Executive Summary

Basinwide water quality planning is a watershed-based approach to restoring and protecting the quality of North Carolina's surface waters. The North Carolina Division of Water Quality (DWQ) prepares Basinwide water quality plans for each of the 17 major river basins in the state. Each basinwide plan is revised at five-year intervals. While these plans are prepared by DWQ, their implementation and the protection of water quality entail the coordinated efforts of many agencies, local governments and stakeholders throughout the state.

The goals of basinwide planning are to:

- Identify water quality problems and restore full use to Impaired waters.
- Identify and protect high value resource waters.
- Protect unimpaired waters while allowing for reasonable economic growth.

DWQ accomplishes these goals through the following objectives:

- Collaborate with other agencies to develop appropriate management strategies. This includes providing agencies information related to financial and funding opportunities.
- Assure equitable distribution of waste assimilative capacity.
- Evaluate cumulative effects of pollution.
- Improve public awareness and involvement.
- Regulate point and nonpoint sources of pollution where other approaches are not successful.

This document is the third five-year update of the *Hiwassee River Basinwide Water Quality Plan*. The first basinwide plan for the Hiwassee River Basin was completed in 1997 and the second in 2002. The format of this plan was revised in response to comments received during the first and second planning cycles. DWQ replaced much of the general information in the first two plans with more detailed information specific to the Hiwassee River basin. For this plan, a greater emphasis was placed on identifying water quality concerns on the watershed level in order to facilitate protection and restoration efforts.

DWQ considered comments from the Western North Carolina Basinwide Planning Conference held in the region and subsequent discussions with local resource agency staff and citizens during draft plan development. This input will help guide continuing water quality management activities throughout the river basin over the next five years.

Basin Overview

The headwaters of the Hiwassee River basin originate in the mountains of northern Georgia and flow north through North Carolina before veering west into Tennessee to join the waters of the Tennessee River. Water from the Tennessee River flows to the Gulf of Mexico via the Ohio and Mississippi Rivers (Figure *iii,* page *xii*). The entire Hiwassee River watershed drains 2,700 square miles of land, much of which lies in the Chattahoochee (Georgia), Nantahala (North Carolina) and Cherokee (Tennessee) National Forests. In the North Carolina portion of the basin, the Hiwassee River and its two major tributaries, the Nottely and Valley Rivers, drain

more than 400,000 acres (644 square miles) of Clay and Cherokee counties in the southwestern corner of the state (Figure *iv*).

Information presented in this basinwide water quality plan is based on data collected from September 1999 to August 2004. Maps of each subbasin are included in each of the subbasin chapters. Each subbasin has its own characteristics and water quality concerns. These are discussed in Chapters 1 and 2.

DWQ identifies the stressors of water quality impact as specifically as possible depending on the amount of information available in a watershed. Most often, the source of the stressor is based on the predominant land use in a watershed. In the Hiwassee River basin, new development/construction activities, agriculture, impervious surfaces, pasture and stormwater outfalls were all identified as possible stressors. However, unknown stressors impact many streams. Water quality decline can often be attributed to a combination of many stressors that lead to habitat and water quality degradation. In some way, every person, industry, landowner, and municipality in the basin impacts water quality. Therefore, every resident of the basin must play a role in management strategies designed to protect and restore the streams, lakes, and rivers of the basin.

Subbasin 04-05-01

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. Two major tributaries, Big Tuni Creek and Fires Creek, originate in the high mountains of northern Clay County. Land use in this area is mostly forest and the terrain is rugged. Conversely, Tusquitee and Brasstown Creeks flow through the broad valleys of southern Clay County where topography is gentle and more favorable for agriculture and residential land uses. Hayesville is the only municipality.

Most of the land within this subbasin is forested (69 percent), but cropland and pasture are also common (14 percent). Nearly fifteen percent of the area is surface water, reflecting the 3,629 acres of Lake Chatuge. 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 26.4 percent over the years 2000-2020.

There is one large NPDES discharger in this subbasin (Clay County WWTP, NC0026697) whose permitted discharge is 0.3 MGD. Since the last basinwide assessment in 1999, this facility has had an upgrade in treatment and is no longer required to perform toxicity testing. There is also a facility in Georgia (Town of Young Harris Water Pollution Control Plant, 0.24 MGD) that discharges to Brasstown Creek about six miles upstream of the North Carolina state line in Towns County.

Subbasin 04-05-02

The North Carolina portion of this subbasin lies entirely within Cherokee County. Steeper relief, more precipitation, and greater forest cover characterize the north and eastern portions of the watershed. This area includes the catchments of Apalachia Lake, Hanging Dog, Owl, Beaverdam, and Shuler Creeks, as well as the headwaters of the Valley River including Junaluska, Welch Mill, and Hyatt Creeks. The Nantahala National Forest generally dominates land use in this section but residential development is increasing along ridges and in proximity to the Town of Andrews.

The southern and central portions of the watershed are characterized by broad valleys with lower elevations, less relief, less precipitation, and less forest cover. The Hiwassee River, Nottely River, Peachtree, Martins, Persimmon, and South Shoal creeks, along with Hiwassee Lake and the lower half of the Valley River are major water bodies in this area. Agricultural lands in the broad Hiwassee River valley remain common; however conversion to residential development is on the rise. In addition, a new bypass is currently under construction in Murphy and residential and commercial development in the Peachtree and Martins Creek watershed is rapidly increasing as a result. Despite these changes, land use in Subbasin 04-05-02 remains largely forested. The vast majority of the Nottely River watershed lies in Georgia and includes the City of Blairsville.

From 1990 to 2000, the population in Murphy remained fairly constant. However, Andrews saw a 37 percent decrease in population over the same period. Cherokee County as a whole grew approximately 17 percent from 1990 to 2000 and is expected to grow another 20 percent by 2020.

There are two major NPDES dischargers in this subbasin and both are required to perform whole effluent toxicity testing. The Andrews WWTP (NC0020800, 1.5 MGD) discharges to the Valley River and has had three failing tests since 2001. The Murphy WWTP (NC0020940, 0.925 MGD) has had no failing tests since January of 2001 and discharges to the Hiwassee River.

Impaired streams in this subbasin include Martins Creek, Persimmon Creek, and the Valley River.

Use Support Summary

Use support assessments based on surface water classifications form the foundation of this basinwide plan. Surface waters are classified according to their best-intended use. Determining how well a waterbody supports its use (*use support* rating) is an important method of interpreting water quality data and assessing water quality.

Biological, chemical, and physical monitoring data collected between September 1999 and August 2004 were used to assign use support ratings in the Hiwassee River basin. A total of 23.6 miles (13 percent) of monitored streams are Impaired in the Hiwassee River basin (Table *i*). The impairments are associated with nonpoint source pollution and habitat degradation. Table *ii* presents a summary of the Impaired waters and the associated stressors. Current status and recommendations for restoration of water quality for each Impaired water is discussed in the subbasin chapters (Chapters 1 & 2). Maps showing the current use support rating are also presented in each subbasin chapter.

Table *i* Summary of Use Support Ratings by Category and Subbasin in the Hiwassee River Basin

Subbasin 04-05-01			Subbasin 04-05-02		
Use Support Rating	**Aquatic Life**	**Recreation**	**Use Support Rating**	**Aquatic Life**	**Recreation**
Monitored Waters					
Supporting	34.9 mi	0	Supporting	133.0 mi	11.9 mi
Impaired*	0	0	Impaired*	23.6 mi (13%)	0
Not Rated	8.4 mi	0	Not Rated	27.7 mi	0
Total	**43.3 mi**	**0**	**Total**	**184.3 mi**	**0**
Unmonitored Waters					
Not Rated	2.5 mi	2.6 mi	Not Rated	2.4 mi	0
No Data	271.5 mi	314.7 mi	No Data	464.7 mi	639.5 mi
Total	**274 mi**	**317.3 mi**	**Total**	**467.1 mi**	**639.5 mi**
Totals					
All Waters	**317.3 mi**	**317.3 mi**	**All Waters****	**651.4 mi**	**639.5 mi**

* The noted percent Impaired is the percent of monitored miles/acres only.
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Use support methodology has changed significantly since the 2002 revision of the *Hiwassee River Basinwide Water Quality Plan*. In the previous plan, surface waters were rated fully supporting (FS), partially supporting (PS), not supporting (NS) and not rated (NR). FS was used to identify waters that were meeting their designated use. Impaired waters were rated PS and NS, depending on the degree of degradation. NR was used to identify waters with no data or those that had inconclusive data.

The *2002 Integrated Water Quality Monitoring and Assessment Report Guidance* issued by the Environmental Protection Agency (EPA) requests that states no longer subdivide the Impaired category. In agreement with this guidance, North Carolina no longer subdivides the Impaired category and rates waters as Supporting (S), Impaired (I), Not Rated (NR), or No Data (ND). These ratings refer to whether the classified uses of the water (such as water supply, aquatic life, primary/secondary recreation) are being met. Detailed information on use support methodology is provided in Appendix VIII.

Table *ii* Summary of Impaired Waters in the Hiwassee River Basin

Stream/ River Name	Assessment Unit Number (AU#)	Subbasin	Class	Miles	Category	Water Quality Stressor/Source
Martins Creek	1-49	04-05-02	C	8.8	Aquatic Life	Habitat degradation
Persimmon Creek	1-63	04-05-02	C	7.1	Aquatic Life	Habitat degradation
Valley River	1-52c	04-05-02	C Tr	7.7	Aquatic Life	Turbidity and Habitat Degradation

Use support methods were developed to assess ecosystem health and human health risk through the development of use support ratings for five categories: aquatic life, fish consumption, recreation, shellfish harvesting, and water supply. These categories are tied to the uses associated with the primary classifications applied to North Carolina rivers, streams, and lakes. A full description of the classifications is available in the DWQ document titled *Classifications and Water Quality Standards Applicable to Surface Waters of North Carolina*. This document is available on-line at http://h2o.enr.state.nc.us/csu/.

Challenges Related to Achieving Water Quality Protection

Several streams in the Hiwassee River basin appear on the 303(d) list of impaired waters and as urbanization continues the risk of impairment increases. Balancing economic growth and water quality protection will be a tremendous challenge. Point source impacts on surface waters can be measured and addressed through the basinwide planning process, however they do not represent the greatest threat to water quality in the basin.

> ***Cumulative Effects***
>
> While any one activity may not have a dramatic effect on water quality, the cumulative effect of land use activities in a watershed can have a severe and long-lasting impact.

The cumulative effects of nonpoint source pollution are the primary threat to water quality and aquatic habitat in the Hiwassee River basin. Nonpoint source pollution issues can be identified through the basinwide plan, but actions to address these impacts must be taken at the local level. Such actions should include:

- Develop and enforce local erosion control ordinances
- Conduct comprehensive land use planning that assesses and reduces the impact of development on natural resources
- Require stormwater best management practices for existing and new commercial and residential development
- Develop and enforce riparian buffer ordinances

This basinwide plan presents many water quality initiatives and accomplishments that are underway within the basin. These actions provide a foundation on which future initiatives can be built. Individual homeowners can participate in resource protection by doing the following on their own properties.

- To decrease polluted runoff from paved surfaces, households can develop alternatives to areas traditionally covered by impervious surfaces. Porous pavement materials are available for driveways and sidewalks, and native vegetation and mulch can replace high maintenance grass lawns.
- Homeowners can use fertilizers sparingly and sweep driveways, sidewalks, and roads instead of using a hose.
- Instead of disposing of yard waste, use the materials to start a compost pile.
- Learn to use Integrated Pest Management (IPM) in the garden and on the lawn to reduce dependence on harmful pesticides.
- Pick up after pets.
- Use, store, and dispose of chemicals properly.
- Drivers should check their cars for leaks and recycle their motor oil and antifreeze when these fluids are changed.
- Drivers can also avoid impacts from car wash runoff (e.g., detergents, grime, etc.) by using car wash facilities that recycle water.
- Households served by septic systems should have them professionally inspected and pumped every 3 to 5 years. They should also practice water conservation measures to extend the life of their septic systems.
- Support local government watershed planning efforts and ordinance development.

Impacts from Steep Slope Disturbance

Dramatic elevation changes and steep slopes define mountain topography. Building sites perched along mountainsides provide access to unparalleled vistas and are a major incentive for development. However, construction on steep slopes presents a variety of risks to the environment and human safety.

Poorly controlled erosion and sediment from steep slope disturbance negatively impact water quality, hydrology, aquatic habitat, and can threaten human safety and welfare. Soil types, geology, weather patterns, natural slope, surrounding uses, historic uses, and other factors all contribute to unstable slopes. Improper grading practices disrupt natural stormwater runoff patterns and result in poor drainage, high runoff velocities, and increased peak flows during storm events. There is an inherent element of instability in all slopes and those who choose to undertake grading and/or construction activities should be responsible for adequate site assessment, planning, designing, and construction of reasonably safe and stable artificial slopes.

Local communities also have a role in reducing impacts from steep slope development. These impacts can also be addressed through the implementation of city and/or county land use and sediment and erosion control plans. Land use plans are a non-regulatory approach to protect water quality, natural resources and sensitive areas. In the planning process, a community gathers data and public input to guide future development by establishing long-range goals for the local community over a ten- to twenty-year period. They can also help control the rate of development, growth patterns and conserve open space throughout the community. Land use plans examine the relationship between land uses and other areas of interest including quality-of-life, transportation, recreation, infrastructure and natural resource protection (Jolley, 2003).

Hiwassee River Basin Statistics (North Carolina Portion)

Total Area: 644 sq. miles
Freshwater Stream Miles: 968.7 mi
No. of Counties: 2
No. of Municipalities: 3
No. of Subbasins: 2
Population (2000): 33,073*
Pop. Density (2000): 49 persons/sq. mile*

Water Quality Statistics

Aquatic Life
Percent Monitored Streams: 34.9%
Percent Supporting: 25.8%
Percent Impaired: 3.6%

Recreation
Percent Monitored Streams: 1.2%
Percent Supporting: 1.2%
Percent Impaired: 0%

* Estimated based on % of county land area that is partially or entirely within the basin, not the entire county population.

Population Growth and Changes in Land Use

The Hiwassee River basin encompasses all or portions of two counties and three municipalities. In 2000, the overall population in the basin (based on the percent of the county land area in the basin) was 33,073. The most populated areas are located in and around the towns of Andrews, Hayesville and Murphy.

Once one of the most remote and sparsely populated regions of the state, western North Carolina is now penetrated by modern interstates and highways that provide speedy access to the deepest folds of the rugged terrain. This improved access coupled with an abundance of recreational opportunities, cultural activities, and countless other amenities sets the stage for rapid population increases. With this growth comes increased pressure on the natural environment. Every person living in or visiting a watershed contributes to impacts on water quality. If water pollution is to be eliminated, each

individual should be aware of these contributions and take actions to reduce them.

Between 1990 and 2000, county populations increased by nearly 6,000 people. The fastest growing county was Clay (18.5 percent increase). County populations are expected to grow by another 9,500 people (22.3 percent) by 2020. This would result in a total population of over 42,000 people in the two counties partially or entirely contained within the Hiwassee River basin. Population growth trends and the accompanying impacts to water quality are discussed in Chapters 4 and 5.

Population growth results in dramatic impacts on the natural landscape. The most obvious impact is the expansion of urban and suburban areas. New stores, roads, and subdivisions are products of growing populations. What is not so obvious is the astonishing rate at which rural landscapes are converted to developed land. Between 1982 and 1997, the United States population increased by 15 percent. Over the same period, developed land increased by 34 percent – more than double the rate of population growth (NRI, 2001; U.S. Census Bureau, 2000). Locally, the trend can be even more pronounced. For example, the urban area of Charleston, SC expanded 250 percent between 1973 and 1994 while its population grew by 40 percent (Allen and Lu, 2000). Based on the current land cover information provided by the National Resources Inventory (USDA-NRCS, 2001), there was a 78.6 percent decrease (6,600 acres) in cultivated cropland in the Hiwassee River basin from 1982 to 1997. Uncultivated cropland decreased by 17.4 percent (400 acres), and pastureland followed with a 21.7 percent decrease (4,800 acres). Urban and built-up areas increased by nearly 100.8 percent (12,200 acres). Much of this land cover change is accounted for in the area around Andrews. Land use cover tables and statistics are included in Appendix III.

Growing populations not only require more water, but they also lead to the discharge and runoff of greater quantities of waste and pollutants into the state's streams and groundwater. The impacts on rivers, lakes, and streams can be significant and permanent if stormwater runoff is not controlled. Thus, just as demand and use increases, some of the potential water supply is lost (Orr and Stuart, 2000).

Impacts from Stormwater Runoff

Stormwater runoff is rainfall or snowmelt that runs off the ground or impervious surfaces (e.g., buildings, roads, parking lots, etc.) instead of absorbing into the soil. In some cases, stormwater runoff drains directly into streams, rivers, lakes, and oceans. In other cases, particularly in urbanized areas, stormwater drains into streets and manmade drainage systems consisting of inlets and underground pipes, commonly referred to as a storm sewer system. Stormwater runoff is a primary carrier of nonpoint source pollution in both urbanized and rural areas. The impact of stormwater runoff is particularly severe in developing areas where recently graded lands are highly susceptible to erosion. Water quality impacts are also evident in urbanized areas where stormwater runoff is increased by impervious surfaces and is rapidly channeled through ditches or curb and gutter systems into nearby streams. For more information on stormwater as it relates to growth and development, refer to Chapter 5.

There are several different stormwater programs administered by DWQ. One or more of these programs may affect communities in the Hiwassee River basin. The goal of DWQ stormwater discharge permitting regulations and programs is to prevent pollution from entering the waters of the state via stormwater runoff. These programs try to accomplish this goal by controlling the

source(s) of pollution. For more information on statewide stormwater programs, refer to Chapter 6.

Septic Systems and Straight Pipes

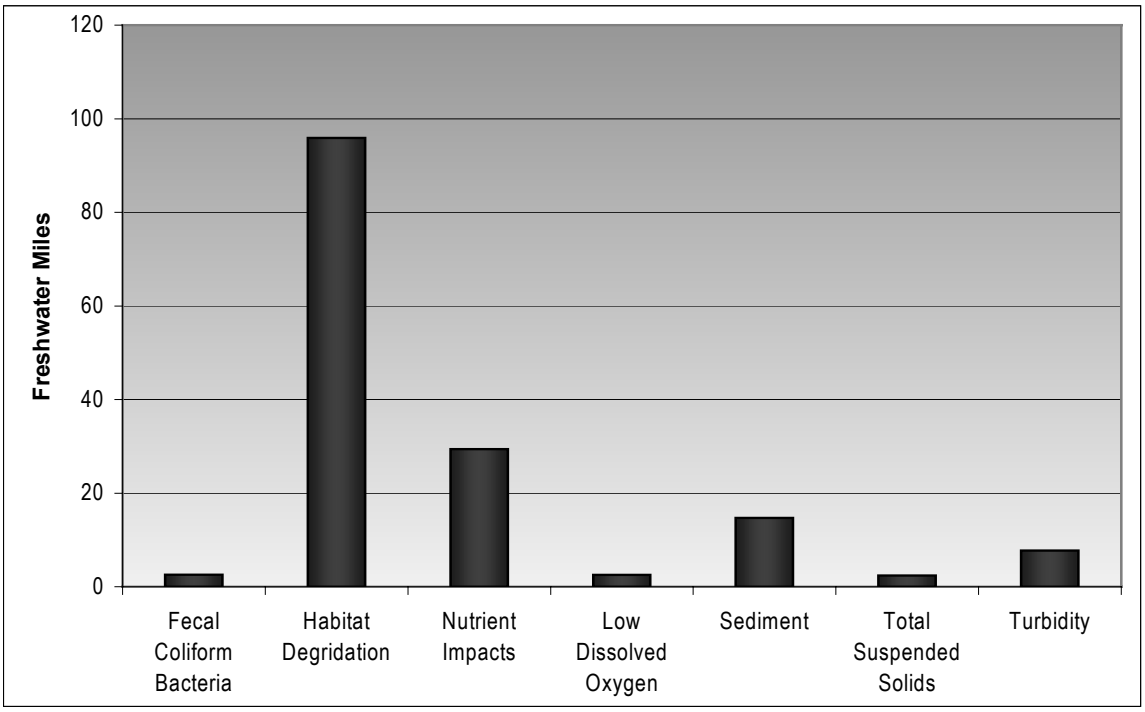
In the Hiwassee River basin, wastewater from many households is not treated at a wastewater treatment plant (WWTP). Instead, it is treated on-site through the use of permitted septic systems. However, wastewater from some homes illegally discharges directly into streams through what is known as a "straight pipe". In some cases, wastewater can also enter streams through failing septic systems. In highly susceptible areas, wastewater from failing septic systems or straight pipes can contaminate a drinking water supply or recreational waters with nutrients, disease pathogens (such as fecal coliform bacteria), and endocrine disturbing chemicals. More information on DWQ wastewater programs can be found in Chapter 6.

Water Quality Stressors

Water quality stressors are identified when impacts have been noted to biological (fish and benthic) communities or water quality standards have been violated. Whenever possible, water quality stressors are identified for Impaired waters as well as waters with notable impacts (Figure *i* & *ii*).

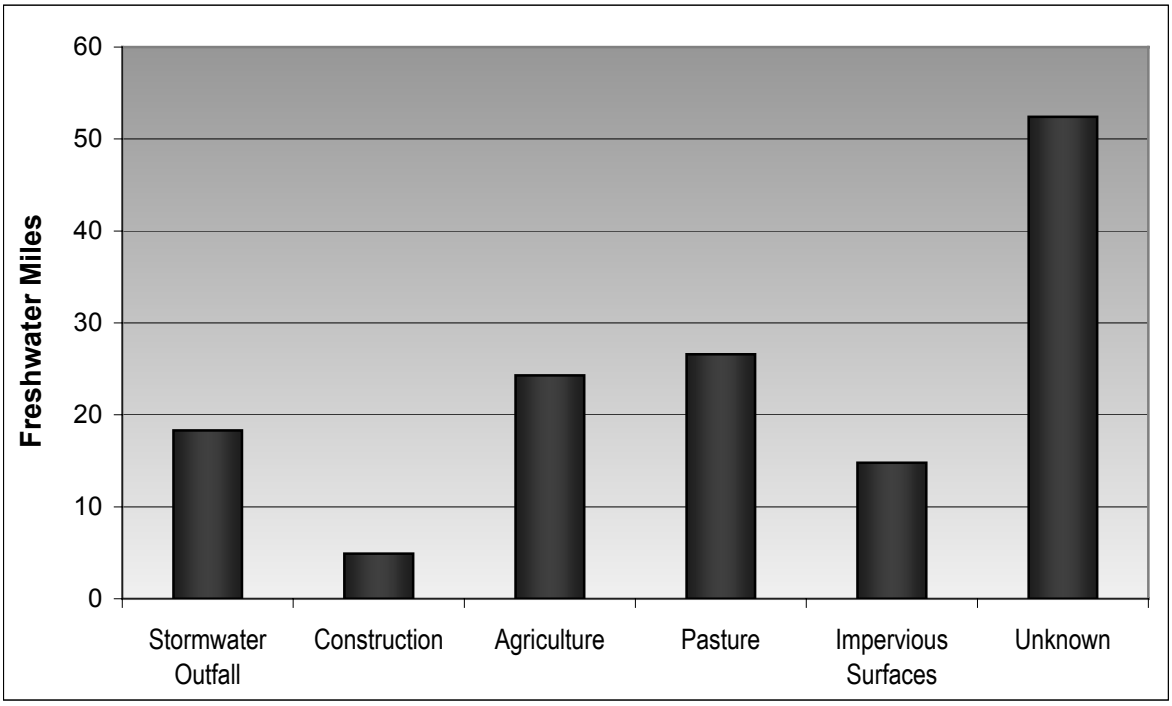
One of the most commonly noted water quality stressors in the Hiwassee River Basin is instream habitat degradation. Instream habitat degradation is identified where there is a notable reduction in habitat diversity or a negative change in habitat. Sedimentation, streambank erosion, channelization, lack of riparian vegetation, loss of pools or riffles, loss of woody habitat, and streambed scour are all associated with habitat degradation. These stressors are typically a result of increased flow of stormwater runoff from land-disturbing activities and streambank erosion due to a lack of adequate riparian vegetation. Streams with noted habitat degradation are discussed in the subbasin chapters (Chapters 1-2).

Figure *i* Stressors Identified for Streams in the Hiwassee River Basin



Other chemical and biological factors can also impact water quality. These include excess algal growth, low dissolved oxygen, nitrogen and phosphorus levels, pH, and fecal coliform bacteria. Chapter 4 provides definitions and recommendations for reducing impacts associated with physical, chemical, and biological factors.

Figure *ii* Sources of Stressors Identified in the Hiwassee River Basin



Local Involvement

Local organizations and agencies are able to combine professional expertise and local knowledge not present at the state and federal level. This allows groups to holistically understand the challenges and opportunities of local water quality concerns. Involving a wide array of people in water quality projects also brings together a range of knowledge and interests and encourages others to become involved and invested in these projects. Working in cooperation across jurisdictional boundaries and agency lines opens the door to additional funding opportunities and eases the difficulty of generating matching or leveraged funds. This could potentially allow local entities to do more work and be involved in more activities because funding sources are diversified. The most important aspect of these local endeavors is that the more localized the project, the better the chances for success. Chapter 11 examines the importance of local, state, and federal initiatives.

The collaboration of local efforts is key to water quality improvements. The demonstrated cooperation between the members of the Hiwassee River Watershed Coalition is an excellent example in the Hiwassee River Basin. DWQ encourages local governments to continue their support for the Coalition and encourages concerned citizens to get involved in the Coalition's activities. Several of the Coalition's projects are discussed in the subbasin chapters (Chapters 1 & 2).

Water Quality Standards and Classifications

Throughout the Hiwassee River basin, water quality is generally good. However, significant problems and some impairments exist. Chapter 3 discusses water quality standards and classifications and includes maps showing the designated Water Supply (WS) watersheds, High Quality Waters (HQW), and Outstanding Resource Waters (ORW).

In the Hiwassee River basin, several municipalities and smaller outlying communities are being pressured to expand. This often involves construction and/or development in areas of pristine waters along several tributaries of Hiwassee and Valley Rivers. HQW and ORW are supplemental classifications to the primary freshwater classification placed on a waterbody. Special management strategies are often associated with the supplemental HQW and ORW classification and are intended to prevent degradation of water quality below present levels from point and nonpoint sources of pollution. A brief summary of these strategies and the administrative code under which the strategies are found are included in Chapters 1 & 2.

Agriculture and Water Quality

Excess nutrient loading, pesticide and/or herbicide contamination, bacterial contamination, and sedimentation are often associated with agricultural activities, and all can impact water quality. Chapter 7 provides information related to agricultural activities in the Hiwassee River basin and also identifies funding opportunities for best management practices (BMP). During this assessment period, the North Carolina Agricultural Cost Share Program (NCACSP) funded BMP projects totaling more than $800,000 (Table *iii*).

Table *iii* NCACSP Summary for Hiwassee River Basin

NCACSP Summary for Hiwassee River Basin				
	Subbasin 04-05-01		**Subbasin 04-05-02**	
Purpose of BMP	**Total Implemented**	**Cost**	**Total Implemented**	**Cost**
Erosion Reduction/Nutrient Loss Reduction in Fields	3 acres	$7,611	17.6 acres 145 linear ft.	$3,654 $268
Sediment/Nutrient Delivery Reduction from Fields	0.2 acres 2,570 linear ft.	$5,123 $62,118	0.3 acres 100 linear ft.	$489 $1,015
Stream Protection from Animals	277.2 units 62,550 linear ft.	$301,178 $69,234	621.1 units 51,559 linear ft	$194,107 $59,864
Proper Animal Waste Management	1 unit	$15,000		
Agricultural Chemical Pollution Prevention				
Total Costs		$460,264		$259,397

Benefits*	**Subbasin 04-04-01**	**Subbasin 04-04-02**
Total Soil Saved (tons)	961.38	823.00
Total Nitrogen (N) Saved (lb.)	148.00	443.50
Total Phosphorus (P) Saved (lb.)	21.25	31.00
Total Waste-N Saved (lb.)		
Total Waste-P Saved (lb.)		

* The North Carolina Agricultural Nutrient Assessment Tool (NCANAT) contains two field-scale assessment tools: the Nitrogen Loss Estimation Worksheet (NLEW) and the Phosphorus Loss Assessment Tool (PLAT). NCANAT is a product of the cooperative effort between the NC State University, NC Department of Agriculture & Consumer Services, USDA-NRCS and the NCDENR. The tool consists of a function that allows comparisons to be made before and after BMPs are installed. Gains and losses of nitrogen, phosphorus, and sediment due to BMP implementation can be computed. The DSWC has adopted this program to calculate these losses for the NCACSP reporting requirements.

In several streams throughout the basin, DWQ noted evidence and observed several areas where livestock had direct, easy access to the streams. Fencing, or livestock exclusion, prevents livestock from entering a stream and provides an area of vegetative cover, which can secure streambanks, lower stream velocities, trap suspended sediments, and decrease downgradient erosion. Livestock exclusion is also effective in reducing nutrient, bacteria, and sediment loads in a stream (Line and Jennings, 2002).

Forestry and Water Quality

Approximately 50 percent of forestland in the Hiwassee River basin is publicly owned, and primarily consists of the Nantahala National Forest. Most of the remaining balance of forestland is privately owned by individuals. This ownership estimate comes from the most recent data published by the USDA-Forest Service *Forest Statistics for North Carolina, 2002.* (Brown, Mark J. Southern Research Station Resource Bulletin SRS-88. January 2004). No streams were noted or identified by stressors associated with forestry activities. Where forest harvesting is identified as a source of water quality impact, DWQ will notify the Division of Forest Resources to investigate for potential violations and the enforcement of management strategies. Chapter 8 presents more information related to the impacts of forestry on water quality.

Water Resources

Chapter 9 presents information related to minimum streamflow requirements, interbasin transfers, and the impact to water quality during drought conditions. The chapter also includes the federal cataloging units, or hydrologic units, as they relate to the state subbasin boundaries.

Natural Resources

North Carolina's portion of the Hiwassee River basin is located entirely within the Blue Ridge physiographic province. The basin is home to a wide diversity of plants and animals with over 70 species considered endangered, threatened, special concern, or significantly rare by the NC Natural Heritage Program (NHP). Chapter 10 presents information related to the ecological significance of the basin and identifies endangered and threatened species, significant natural areas and aquatic habitats, and public lands that are locally significant.

Figure iii General Map of the Entire Hiwassee River Basin

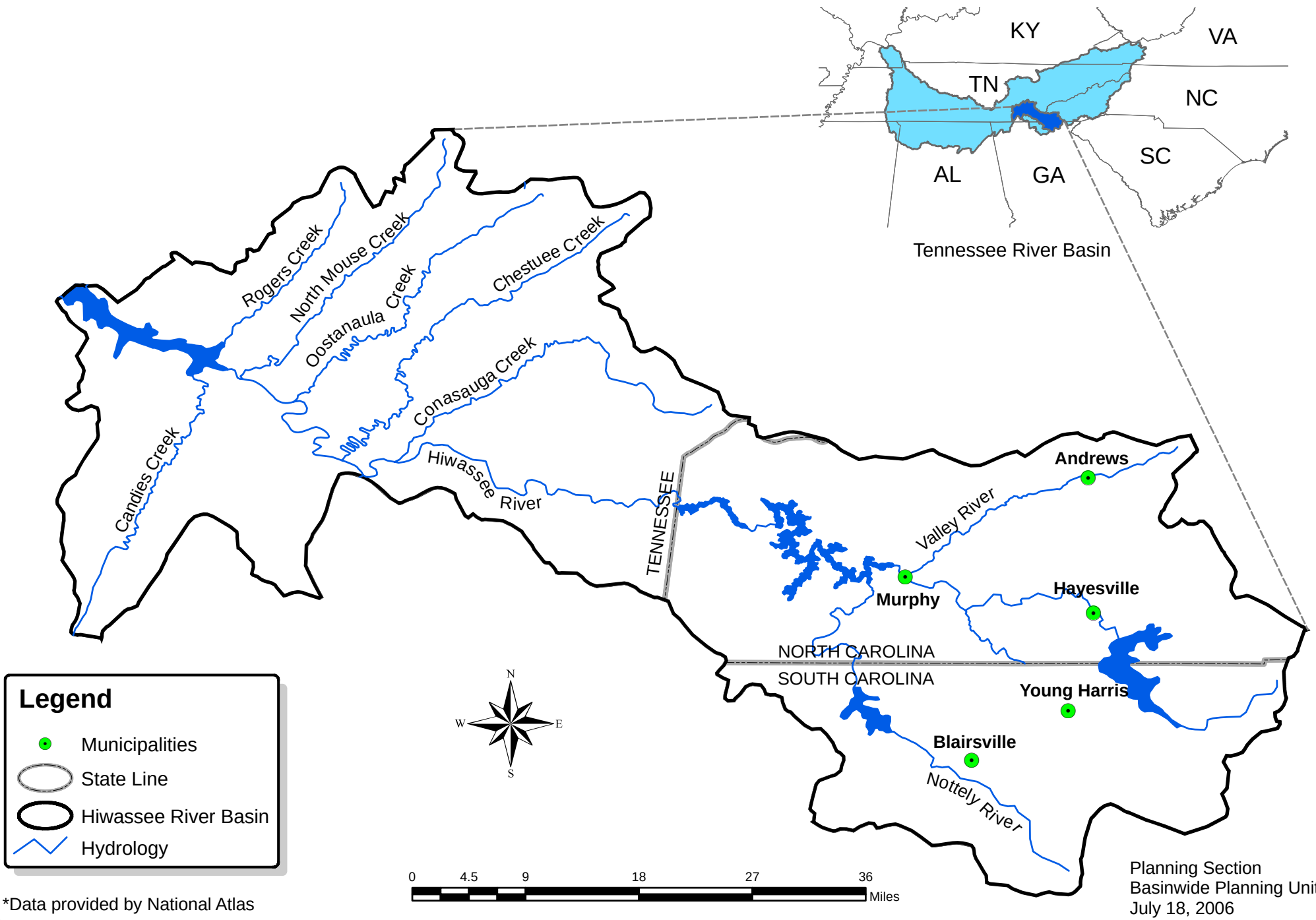
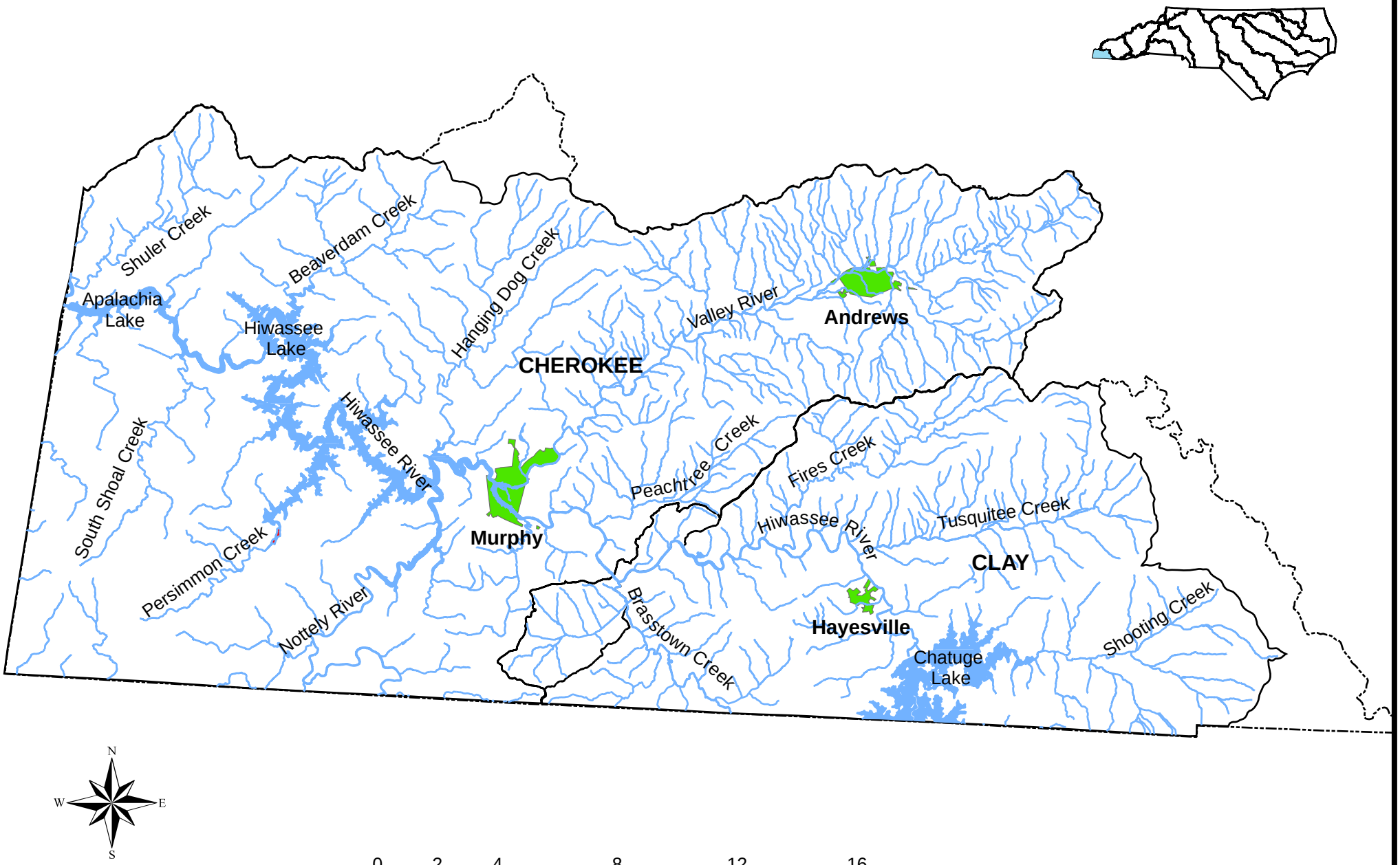


Figure iv General Map of the Hiwassee River Basin in North Carolina



Planning Section
Basinwide Planning Unit
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