duration of the disturbance is temporary and the extent of the disturbance is minimal. This rule applies to unnamed tributaries flowing to the affected trout water stream. Further clarification on classifications of unnamed tributaries can be found under Administration Code 15A NCAC 02B .0301(i)(1). For more information

regarding land-disturbing activities along designated trout streams, see the DLR website at http://www.dlr.enr.state.nc.us/.

Those streams noted as having Excellent bioclassifications in Table 12 may qualify for HQW or ORW classification. There may also be many more streams in the basin that qualify for such designation that DWQ has not monitored. DWQ relies on citizen requests to initiate the stream reclassification process (See Section 5.1.4) and encourages requests for reclassification to HQW or ORW when it is warranted. Appropriate stream classification will help to protect water quality in the long-term.

Native Southern Appalachian Brook Trout occupy many high elevation streams in the Little Tennessee River Basin. They are the only trout native to the southern Appalachian Mountains and require clear, cold streams to survive. They are very sensitive to excess sediment. Efforts to restore and expand their populations across the basin will benefit from designation as HQW or ORW. Those streams that can support Native Appalachian Brook Trout should be identified and evaluated for qualification as HQW or ORW.

4.5.2 Special Management Strategies for Threatened and Endangered Species

Several streams in Little Tennessee River subbasin 04-04-04 are home to Federally listed Threatened and Endangered Species. The Cheoah River and Talula Creek host the Appalachian elktoe. Section .0100 of the Administrative Code states the following:

> Certain waters provide habitat for federally-listed aquatic animal species that are listed as threatened or endangered by the U.S. Fish and Wildlife Service or National Marine Fisheries Service under the provisions of the Endangered Species Act, 16 U.S.C. 1531-1544 and subsequent modifications. Maintenance and recovery of the water quality conditions required to sustain and recover federally-listed threatened and endangered aquatic animal species contributes to the support and maintenance of a balanced and indigenous community of aquatic organisms and thereby protects the biological integrity of the waters. The Division shall develop site-specific management strategies under the provisions of 15A NCAC 2B .0225 or 15A NCAC 2B .0227 for those waters. These plans shall be developed within the basinwide planning schedule with all plans completed at the end of each watershed's first complete five year cycle following adoption of this Rule. Nothing in this Rule shall prevent the Division from taking other actions within its authority to maintain and restore the quality of these waters.

An interagency team from the USFWS, the NC Wildlife Resources Commission and the NC Natural Heritage Program was asked to develop technical reports to support NCDWQ's development of site-specific management strategies to restore water quality in the Little Tennessee River Basin. It is intended to provide a framework for getting additional stakeholder input prior to formulating the water quality management strategy which will be completed through rule-making by NCDWQ (with the requisite public involvement and Environmental Management Commission oversight).

4.5.3 Septic System Concerns

Development of rural land in areas not served by sewer systems is occurring rapidly in the Little Tennessee River basin. Hundreds of permit applications for onsite septic systems are approved

every year. Septic systems generally provide a safe and reliable method of disposing of residential wastewater when they are sited (positioned on a lot), installed, operated, and maintained properly. Rules and guidelines are in place in North Carolina to protect human health and the environment. Water quality is protected by locating the systems at least 50 feet away from streams and wetlands, limiting buildable lot sizes to a ¾-acre minimum, and installing drain fields in areas that contain suitable soil type and depth for adequate filtration; drinking water wells are further protected by septic system setbacks.

Septic systems typically are very efficient at removing many pollutants found in wastewater including suspended solids, metals, bacteria, phosphorus, and some viruses. However, they are not designed to handle other pollutants that they often receive such as solvents, automotive and lubricating oil, drain cleaners, and many other household chemicals. Additionally, some byproducts of organic decomposition are not treated. Nitrates are one such byproduct and are the most widespread contaminant of groundwater in the United States (Smith, et al., 2004).

One septic system generates about 30 to 40 pounds of nitrate nitrogen per year (NJDEP, 2002). Nitrates and many household chemicals are easily dissolved in water and therefore move through the soil too rapidly to be removed. Nitrates are known to cause water quality problems and can also be harmful to human health (Smith, et al., 2004).

Proper location, design, construction, operation, and maintenance of septic systems are critical to the protection of water quality in a watershed. If septic systems are located in unsuitable areas, are improperly installed, or if the systems have not been operated and/or maintained properly, they can be significant sources of pollution. Additionally if building lots and their corresponding septic systems are too densely developed, the natural ability of soils to receive and purify wastewater before it reaches groundwater or adjacent surface water can be exceeded (Smith, et al., 2004). Nutrients and some other types of pollution are often very slow to leave a lake system. Therefore, malfunctioning septic systems can have a significant long-term impact on water quality and ecological health (PACD, 2003).

Local governments, in coordination with local health departments, should evaluate the potential for water quality problems associated with the number and density of septic systems being installed throughout their jurisdiction. Long-term county-wide planning for future wastewater treatment should be undertaken. There are water quality concerns associated with both continued permitting of septic systems for development in outlying areas and with extending sewer lines and expanding wastewater treatment plant discharges. Pros and cons of various wastewater treatment options should be weighed for different parts of the county (based on soil type, depth, proximity to existing sewer lines, etc.) and a plan developed that minimizes the risk of water quality degradation from all methods employed.

In addition, local governments, again in coordination with local health departments, should consider programs to periodically inform citizens about the proper operation of septic systems and the need for routine maintenance and replacement. Owners of systems within 100 feet of streams or lakes should be specifically targeted and encouraged to routinely check for the warning signs of improperly functioning systems and to contact the health department immediately for assistance in getting problems corrected.