

# Chapter 2 -

## Hiwassee River Subbasin 04-05-02

### Includes Hiwassee and Apalachia Lakes and Valley River

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#### 2.1 Water Quality Overview

##### ***Subbasin 04-05-02 at a Glance***

###### **Land and Water**

Land area:	431 mi <sup>2</sup>
Stream miles:	653.9
Lake acres:	1,974

###### **Population Statistics**

1990 Est. pop.:	19,278 people
Pop. density:	45 persons/mi <sup>2</sup>

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

Forest/Wetland:	69.4
Surface Water:	6.4
Urban:	2.0
Cultivated Crop:	4.4
Pasture/ Managed Herbaceous:	17.8

This subbasin lies entirely within Cherokee County. Here the Hiwassee River is impounded to form Hiwassee Lake and Apalachia Lake before it leaves North Carolina, flowing west into Tennessee. The Valley River is the largest tributary in this subbasin. It flows in a southwesterly direction from Tipton through Andrews, Marble and Tomatla to converge with the Hiwassee River near Murphy. Other tributaries include Nottely River, Hanging Dog Creek and Shuler Creek. A map of this subbasin including water quality sampling locations is presented as Figure B-2.

Bioclassifications for these sample locations are presented in Table B-4. Use support ratings for each applicable category in this subbasin are summarized in Tables B-5 and B-6. Refer to Appendix III for a complete listing of monitored waters and use support ratings.

Generally, water quality in this subbasin is good. The headwaters of many tributaries to the Valley River, as well as much of the land surrounding Hiwassee Lake is part of the Nantahala National Forest. Almost all of the Shuler Creek watershed is federal land also. Gipp Creek, a tributary to the Valley River, and its watershed is classified ORW.

Most of the land within this subbasin is forested (70 percent); however, pasture represents almost 18 percent of the land cover. While only two percent of the land falls into the urban category, almost all of it lies within the Valley River watershed, including Andrews and Murphy along US 19/129.

There are eight permitted dischargers in this subbasin, the largest of which are the Andrews and Murphy WWTPs. No significant compliance or toxicity problems were noted during the most recent review period. Part 2.5.2 contains further discussion about NPDES discharges in this subbasin.

Hiwassee and Apalachia Lakes are monitored by both DWQ and the Tennessee Valley Authority (TVA). The lakes are classified for the protection of aquatic life and secondary recreation as well as primary recreation. Both lakes are oligotrophic and currently fully supporting all designated uses.

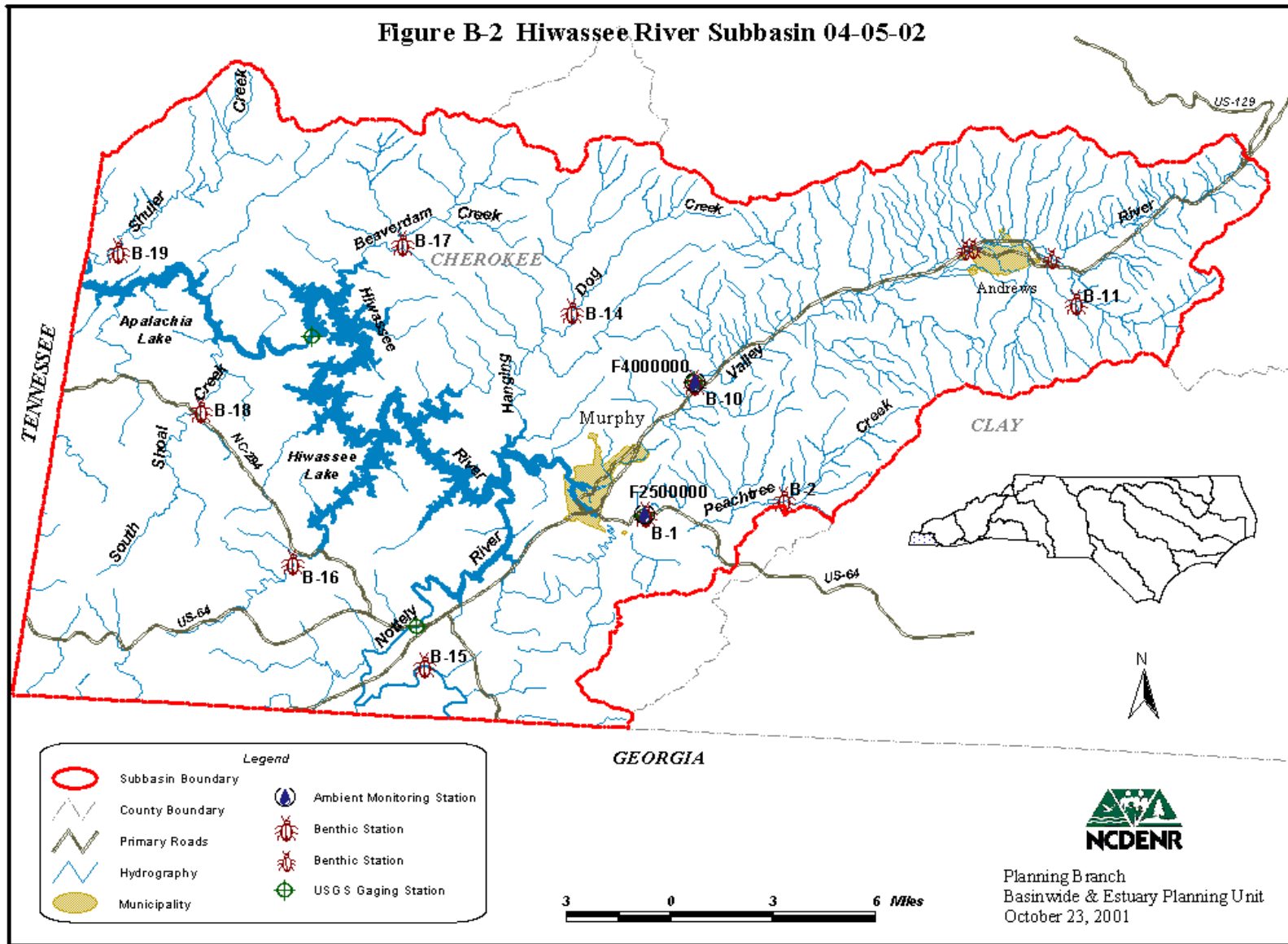


Figure B-2 Sampling Locations within Subbasin 04-05-02

Table B-4 DWQ Monitoring Locations and Benthic Macroinvertebrate Bioclassifications (1999) for the Hiwassee River Subbasin 04-05-02

Site(s)	Stream	County	Location	Bioclassification
<b><i>Benthic Macroinvertebrates</i></b>				
B-1	Hiwassee River	Cherokee	US 64	Good
B-2	Peachtree Creek	Cherokee	SR 1537	Excellent
B-10	Valley River	Cherokee	SR 1555	Good-Fair
B-11	Junaluska Creek	Cherokee	SR 1505	Good
B-14	Hanging Dog Creek	Cherokee	SR 1331	Excellent
B-15	Nottely River	Cherokee	SR 1596	Good
B-16	Persimmon Creek	Cherokee	SR 1127	Excellent
B-17	Beaverdam Creek	Cherokee	SR 1326	Excellent
B-18	South Shoal Creek	Cherokee	SR 1314	Good
B-19	Shuler Creek	Cherokee	SR 1323	Excellent
<b><i>Ambient Monitoring</i></b>				
F2500000	Hiwassee River	Cherokee	Above Murphy	N/A
F4000000	Valley River	Cherokee	SR 1373 (Tomotla)	N/A

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

Benthic macroinvertebrates have been collected from nineteen sites in this subbasin since 1983. Two of the sites sampled in 1999, Valley River near Tomotla and the Hiwassee River at Murphy, have long-term data. Water quality has not fluctuated much through time at either site, the Hiwassee River maintaining a Good bioclassification and the Valley River a Good-Fair. Half of the streams sampled received an Excellent bioclassification. Nottely River declined from Excellent in 1994 to Good in 1999, while Shuler Creek improved from Good in 1994 to Excellent in 1999.

Two sites on the Valley River and one site on Webb Creek were also sampled in 1999 as part of a special study of streams on the state's 303(d) List. Webb Creek received a Good bioclassification and both Valley River sites received a Good-Fair.

Water chemistry samples are collected monthly from the Hiwassee River and the Valley River. These data have indicated good water quality. Fecal coliform bacteria (a pathogen indicator) concentrations at both stations have decreased significantly over time; however, concentrations in 12 percent of samples at the Valley River station were greater than 200 colonies per 100 ml.

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-5 Use Support Ratings Summary (2000) for Monitored Lakes (acres) in Hiwassee River Subbasin 04-05-02

Use Support Category	FS	PS	NS	Total <sup>1</sup>
<b>Aquatic Life/ Secondary Recreation</b>	7,218.8	0.0	0.0	7,218.8
<b>Fish Consumption</b>	0.0	0.0	0.0	0.0
<b>Primary Recreation</b>	7,218.8	0.0	0.0	7,218.8
<b>Water Supply</b>	0.0	0.0	0.0	0.0

Table B-6 Use Support Ratings Summary (2000) for Monitored and Evaluated Freshwater Streams (miles) in Hiwassee River Subbasin 04-05-02

Use Support Category	FS	PS	NS	NR	Total <sup>1</sup>
<b>Aquatic Life/ Secondary Recreation</b>	497.9	0.0	0.0	155.9	653.8
<b>Fish Consumption</b>	653.8	0.0	0.0	0.0	653.8
<b>Primary Recreation</b>	27.7	0.0	0.0	0.0	27.7
<b>Water Supply</b>	7.6	0.0	0.0	0.0	7.6

<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.

## 2.2 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 aimed at improving water quality for each water. The 1997 Hiwassee River Basinwide Plan identified two impaired waters in this subbasin: Valley River and Webb Creek. These streams are no longer impaired and are discussed in further detail below.

### 2.2.1 Valley River (19.6 miles from Rhodo to just above the landfill near Andrews)

#### *1997 Recommendations*

This portion of the Valley River near Andrews was rated partially supporting in 1994, based on Fair benthic macroinvertebrate bioclassifications from three sites in the 19.6-mile reach. The Andrews WWTP was having problems passing toxicity tests; however, nonpoint source pollution was also identified as contributing to the decline in water quality. The 1997 basin plan recommended that more investigation was needed to identify specific sources.

#### *Status of Progress*

DWQ worked extensively with local resource agencies, through the Hiwassee Interagency Team, to better understand land uses and water quality impacts in the Valley River watershed. The

Valley River begins near the Cherokee/Graham county line in predominately forested and low density residential conditions. The major highway (US 74/19/129) crosses back and forth over it as it follows the river down the valley. Land along the lower portion of tributaries is in agriculture, primarily pastureland. There are impacts from rock mining, stream alterations, wetland draining and road runoff.

By the time the Valley River gets to Andrews, it is receiving a large amount of road runoff from the highway (which is four lanes at Andrews), in addition to urban runoff from the town. Riparian vegetation is thin, and there is a large amount of streambank erosion. Instream habitat is mediocre. Benthic macroinvertebrate bioclassifications seem to fluctuate based on flow. Flows were above average in 1994, increasing the amount of nonpoint source runoff into the river, and bioclassifications were Fair. Flows in 1999 were below average and bioclassifications were Good-Fair.

It appears there is some recovery in the lower third of the watershed. The tributaries in this section are primarily forested, and there is not as much agriculture. Ambient water chemistry shows few water quality concerns and benthic macroinvertebrate bioclassifications are Good-Fair, regardless of flow conditions.

In summary, the Valley River received Good-Fair bioclassifications at three sites in 1999. Therefore, it is no longer considered impaired. However, impacts to water quality from nonpoint sources of pollution in the watershed are still evident and need to be addressed. The Andrews WWTP had no significant compliance or toxicity problems during this basinwide cycle.

#### 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 recently received a CWMTF grant for stream restoration projects in the Valley River watershed. Work is slated to begin in 2002. Further details and contact information for the coalition are presented on page 86.

#### **2.2.2 Webb Creek (1.6 miles from source to Valley River)**

##### 1997 Recommendations

Webb Creek is listed on NC's 2000 303(d) List based on sedimentation impacts that were historically observed. DWQ planned to sample the stream in 1999.

##### Status of Progress

DWQ sampled Webb Creek in 1999 and the stream received a Good bioclassification. The watershed is primarily forested with a small amount of residential use. Little streambank erosion and good instream habitat were observed (MacPherson, August 2001). This stream is currently fully supporting all designated uses.

## **2.3 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.

## **2.4 303(d) Listed Waters**

Valley River and Webb Creek (discussed above) are the only waters listed on the state's year 2000 303(d) list. During this basinwide cycle, DWQ data documented water quality improvement that may allow these streams 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.

## **2.5 Other Water Quality Impacts 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.

### **2.5.1 Nottely River**

Although the bioclassification score for the Nottely River varied only slightly between 1999 and 1994, impacts were observed. Two groups of insects that indicate low dissolved oxygen conditions were abundant, and the water temperature was several degrees lower than at other sites sampled on the same day. Habitat degradation as a result of flow fluctuation was also noted by DWQ biologists. These impacts are all likely results of flow management and water quality from the Nottely Reservoir located upstream in Georgia.

The overall ecological condition of Nottely Reservoir rated poor based on 1999, 1997 and 1995 Tennessee Valley Authority (TVA) monitoring results. In 1999, the only indicator that received

a high score was sediment. Data indicate increasing nutrient enrichment. Dissolved oxygen was low in as much as 50 percent of the water column from mid-August to mid-September. Benthic macroinvertebrate scores were also low. Problems with low dissolved oxygen have been observed in Nottely Lake every year since monitoring began in 1991 (TVA-Nottely, 1999).

### 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 recently received a two-year grant from the Georgia legislature to determine causes of environmental degradation in Nottely and Chatuge Reservoirs. Further details and contact information about the coalition are presented on page 86.

## **2.6 Additional Issues of Concern within this Subbasin**

The previous part discussed water quality concerns for specific stream segments. This section discusses water quality issues related to multiple watersheds within subbasin 04-05-02. Problems with Murphy's WWTP and collection system were water quality impacts identified in the 1997 basin plan.

### **2.6.1 NPDES Discharges**

The 1997 Hiwassee River Basin Plan reported that the Town of Murphy had substantial inflow and infiltration (I&I) problems that resulted in occasional raw wastewater discharges to the Hiwassee River. The town was under a flow moratorium for additional sewer hookups. Murphy was working with an engineering consulting firm to alleviate the I&I problems and was planning to pursue expanding the wastewater treatment plant.

The majority of the Town of Murphy's I&I problems have been resolved and the town is no longer under a sewer moratorium. A modified permit was issued in May 2000 which incorporated discharge limits for 1.4 MGD, in addition to the existing flow (0.925 MGD). In March 2001, the Construction Grants and Loans Section issued an Authorization to Construct for expansion to accommodate the additional capacity.

As was mentioned previously, no significant compliance or toxicity problems were noted during the most recent review period for this or any other permitted facility in this subbasin.