

# Chapter 1 - Hiwassee River Subbasin 04-05-01 Includes Chatuge Lake, Shooting Creek and Brasstown Creek

## 1.1 Water Quality Overview

### ***Subbasin 04-05-01 at a Glance***

#### **Land and Water**

|               |                     |
|---------------|---------------------|
| Land area:    | 195 mi <sup>2</sup> |
| Stream miles: | 313.8               |
| Lake acres:   | 3,629               |

#### **Population Statistics**

|                 |                            |
|-----------------|----------------------------|
| 1990 Est. pop.: | 7,445 people               |
| Pop. density:   | 38 persons/mi <sup>2</sup> |

#### **Land Cover (%)**

|                                 |      |
|---------------------------------|------|
| Forest/Wetland:                 | 69.0 |
| Surface Water:                  | 14.8 |
| Urban:                          | 2.5  |
| Cultivated Crop:                | 6.9  |
| Pasture/<br>Managed Herbaceous: | 6.8  |

The Hiwassee River originates in the mountains of Towns County, Georgia and flows northward. Near the NC/GA state line, the river is impounded to form Lake Chatuge. Larger tributaries to the Hiwassee River in this subbasin include Shooting Creek, Tusquitee Creek, Fires Creek and Brasstown Creek (which also originates in Georgia). Hayesville is the only municipality. A map of this subbasin including water quality sampling locations is presented as Figure B-1.

Bioclassifications for these sample locations are presented in Table B-1. Use support ratings for each applicable category in this subbasin are summarized in Tables B-2 and B-3. Refer to Appendix III for a complete listing of monitored waters and use support ratings.

Generally, water quality in this subbasin is good. Two large watersheds are fairly undisturbed, undeveloped and protected mountain areas; almost all of Fires Creek and the headwaters of Tusquitee Creek, including Big Tuni Creek, are part of the Nantahala National Forest. The Fires Creek watershed is classified ORW, and most of the Tusquitee Creek watershed is HQW.

Most of the land within this subbasin is forested (70 percent), but cropland and pasture are also common (13 percent). Nearly fifteen percent of the area is surface water reflecting, in part, the 3,629 acres of Lake Chatuge. The subbasin population, based on the 1990 census, is 7,445. However, the population of Clay County, based on 2000 census data, is 8,775 and the majority of the county lies within this subbasin boundary. The population of Clay County is expected to increase 16 percent over the next twenty years (2000-2020).

There are three permitted dischargers in the subbasin. The Hayesville WWTP (operated by Clay County) had chronic problems meeting permitted limits for suspended solids over the most recent review period and historically experienced problems meeting limits for BOD, fecal coliform and flow. Clay County constructed a new WWTP in 1999 to replace the old Hayesville WWTP. The new plant has more capacity and discharges directly to the Hiwassee River.

Lake Chatuge is monitored by both DWQ and the Tennessee Valley Authority (TVA). The North Carolina portion of the lake is classified for the protection of aquatic life and secondary recreation, as well as primary recreation. It is currently fully supporting these designated uses.

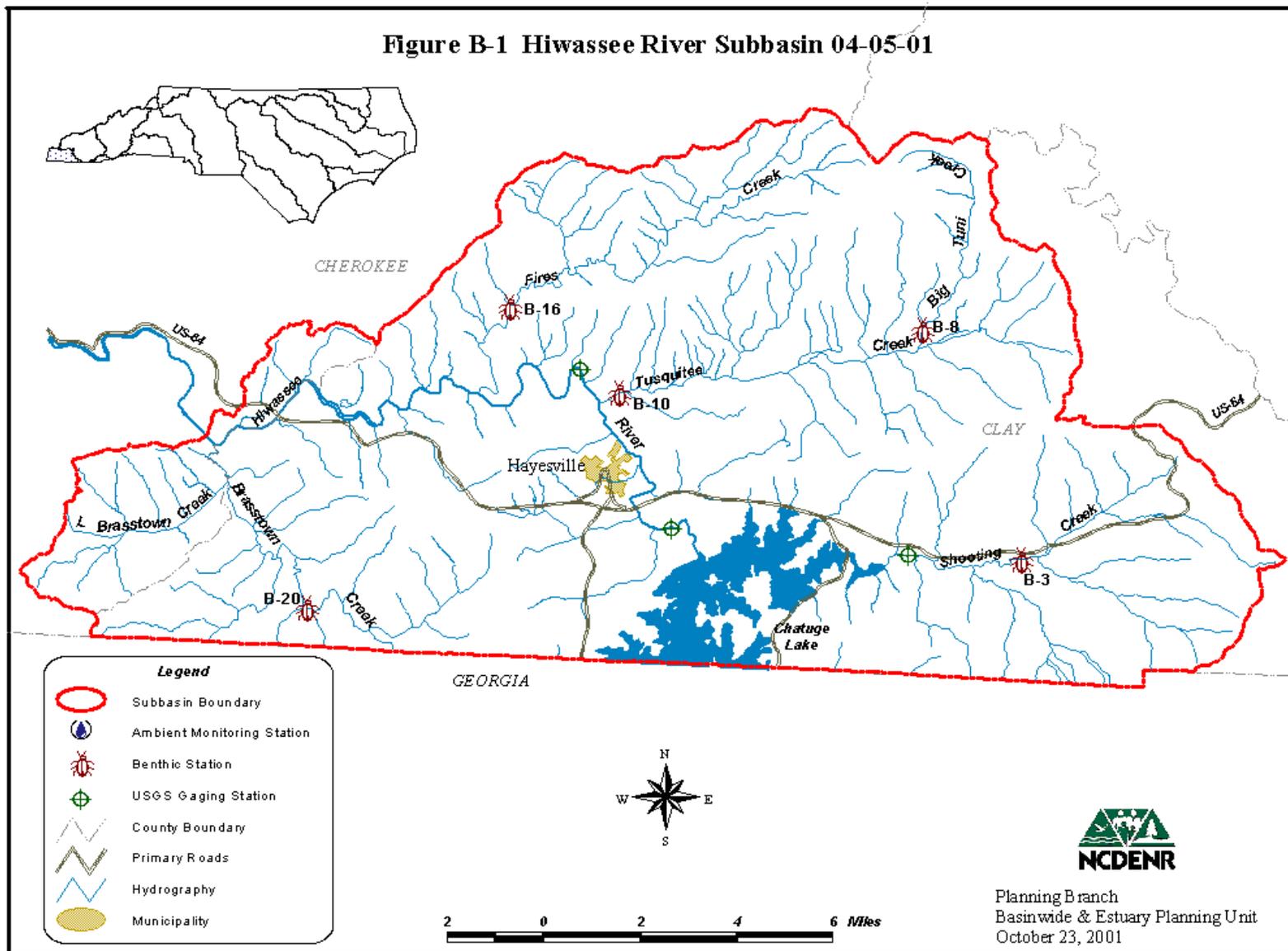


Figure B-1 Sampling Locations within Subbasin 04-05-01

Table B-1 DWQ Monitoring Locations and Benthic Macroinvertebrate Bioclassifications (1999) for Hiwassee River Subbasin 04-05-01

| Site                                     | Stream          | County | Location | Bioclassification |
|--|-----------------|--------|----------|-------------------|
| <b><i>Benthic Macroinvertebrates</i></b> |                 |        |          |                   |
| B-3                                      | Shooting Creek  | Clay   | SR 1340  | Good              |
| B-8                                      | Big Tuni Creek  | Clay   | SR 1311  | Excellent         |
| B-10                                     | Tusquitee Creek | Clay   | SR 1300  | Excellent         |
| B-16                                     | Fires Creek     | Clay   | SR 1330  | Excellent         |
| B-20                                     | Brasstown Creek | Clay   | SR 1104  | Good              |

Historical data are available for all of the benthic macroinvertebrate sample sites; refer to Appendix II.

Benthic macroinvertebrates have been collected from twenty sites in this subbasin since 1985. Two of the sites sampled in 1999, Fires Creek and Big Tuni Creek, have long-term data. Both streams continue to receive Excellent bioclassifications. Brasstown Creek showed an improvement in water quality between 1994 (Fair) and 1999 (Good). Shooting Creek also received a Good bioclassification in 1999. The few water quality problems encountered in this subbasin are related to nonpoint source runoff. Water quality in Brasstown Creek and Shooting Creek is discussed further in the following sections.

Some small fish kills were observed in Chatuge Lake in the summer of 1998 when dissolved oxygen (DO) concentrations were low in the reservoir. A larger kill (approximately 200 fish) was also observed during this hot dry period in the Hiwassee River below the dam. This kill was attributed to low DO as well. Chatuge Lake was sampled by DWQ in 1998 and 1999 and was found to be oligotrophic. Refer to Part 1.5.4 for further discussion of the Hiwassee River below Lake Chatuge.

For more detailed information on sampling and assessment of streams and lakes in this subbasin, refer to the *Basinwide Assessment Report - Hiwassee River Basin* (NCDENR-DWQ, April 2000), available from DWQ Environmental Sciences Branch at <http://www.esb.enr.state.nc.us/bar.html> or by calling (919) 733-9960.

Table B-2 Use Support Ratings Summary (2000) for Monitored Lakes (acres) in Hiwassee River Subbasin 04-05-01

| Use Support Category                          | FS      | PS  | NS  | Total <sup>1</sup> |
|---|---------|-----|-----|--------------------|
| <b>Aquatic Life/<br/>Secondary Recreation</b> | 3,629.0 | 0.0 | 0.0 | 3,629.0            |
| <b>Fish Consumption</b>                       | 0.0     | 0.0 | 0.0 | 0.0                |
| <b>Primary Recreation</b>                     | 3,629.0 | 0.0 | 0.0 | 3,629.0            |
| <b>Water Supply</b>                           | 0.0     | 0.0 | 0.0 | 0.0                |

Table B-3 Use Support Ratings Summary (2000) for Monitored and Evaluated Freshwater Streams (miles) in Hiwassee River Subbasin 04-05-01

| Use Support Category                          | FS    | PS  | NS  | NR   | Total <sup>1</sup> |
|---|-------|-----|-----|------|--------------------|
| <b>Aquatic Life/<br/>Secondary Recreation</b> | 216.1 | 0.0 | 0.0 | 97.7 | 313.8              |
| <b>Fish Consumption</b>                       | 313.8 | 0.0 | 0.0 | 0.0  | 313.8              |
| <b>Primary Recreation</b>                     | 2.6   | 0.0 | 0.0 | 0.0  | 2.6                |
| <b>Water Supply</b>                           | 30.0  | 0.0 | 0.0 | 0.0  | 30.0               |

<sup>1</sup> Total stream miles/acres assigned to each use support category in this subbasin. Column is not additive because some stream miles are assigned to more than one category.

## 1.2 Status and Recommendations for Previously Impaired Waters

This section reviews use support and recommendations detailed in the 1997 basinwide plan, reports status of progress, gives recommendations for the next five-year cycle, and outlines current projects directed towards improving water quality for each water. The 1997 Hiwassee River Basinwide Plan identified one impaired water in this subbasin: Brasstown Creek. This stream is no longer impaired and is discussed in further detail below.

### 1.2.1 Brasstown Creek (8.5 miles from the NC/GA state line to Hiwassee River)

#### 1997 Recommendations

Brasstown Creek received a Fair bioclassification in 1994 and was rated partially supporting. Water quality appeared to be most degraded by nonpoint sources throughout the watershed, including runoff from the Town of Young Harris, GA, agricultural lands and NC 66 which follows the stream for most of its length. Elevated fecal coliform concentrations were attributed to problems with the Young Harris Water Pollution Control Plant upstream in Georgia. The 1997 basin plan recommended that DWQ work more closely with Georgia's Environmental Protection Division (EPD) to address problems with permitted discharges in the Georgia portion of the watershed.

#### Status of Progress

DWQ most recently sampled Brasstown Creek in 1999. Although instream habitat was still sparse and there was significant sedimentation, the benthic macroinvertebrate community showed a marked improvement (Good bioclassification). EPT taxa richness and abundance (indices of certain pollution intolerant indicator species) more than doubled over the five-year period. In 1994, flow in the stream was substantially higher, making this fairly difficult sampling site even more so. This may explain some of the difference between the bioclassifications; however, the majority of the water quality improvement in Brasstown Creek is likely due to efforts of local agencies and citizens (outlined below), funded in large part by the Clean Water Management Trust Fund. Brasstown Creek is no longer considered impaired.

In terms of point sources, DWQ has been working to establish a better relationship with Georgia EPD. Brasstown Creek, from Little Bald Cove to the GA/NC state line, is on the Georgia 303(d) list. The "action to alleviate" water quality problems in the stream in Georgia is for EPD to "address nonpoint sources through a watershed protection strategy". In 1993, Georgia began a River Basin Management Planning approach. River Basin Watershed Protection Plans have been developed for five of Georgia's fourteen river basins (<http://www.state.ga.us/dnr/environ/> scroll down and click on water quality under "Georgia's Environment"). However, the draft "Tennessee River Basin Management Plan" that would cover streams flowing into NC will not be available until mid-2004.

DWQ is also working with GA EPD Water Protection Branch to establish a system whereby NC would be notified in the event of a spill or other event affecting waters flowing into the state from GA. GA currently has a similar arrangement with other surrounding states.

### Current Water Quality Projects

The Hiwassee River Watershed Coalition is a nonprofit, grassroots organization made up of citizens from both Georgia and North Carolina, with a mission to improve water quality, in the upper Hiwassee River watershed. The coalition received \$2.1 million from the Clean Water Management Trust Fund in 1999 for restoration work in the Brasstown Creek watershed.

In 1998, the Hiwassee River Nonpoint Source Team chose Little Brasstown Creek as one of two watersheds to implement nonpoint source pollution demonstration projects using Section 319 funds. Section C contains more information on these and other water quality improvement initiatives in the Hiwassee River basin.

## **1.3 Status and Recommendations for Newly Impaired Waters**

No stream segments in this subbasin are rated as impaired based on recent DWQ monitoring (1994-1999). However, impacts to many streams from narrow riparian buffer zones, sedimentation and moderate to severe bank erosion were documented. Part 1.5 below discusses specific streams where these impacts were observed.

## **1.4 303(d) Listed Waters**

Brasstown Creek (discussed above) is the only water listed on the state's year 2000 303(d) list. During this basinwide cycle, DWQ data documented water quality improvement that may allow this stream to be removed from the 303(d) list in 2002. Refer to Appendix IV for more information on the state's 303(d) list and listing requirements.

## **1.5 Other Water Quality Concerns and Recommendations**

The surface waters discussed in this section are fully supporting designated uses based on DWQ's use support assessment and are not considered to be impaired. However, notable water quality problems and concerns have been documented for some waters based on this assessment. While these waters are not considered impaired, attention and resources should be focused on these waters over the next basinwide planning cycle to prevent additional degradation or

facilitate water quality improvement. A discussion of how impairment is determined can be found on page 43.

Water quality problems in the Hiwassee River basin are varied and complex. Inevitably, many of the water quality impacts noted are associated with human activities within the watershed. Solving these problems and protecting the surface water quality of the basin in the face of continued growth and development will be a major challenge. Voluntary implementation of BMPs is encouraged and continued monitoring is recommended. DWQ will notify local agencies and others of water quality concerns for the waters discussed below and work with them to conduct further monitoring and to locate sources of water quality protection funding. Additionally, education on local water quality issues is always a useful tool to prevent water quality problems and to promote restoration efforts. Nonpoint source program agency contacts are listed in Appendix VI.

### **1.5.1 Shooting Creek**

Sedimentation in Shooting Creek was noted in the 1997 basin plan. Although the stream received a Good bioclassification in 1999, pools filled with sand and silt and bank erosion were noted by DWQ biologists. This watershed continues to experience increasing pressure for residential development due to its close proximity to US Highway 64 and Chatuge Lake. The Shooting Creek arm of the lake is almost completely full of sediment. When the reservoir is drawn down during winter months, the flow in Shooting Creek carries sediment further into the main body of the lake. More information about and recommendations for reducing sedimentation and other forms of habitat degradation is presented beginning on page 49.

### **1.5.2 Town Creek**

Although the Town Creek watershed is fairly small (less than two square miles), many different land uses have the potential to impact water quality. Because the stream is too small for DWQ to assign a bioclassification, the stream is not rated; however, Tennessee Valley Authority (TVA) data indicate water quality impacts in 1999 (refer to page 41). The 1997 basin plan discussed impacts to Town Creek from the Hayesville WWTP. In 1999, Clay County constructed a new facility to replace the old Hayesville WWTP, and the discharge was moved from Town Creek to the Hiwassee River. The new WWTP contains additional capacity for connecting homes and businesses with failing septic systems while allowing for future growth in Clay County. Clay County WWTP is required, through its NPDES permit, to monitor dissolved oxygen levels in the Hiwassee River above and below the discharge as well as actual discharge water.

In addition to the point source problems discussed above, habitat degradation also impacts water quality in Town Creek. The watershed is approximately 25 percent forested, 25 percent pasture, and about 50 percent urban area (Town of Hayesville). Habitat degradation is primarily a result of streambank erosion, loss of riparian vegetation, gully erosion from improperly routed stormwater runoff, and eroding road grades and roadside ditches. Impacts from beef cattle, questionable performance of septic systems, spills from municipal wastewater collection systems, and sediment from development activities are also likely contributing to water quality degradation (Southwestern RC&D, 1998). This watershed was targeted by the Hiwassee River Basin Nonpoint Source Team for nonpoint source pollution demonstration projects. Refer to

page 79 for further information regarding this locally managed water quality improvement initiative.

### **1.5.3 Hiwassee River (below Chatuge Dam)**

The 1997 Hiwassee River basin plan discussed historical problems with low dissolved oxygen (DO) in the Hiwassee River below Chatuge Dam. TVA is not required to provide a minimum flow below this dam and a now discontinued USGS flow gage showed wide fluctuations in flow historically. The plan also reported that, in 1992, TVA constructed a reaeration weir in the Hiwassee River downstream of the dam to improve DO concentrations; however, it was designed to provide a minimum DO of 5.0 mg/l. DWQ recommended that Clay County monitor instream DO concentrations after the WWTP discharge was moved to the Hiwassee River.

Although DWQ did not monitor this portion of the Hiwassee River over the past five years, a fairly large fish kill (approximately 200 fish) was reported in the summer of 1998 in the Hiwassee River below Chatuge dam. This fish kill, as well as some smaller fish kills that were observed in Chatuge Lake, were attributed to low DO concentrations within the reservoir. [Page 41 discusses TVA data collected from Lake Chatuge in 1998 and 1999.]

In 1999, Clay County constructed a new facility to replace the old Hayesville WWTP and the discharge was moved from Town Creek to the Hiwassee River. Clay County WWTP is required, through its NPDES permit, to monitor dissolved oxygen levels in the Hiwassee River above and below the discharge as well as actual discharge water. DWQ will summarize these data for the next Hiwassee River basinwide water quality plan.

### **1.5.4 Hyatt Mill Creek Blair Creek**

Hyatt Mill Creek and Blair Creek were both brought up as problem areas by participants at the Hiwassee River Basin Water Quality Workshop in October 2000 (see Appendix V). These small streams are tributaries to the Hiwassee River below Lake Chatuge near Hayesville. The recommendations were for better sediment BMPs and better enforcement of current rules related to construction. TVA sampled these streams in 1999 (see page 41), and the biological community of each appears to be in good shape. Habitat scores, however, were fairly low. Nonpoint source pollution, including sedimentation, produces habitat degradation. Habitat degradation can eventually lead to impairment of aquatic life in streams. BMPs should be installed and maintained in these two watersheds to prevent further habitat degradation. Restoration activities may also be needed. Further information regarding habitat degradation is presented beginning on page 49.