Savannah River Basin

HUC 030601

Includes: Toxaway, Horsepasture, Whitewater, Chattooga, & Tullulah Rivers

North Carolina contains the headwaters of the Savannah River, draining 171 square miles. The River then flows southeast through South Carolina and Georgia to the Atlantic Ocean (Figure 1-2). Southeast portions of Clay and Macon, southern Jackson, and southwestern Transylvania counties are included within the basin. The largest community wholly contained within the basin is Cashiers. Southern and eastern portions of Highlands are also within the basin. Additional areas of commercial, residential, and golf course development are scattered throughout the US 64 corridor between Lake Toxaway and Highlands.

Water quality conditions are reflective of much of the basin (74 square miles) being within Nantahala National Forest, including Southern Nantahala Wilderness, Ellicott Rock Wilderness and Gorges State Park. Outstanding Resource Waters located in the basin include Big Creek and its tributaries, Overflow Creek and its tributaries, the lower reach of Horsepasture River and the mainstem of Chattooga River. In addition, a portion of Horsepasture River downstream from NC 281 and most of the North Carolina portion of Chattooga River are included in the National Wild and Scenic River System. The biggest challenge in maintaining high quality water conditions within the basin is the threat of development.

A portion of Horsepasture River is listed on the 2012 303(d) list of Impaired waters for low pH.

There are two 8-digit hydrologic units (HUs) in this basin: 03060101 (Seneca River), and 03060102 (Tugaloo River). Waters from the two HUs flow to Hartwell Lake in Georgia, joining to form Savannah River. Much of the remainder of this document will be organized around these two HUs.

Basin at a Glance

Land Area square miles.....171
Stream Miles.....198
Lake/Reservoir acres.....691

County:

Jackson, Macon, Clay, Transylvania

Towns:

Highlands, Cashiers

Population:

2000: 3,341
2010: 5,563

Land Cover 2006:

Forest 91%
Developed..... 6%
Agriculture..... 1.5%
Shrub 1%
Other..... .5%

Ecoregion:

Southern Crystalline Ridges & High Mountains

Permits:

Wastewater Discharge: 11
Wastewater Nondischarge: 2
Stormwater 4

Management Strategies for Water Quality Protection

Many waters within the Savannah River Basin have been assigned one or more of the following supplemental classifications including: Trout (Tr), High Quality Water (HQW) and Outstanding Resource Water (ORW). Management strategies are associated with supplemental HQW and ORW classifications and are intended to protect water quality. A brief summary of these strategies and administrative code under which the strategies can be found at the end of this document. More detailed information can be found in the document entitled Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina: http://portal.ncdenr.org/web/wq/ps/csu/rules (NCDENR-DWQ, 2004).

Water Quality Permit Programs

Stormwater

There are several different stormwater programs administered by DWQ. One or more of these programs affects activities in the Savannah River Basin. The goals of the DWQ's National Pollutant Discharge Elimination System (NPDES) stormwater discharge permitting regulations and State stormwater programs are to prevent pollution from entering the waters of the state through the use of stormwater runoff controls.

Wastewater

The National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States, as authorized by the Clean Water Act. Non-compliance with permit limits on wastewater flow and constituents can lead to discharge of pollutants that degrade surface waters making them unsafe for drinking, fishing, swimming, and other activities. The NPDES Permitting and Compliance Programs of DWQ are responsible for administering the program for the state.

Nondischarge systems are operated without a discharge to surface waters but they still require a DWQ permit. The permit insures that treated wastewater is land applied at a rate that is protective of groundwater and does not produce ponding or runoff into a waterbody.

These permits are reviewed and are potentially renewed every five years. Wastewater permits in the Savannah Basin are listed in Table 1-1.

Table 1-1: NPDES Discharge & Nondischarge Permits

Permit Number	Type	Owner	Flow g/d
NC0061123	Discharging 100% Domestic < 1MGD	The Mountain Retreat & Learning Center	6,000
NC0037711	Discharging 100% Domestic < 1MGD	Vz Top Homeowner's Association Inc	28,000
NCG550315	Single Family Domestic Wastewater Discharge		900
NC0061930	Discharging 100% Domestic < 1MGD	Mark Laurel Homeowner's Association	42,000
NC0064416	Discharging 100% Domestic < 1MGD	Cullasaja Homeowner's Association	150,000
NCG530101	Fish Farms, Packing & Rinsing Wastewater	Sweetwater Trout Farm	0
NC0062553	Discharging 100% Domestic < 1MGD	Wade Hampton Property Owners Association	125,000
NC0024376	Discharging 100% Domestic < 1MGD	The Wilds Christian Association Inc	80,000
NC0059421	Discharging 100% Domestic < 1MGD	A&D Water Service Inc	300,000
NC0063321	Municipal Wastewater Discharge, < 1MGD	Tuckaseigee Water & Sewer Authority	200,000
NC0059439	Discharging 100% Domestic < 1MGD	A&D Water Service Inc	4,900
NCG551100	Single Family Domestic Wastewater Discharge		480
NC0065889	Discharging 100% Domestic < 1MGD	Indian Creek Resort LLC	140,000
NC0022985	Discharging 100% Domestic < 1MGD	Carolina Water Service Inc Of NC	600,000
NC0052043	Discharging 100% Domestic < 1MGD	Toxaway Falls Inc	120,000
NCG550415	Single Family Domestic Wastewater Discharge		300
NC0063312	Discharging 100% Domestic < 1MGD	McKee Development	2,500
NC0068918	Discharging 100% Domestic < 1MGD	Resources Planning Corporation	100,000
Nondischarge			
WQ0000731	Surface Irrigation	Lake Toxaway Golf Course	20,000
WQ0032352	Surface Irrigation	Millstone Inn and Condominium Development	16,400

Biological Monitoring

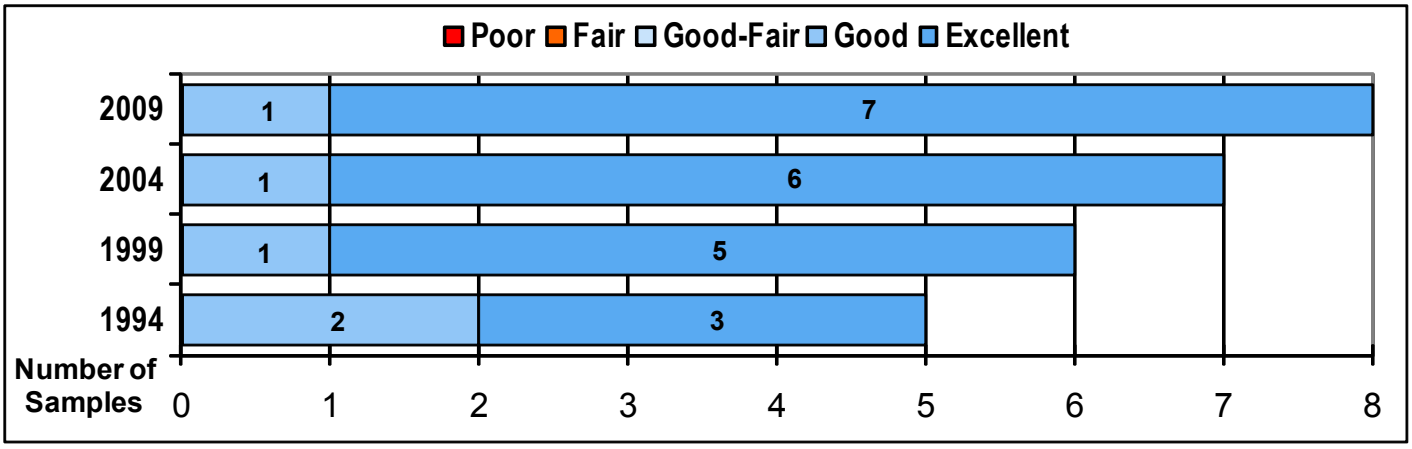
Biocriteria have been developed using the diversity, abundance, and pollution sensitivity of the organisms that inhabit flowing waterbodies in NC. One of five bioclassifications are typically assigned to each water body sampled: Excellent, Good, Good-Fair, Fair and Poor. Not Impaired and Not Rated designations are reserved for samples that were not eligible to be assigned one of the five typical bioclassification categories. Typically, a "Not Impaired" rating is equivalent to a Good-Fair or better bioclassification and a "Not Rated" designation is equivalent to a Fair or worse bioclassification. The reasons for not being able to assign one of these five typical bioclassifications may be a lack of appropriate bio-criteria or atypical sampling conditions (e.g., drought).

These bioclassifications are used to assess the various impacts of both point source discharges and nonpoint source runoff. The resulting information is used to document both spatial and temporal changes in water quality, and to complement water chemistry analyses, ambient toxicity data, and habitat evaluations. In addition to assessing the effects of water pollution, biological information is also used to define High Quality or Outstanding Resource Waters, support enforcement of stream standards, and measure improvements associated with management actions. The results of biological investigations have been an integral part in North Carolina's basinwide monitoring program.

Biological Data

Eight benthic macroinvertebrate samples were collected in the Savannah River Basin as part of the Basinwide Assessment program that reevaluates water quality conditions every five years. Bioclassification trends from 1994-2009 among the long-term basinwide macroinvertebrate stations are shown in Figure 1-1. As seen from these data, the 2009 benthic macroinvertebrate community bioclassifications have generally remained unchanged since 1994. The primary change in this basin from 1994 to 2009 is mainly due to the additional of new basin sites each year from a low of five in 1994 to eight in 2009. The excellent and stable water quality found throughout most of this basin is primarily a function of the mostly forested land use coupled with a generally sparse population and lack of any large-scale agriculture.

Figure 1-1: Basinwide Benthic Macroinvertebrate Bioclassifications



Notable Waters

Table 1-2 lists waterbodies identified as needing additional protection and potential restoration actions. The fourth and fifth columns of this table list potential stressors and sources that may be impacting a stream based on in-field observations, monitoring data, historical evidence, permit or other violations, and other staff and public input. In many cases, additional study is needed to determine exact source(s) of the impact. The last column includes a list of recommended actions.

Table 1-2: Notable Waterbodies

Stream Name	AU#	Class.	Stressor	Source	Status	Actions Needed
Horsepasture River	4-13-(0.5)b	C;Tr:+	low pH, fecal coliform bacteria	?	Impaired	SS, BMPs
Tullulah River	3-11	C;Tr	-	-	Supporting	P
Chattooga River	3b	B;Tr,ORW	habitat degradation	development	Supporting	SC, S&E
Norton Mill Cr.	3-3b	C;Tr:+	habitat degradation	development	Supporting	SC, S&E

+ This symbol identifies waters that are subject to a special management strategy specified in 15A NCAC 2B .0225 the Outstanding Resource Waters (ORW) rule, in order to protect downstream waters designated as ORW

AU # = Assessment Unit # or stream segment/reach

Class. = Classification (e.g., C, S, B, WS-I, WS-II, WS-III, WS-IV, WS-V, Tr, HQW, ORW, SW, UWL)

Stressor = chemical parameters or physical conditions that at certain levels prevent waterbodies from meeting the standards for their designated use.(e.g., low/high DO, nutrients, toxicity, habitat degradation, etc.)

Source= development, agriculture, WWTP, NPS,

Status = Impaired, Impacted, Supporting, Improving

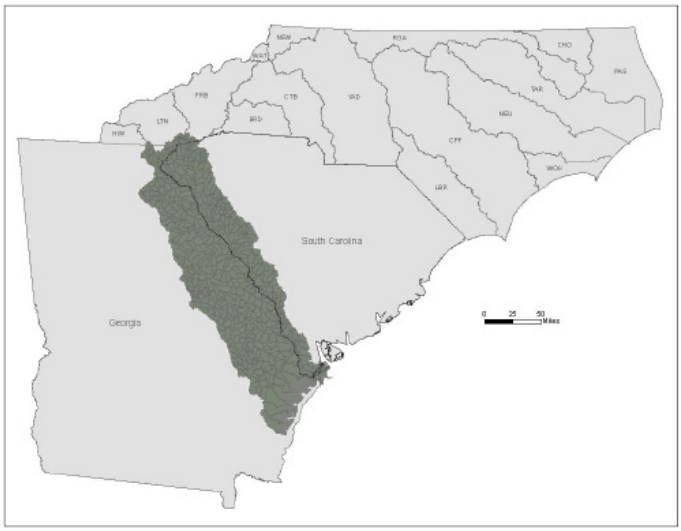
Actions Needed = P= protection, SC= stormwater controls, SS= stressor study, BMPs= best management practices, S&E soil and erosion control

Local Initiatives

The Jackson-Macon Conservation Alliance is a grassroots conservation organization whose mission is to address environmental issues through education, advocacy, collaboration and hands-on initiatives. J-MCA is focusing our resources on the Sustainable Solutions Project which will identify areas for systemic change: first by promoting awareness for and involving its citizens and businesses in conversation regarding environmental protection and conservation; second by exploring opportunities for eco-tourism and green businesses; and third by recommending specific actions for implementation.

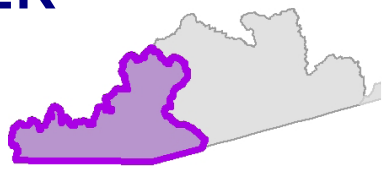
The Sustainable Solutions Project will contribute to "place-based" economic development projects that build on local natural resources and retain wealth within our community. It will foster community involvement in local environmental protection problem solving, through civic engagement. To learn more or to get involved contact Michelle Price, 828-526-0890 x320 or mprice@j-mca.org or visit the website www.j-mca.org

Figure 1-2: Entire Savannah River Basin



The NCDENR Office of Environment Education and Public Affairs has also produced a short natural history and recreation brochure for the Savannah River Basin found here: http://www.eenorthcarolina.org/images/River%20Basin%20Images/Savannah_2012.pdf

Tugaloo Subbasin
Tullulah & Chattooga River Watersheds



HUC 0306010201

This mountainous subbasin is divided into two pieces: a small portion of the Tullulah River headwaters in Clay County and a larger portion of the basin that includes the Chattooga River, Norton Mill, Big, Clear and Overflow Creeks. The majority of streams in this subbasin flow generally south toward Georgia. The Chattooga River forms part of the state boundary between Georgia and South Carolina. The Chattooga and Tullulah Rivers join to form the Tugaloo River in Georgia. A map of this subbasin including water quality sampling locations is presented in Figure 1-4. This subbasin lies within the level IV ecoregion of the Southern Crystalline Ridges and Mountains. This ecoregion is characterized by elevations ranging between 1,200 and 4,500 feet, high rainfall rates, abundant forest cover, and acidic, loamy, well-drained soils (Griffith et al 2002). As would be expected for an area with rugged topography, most of the land within this subbasin is forested and lies within the Nantahala National Forest and includes the Southern Nantahala Wilderness and the Ellicott Rock Wilderness areas. Notable exceptions include the urbanizing areas in and around the Town of Highlands and the Cashiers community. Residential development is increasing rapidly around theses communities and along primary roadways, Figure 1-3.

Watershed at a Glance

County:

Jackson, Macon, Clay

Towns:

Highlands, Cashiers

Population:

2000: 742

2010: 2,107

Land Cover:

Developed.....5%
Forest 91%
Agriculture.....1.5%
Shrub 1%
Other 1.5%

Ecoregion:

Southern Crystalline Ridges & High Mountains

Permits:

Wastewater Discharge: 6
Wastewater Nondischarge: 1
Stormwater 2

Figure 1-3: 2006 Land Cover Tullulah & Chattooga River Watersheds

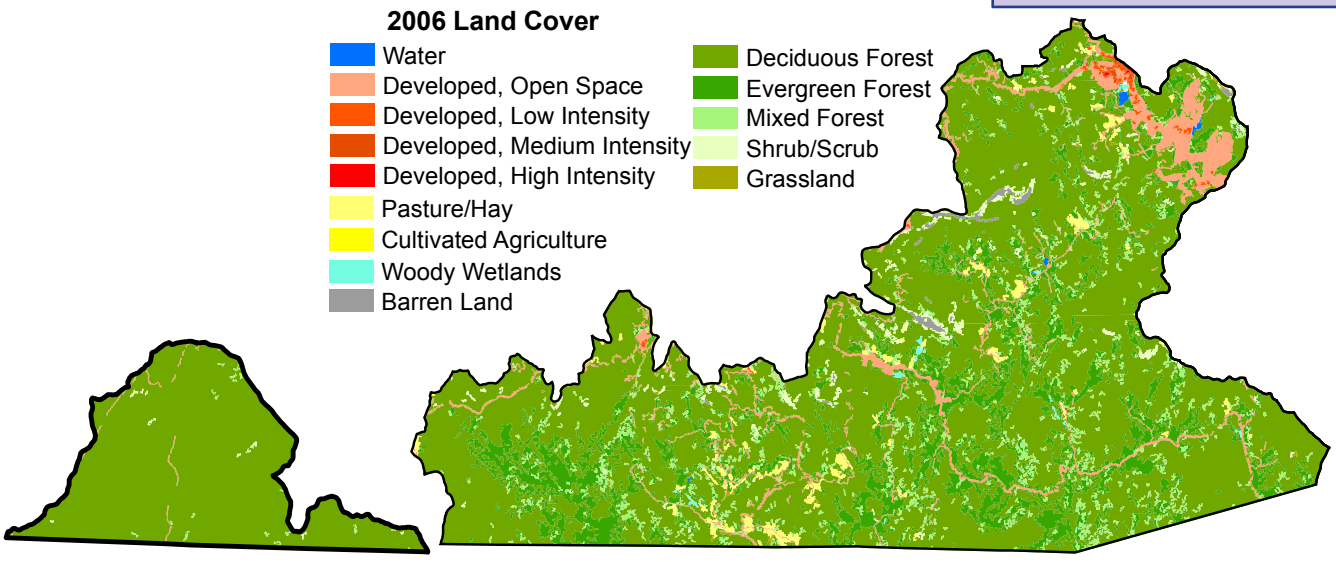
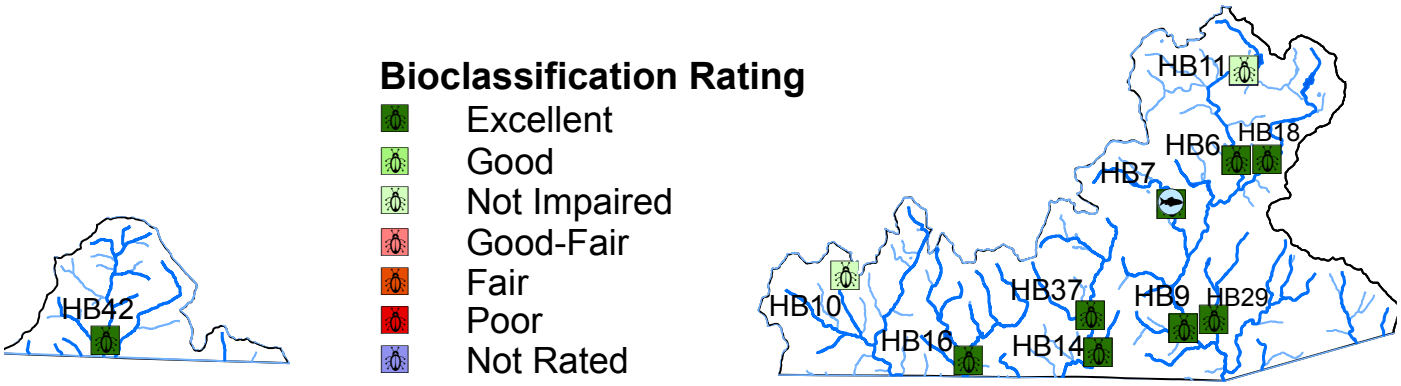


Figure 1-4: Tullulah & Chattooga River Watersheds

Water Quality Monitoring

There are no ambient stations in these watersheds. Biological samples have been taken throughout the watersheds since the 1980's. Basinwide sites were first sampled in 1994 and the four most recent basinwide benthic macroinvertebrate samples were taken in 2009, all resulting in Excellent Bioclassifications. Figure 1-5 shows the most recent benthic site rating in this watershed at sites sampled since 1994.

Figure 1-5: Benthic Sample Sites & Ratings



Protection and Restoration Opportunities

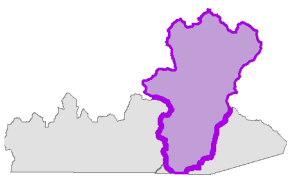
The following section provides more detail about specific streams where special studies have occurred or stressor sources information is available. Within this document, biological sample site IDs ending in an "F" denote fish community and a "B" denote macroinvertebrate community. Specific stream information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

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

Headwaters Tullulah River Subwatershed (HUC 030601020101)

This subwatershed is in the Southern Wilderness area within the Nantahala National Forest and has two Natural Heritage Significant Areas. The Tullulah River (AU# 3-11) was sampled by DWQ for the first time in 2009, resulting in an Excellent bioclassification. This sample site is now part of the basinwide sample sites to be sampled every five years. This catchment could also be considered for reclassification to HQW or ORW status. However, an 11 mile reach of the Tullulah River downstream in GA is Impaired because of high fecal coliform bacterial levels. A TMDL was completed in 2005 and the report is available here: http://www.gaepd.org/Files_PDF/techguide/wpb/TMDL/Savannah/Final_Savannah_Fecal_TMDL.pdf.

Headwaters Chattooga River Subwatershed (HUC 030601020201)

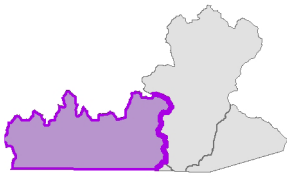


This subwatershed drains part of the Nantahala National Forest and contributes to six different Significant Natural Heritage Areas. The entire subwatershed is either Outstanding Resource Waters (ORW) or in a ORW Special Management Strategy Area. Chattooga River (AU# 3-3b) and Scotsman Creek (AU# 3-7) are classified as Recreation, trout and ORW and are subject to a special management strategy. The other tributaries within this subwatershed are also classified for trout protection and for the protection of downstream ORWs. Habitat conditions including sandy substrate and infrequent riffles in the upstream reach may be attributed to development activities around Cashiers Lake. In the headwaters of the Chattooga R. there is

one non-discharge permit and one discharge permit for Cashiers WWTP. This facility used to perform whole effluent toxicity testing but now has ammonia limits in their permit. Downstream of Cashiers two macroinvertebrate sample sites collected in 2009 resulted in an Excellent bioclassifications.

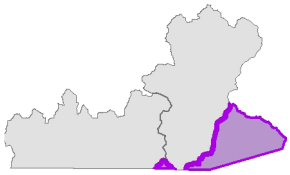
Norton Mill Creek (AU# 3-3b) is a large tributary to the Chattooga River. This segment receives runoff associated with second home building from some of the fast growing residential areas near Highlands and Cashiers. In the headwaters of Norton Mill Creek there is also a minor WWTP discharge for a golf course; this creek's last biological rating was Good from a macroinvertebrate sample taken in 2004. Norton Mill Creek's basinwide site was not sampled in 2009 due to beaver activity impacting stream flow.

Headwaters West Fork Chattooga River Subwatershed (HUC 030601020202)



There are three main creeks that drain this subwatershed to the North Carolina-Georgia State Line. Overflow Creek (AU# 3-10-2) on the west side and Big Creek (AU# 3-10-3) on the east side are both classified as C;Tr,ORWs. The 2009 macroinvertebrate sample on Big Creek resulted in an Excellent bioclassification. Abes Creek (AU# 3-10-2-2-2) is part of the Overflow Creek watershed and is classified ORW. The Mountain Retreat and Learning Center WWTP (NPDES Permit# NC0061123) is one of two dischargers in the watershed permitted before the ORW designation and management strategy were applied. This facility continues to struggle with toxicity problems since monitoring began in 1993. Clear Creek (AU# 3-10-2-3) drains the southern portion of Highlands and there has not been any recent monitoring. There are two minor WWTP discharge permits near Highlands, one is a private residence and other is for a home owners association. In this subwatershed there are nine different Significant Natural Heritage Areas and the majority of the subwatershed is located in the Nantahala Nation Forest.

Reed Creek-Chattooga River Subwatershed (HUC 030601020204)



This subwatershed almost entirely encompassed by Nantahala National Forest, including special areas like Ellicott Rock Wilderness and three different Significant Natural Heritage Areas. Fowler Creek (AU# 3-8) drainage is an ORW Special Management Strategy Area. No recent water quality monitoring has been completed in this subwatershed.

Application of Special Management Strategies

With the exception of the Tullulah River, Clear Creek and East Fork Chattooga River watersheds, an Outstanding Resource Water (ORW) management strategy applies to all waters within this subbasin. Figure 1-6 presents the area and Table 1-3 lists the waters to which an ORW management strategy applies. Table 1-3 also distinguishes between those waters classified ORW and those to which the modified management strategy applies.

Special protection measures that apply to waters classified ORW are set forth in 15A NCAC 02B.0225. No new discharges or expansions are permitted and a 30-foot buffer or stormwater controls are required for most new development. Specifically, development activities requiring a Sediment/Erosion Control Plan are regulated as follows:

Low Density Option: Developments which limit single family developments to one acre lots and other types of developments to 12 percent built-upon area, have no stormwater collection system as defined in 2H.1002(13), and have built-upon areas at least 30 feet from surface waters will be deemed to be in compliance.

High Density Option: Higher density developments will be allowed if stormwater control systems described in 2H.1003(i), (k) and (l) are installed, operated and maintained, so that the runoff from all built-upon areas generated from one inch of rainfall is controlled. The size of the control system must take into account the runoff from any pervious surfaces draining to the system.

The Asheville Regional Office's Division of Land Resources (DLR), Land Quality Section has maps depicting ORW areas throughout the region. When a construction project on land that is larger than one acre is proposed in an ORW watershed, DWQ is notified by DLR and these more stringent development standards are required as part of the sediment/erosion control plan approval process. Additionally, when DWQ receives a request for a permit for a discharge from a new subdivision, construction of a new sewer line, or for a 401 certification, DWQ determines the stream classification and notifies the local government and the applicant of these requirements.

The difference between the two strategies presented in Table 1-3 is that existing discharges on waters not classified ORW will be allowed to expand, provided there is no increase in pollutant loading. The prohibition of new discharges and the development restrictions outlined above apply equally to those waters classified ORW and to those with a modified management strategy.

Figure 1-6: Chattooga River ORW Management Strategy Areas

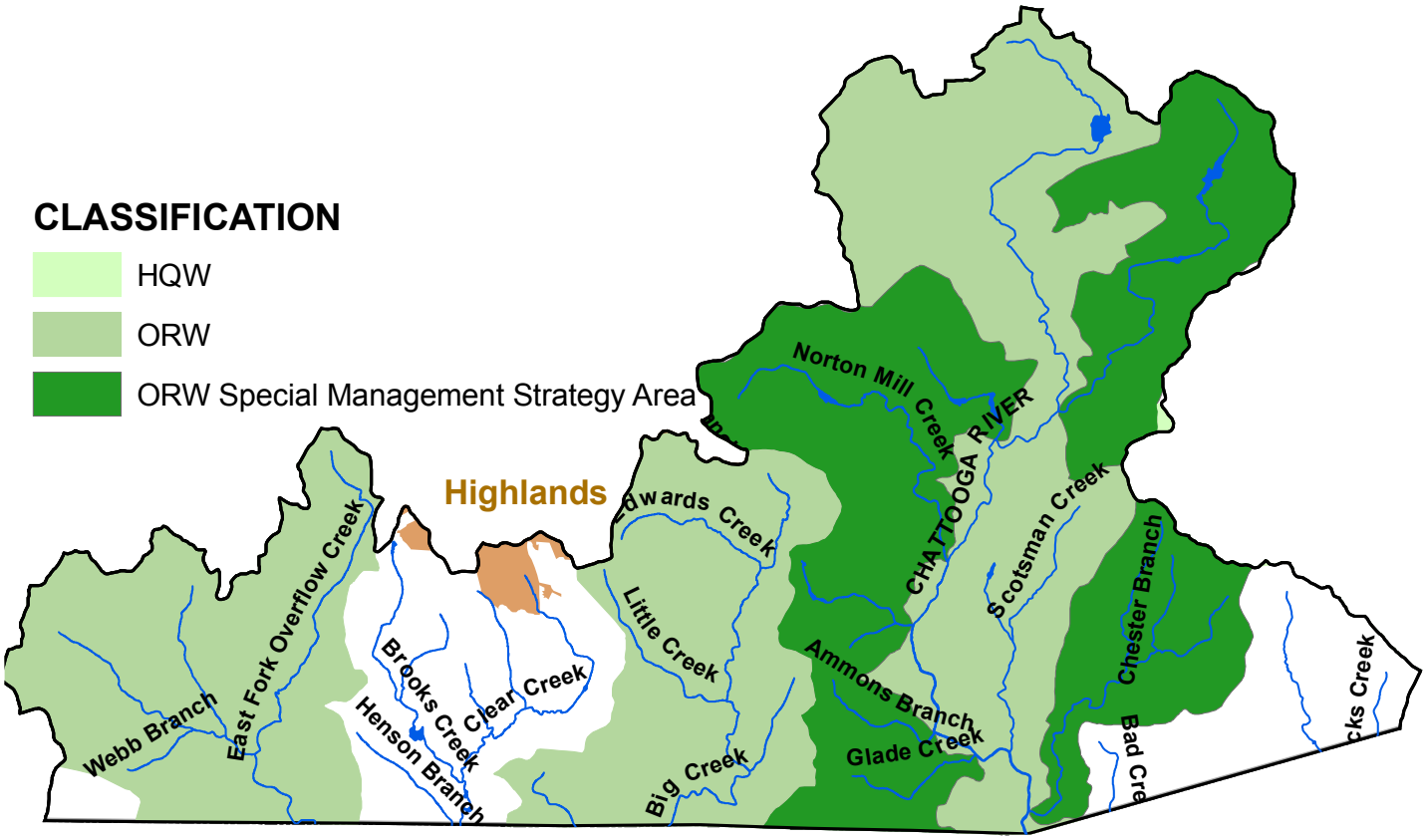
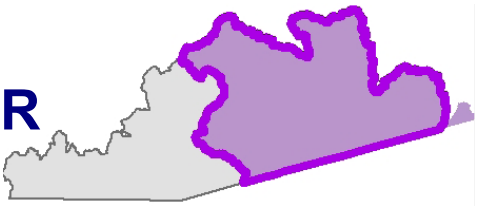


Table 1-3: Chattooga River Water Quality Special Management Areas

Watershed	Management Strategy Status
Chattooga River mainstem & two headwater tributaries	Classified ORW
Scotsman Creek and its tributaries	Classified ORW
Big Creek and its tributaries incl. Edwards & Little Creeks	Classified ORW
East & West Fork Overflow Creeks and tributaries	Classified ORW
North & South Fowler Creeks and tributaries	Modified management strategy applies
Green & Norton Mill Creeks and tributaries	Modified management strategy applies
Cane Creek and its tributaries	Modified management strategy applies
Ammons Branch and Glade Creek	Modified management strategy applies

Seneca Subbasin Headwaters Keowee River Watershed



HUC 0306010101

The Horsepasture and Toxaway Rivers originate in Jackson and Transylvania counties and flow in a southeastern direction toward South Carolina's Lake Jocassee. Horsepasture River falls more than 2,000 feet in the North Carolina portion of the watershed and contains several spectacular waterfalls. Other tributaries in this subbasin include the Whitewater and Thompson Rivers. A map of this subbasin including water quality sampling locations is presented in Figure 1-8.

Most of the land within this subbasin is forested, Figure 1-7. Although only a small portion of primarily the Whitewater River watershed lies within the Nantahala National Forest, the new Gorges State Park and Toxaway Game Lands encompass 10,000 acres in this subbasin (mostly the Toxaway River watershed). There are no municipalities; however, several residential and resort communities exist near Sapphire and Lake Toxaway.

Water quality in this subbasin is generally good to excellent. Nearly all waters are classified trout waters. Several streams including Bearwallow Creek and a portion of the Whitewater River are High Quality Waters. The lower 4.0 miles of Horsepasture River are Outstanding Resource Waters (Figure 1-9) in addition to being both a State Natural and Scenic River and a National Wild and Scenic River. However, the middle reach of Horsepasture River is listed on the 2012 303(d) list of Impaired waters for low pH.

Watershed at a Glance

County:
Jackson, Transylvania

Municipalities:
none

Population:
2000: 2,599
2010: 3,456

Land Cover:
Forest.....90%
Developed.....6.5%
Agriculture.....1.5%
Shrub.....1%
Water.....1%

Ecoregion: Southern Crystalline Ridges and Mountains

Permits:
Wastewater Discharge:..... 11
Wastewater Nondischarge...1
Stormwater.....2

Figure 1-7: Seneca Subbasin Land Cover 2006

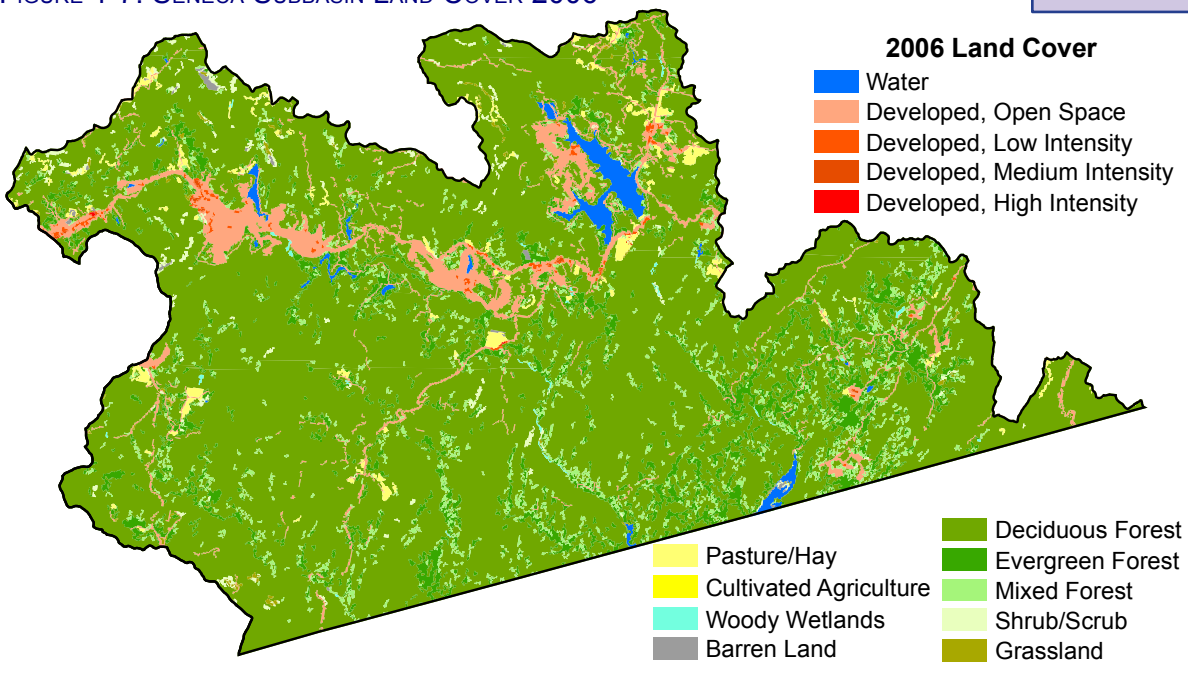


Figure 1-8: Headwaters Keowee River Watershed

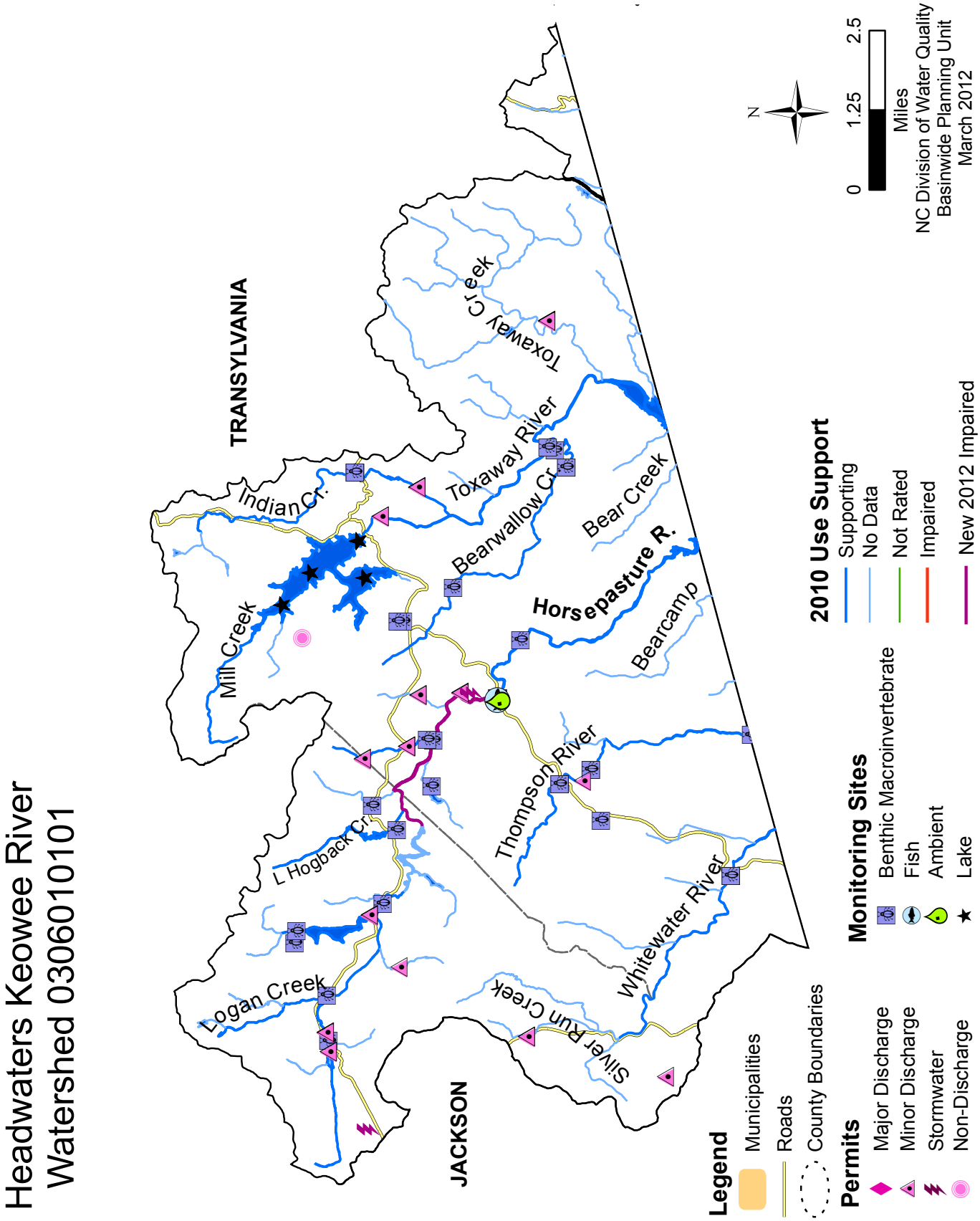
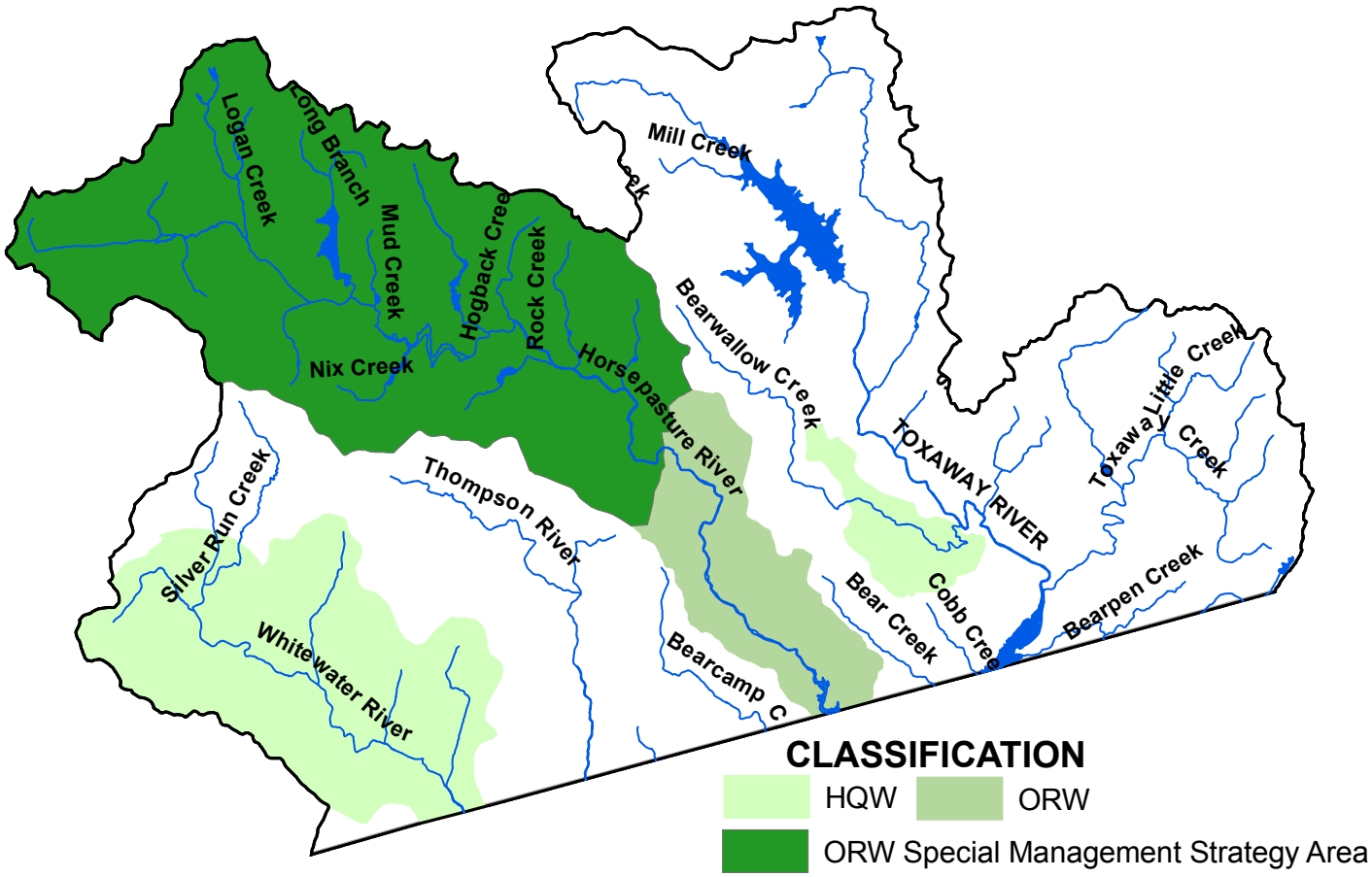


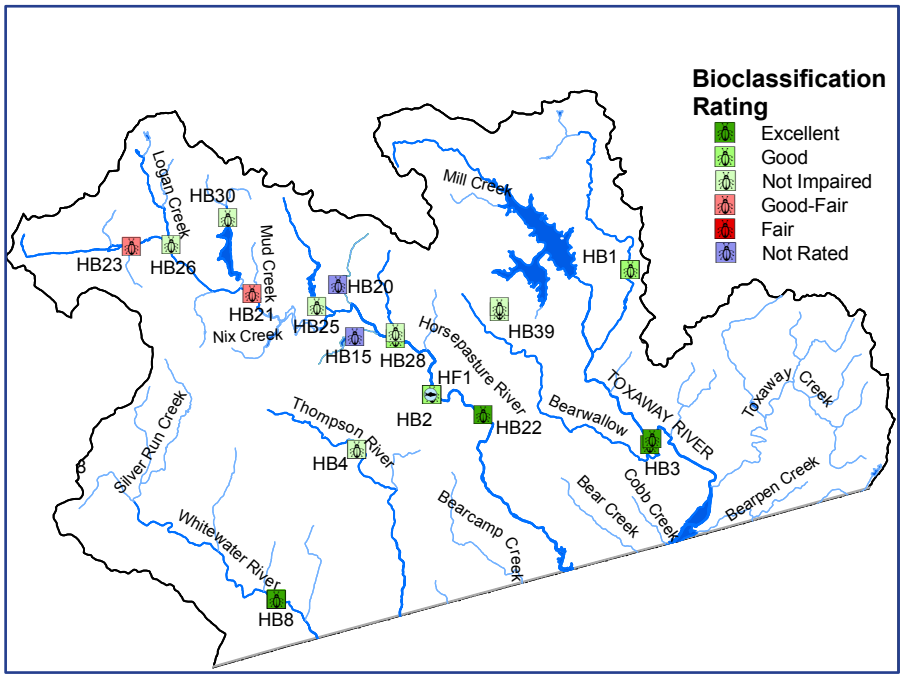
Figure 1-9: Horsepasture River ORW Management Strategy Areas



Water Quality Monitoring

Biological samples have been taken throughout the watersheds since the 1980's. Basinwide sites were first sampled in 1994 and the four most recent basinwide benthic macroinvertebrate samples were taken in 2009. Figure 1-10 shows the most recent benthic site ratings in this watershed at sites sampled since 1994. Two sites were rated as Excellent, one as Good, and one (Thompson River at NC 281) was assigned a classification of Not Impaired. The drainage area above the Thompson River site is 2.5 square miles (which puts the site into the small-stream category) and has always been collected outside of the seasonal window for use of small stream criteria for assessment, therefore all prior bioclassifications for the site have been changed to Not Impaired as well. Bioclassifications did not change at any of the sites between the basinwide sampling events in 2004 and those in 2009.

Figure 1-10: Biological Sample Sites & Ratings



There is one ambient station (H6000000) along Horsepasture River in this watershed. pH conditions below the standard evaluation levels 6-9su., were detected in over 11% of the samples at this ambient site from data collected between 2006-2010. More information about the ambient data parameters are available in the Ambient Monitoring Report pages 23-24.

Protection and Restoration Opportunities

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

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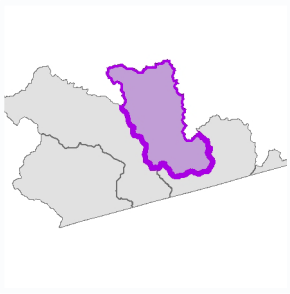
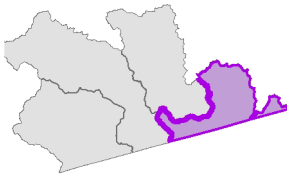
Headwaters Toxaway River Subwatershed (HUC 030601010101)



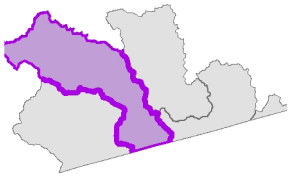
The major feature in this subwatershed is Lake Toxaway with Indian Creek and Bearwallow Creek tributaries joining the Toxaway River (AU# 4-(4)) below the lake. The subwatershed is primarily forested with vacation and resort activities centered around the lake. There are two minor WWTP dischargers (Indian Creek Resort and Toxaway Falls), while the Lake Toxaway golf course operates a non-discharge surface irrigation system. On Indian Creek (AU# 4-5-(3)) (C,Tr) a macroinvertebrate sample was taken in 2009 and resulted in an Excellent rating. An unnamed tributary to Bearwallow Creek is a small stream that was determined to be Not Impaired based on macroinvertebrates samples taken in 2001. The lower 2.2 miles of Bearwallow Creek (AU# 4-7-(2)) is supplementally classified as Trout and HQW; the most recent sample taken near the mouth, in 2004, resulted in an Excellent rating. Auger Fork Creek is also classified for trout protection. The southern half of this subwatershed falls in the boundary of Gorges State Park and is part of the Toxaway River Gorge Significant Natural Heritage Area.

Headwaters Keowee River-Lake Jocassee Subwatershed (HUC 030601010102)



All the creeks in this subwatershed are classified as trout waters, with the exception of Rock Creek which flows between North and South Carolina. There are no water quality monitoring sites in this subbasin and there is one minor WWTP (The Wilds Christian Association Inc) which discharges into Toxaway Creek. The western half of this subwatershed falls in the boundary of Gorges State Park and is part of the Toxaway River Gorge Significant Natural Heritage Area.

Horsepasture River Subwatershed (HUC 030601010103)



Horsepasture River subwatershed is recognized for its exceptional State and national ecological significance, natural heritage areas, as well as national and state forest, park and/or gamelands. Streams in this subwatershed have predominately rocky substrates although some contain more sand/silt with less frequent rock, related mostly to the gradient of the stream at the site. Land use in the watershed is mixed between forest, residential and commercial; the latter being predominately golf courses. Substantial ongoing development activities have occurred in the upper catchment. The lower 4.5 miles of the Horsepasture River (downstream of the NC 281 bridge) have been designated a state Natural and Scenic River and a National Wild and Scenic River. In 2005, the Sierra Club requested a reclassification of the lower portion of the river to receive ORW status. To support this request a reclassification biological special study collected benthos samples from 11 sites in June 2006, followed by a public hearing process and then ORW status was granted in 2009. In addition to providing ORW designation for the lower 4 mile segment [AU# 4-13-(12.75)] of the river and tributaries to this segment, ORW special protection management strategy was established for the entire watershed. Specific regulations include Horsepasture River and all undesignated waterbodies that are located within the Horsepasture River watershed shall comply with ORW rules and to protect outstanding resource values found throughout the watershed. However, new domestic wastewater discharges and expansions of existing wastewater discharges may be allowed provided that:

(A) Oxygen Consuming Wastes: Effluent limitations shall be as follows: BOD = 5 mg/l, and NH3-N = 2 mg/l;

(B) Total Suspended Solids: Discharges of total suspended solids (TSS) shall be limited to effluent concentrations of 10 mg/1 for trout waters and to 20 mg/l for all other waters except for mining operations, which will be held to their respective NPDES TSS permit limits;

(C) Nutrients: Where nutrient overenrichment is projected to be a concern, effluent limitations shall be set for phosphorus or nitrogen, or both; and

(D) Volume: The total volume of treated wastewater for all discharges combined shall not exceed 25 percent of the total instream low in the designated ORW under 7Q10 conditions.

Specific regulations regarding these supplemental classifications are described in NC Administrative Code T15A NCAC 2B .0303 and 15A NCAC 2B .0225

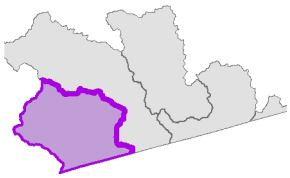
The upper reach of Horsepasture River ([AU# 4-13-(0.5)a1], From source to Lupton Lake, Sapphire Lake) is supplementally classified as Tr +. The most recent biological samples collected in 2006 resulted in Good-Fair ratings from two different collection sites (HB23 & HB21). Biologists described river conditions to have eroded channels and banks, mix of rock and sand substrate with considerable silt, beaver activity, hydrogen sulfide odor emanating from muddy ponds, sparse riparian zones and trash was found in the stream. There are four minor WWTP dischargers along the upper reaches of Horsepasture River. Logan Creek [AU# 4-13-3] has a drainage area of 2.7 mi^2 and the macroinvertebrate sample collected in 2006 resulted in a Not Impaired rating. Logan Creek was noted as having areas of bank erosion along with loss of riparian vegetation associated with development/construction impacts. The NC Ecosystem Enhancement Program (EEP) is funding construction of an approximately 3,700-ft stream restoration project on Logan Creek; this project was still in the pre-construction phase as of January 2012. Trays Island Creek/Fairfield Lake [AU# 4-13-5-(3)] is considered an undisturbed watershed and received a Not Impaired rating from a 2006 macroinvertebrate sample.

The middle reach of Horsepasture River ([AU# 4-13-(0.5)b], from dam at Sapphire Lake to NC 281) is supplementally classified as Tr +. The only ambient site (H6000000) located in this basin is located in this portion of the river. Water quality sampling at this site detected several incidences of low pH and high fecal coliform bacteria levels and elevated water temperatures resulted in a Not Rated status for this assessment unit in the past. The standard violations of low pH placed this reach of the River on the 2012 303(d) list of Impaired waterbodies. The most recent biological sample on the mainstem (HB23) resulted in a Good rating collected in 2006. Biologists noted conditions to include a narrow riparian conditions and impacts from a golf course. There are four minor WWTP discharges that discharge to either Rock Creek, James Creek or

Horsepasture River. Little Hogback Creek [AU# 4-13-8] has a drainage area of 1.9 mi^2 with a good intact riparian zone and instream habitat; due to the small size the stream was rated as Not Impaired. Hogback Creek [AU# 4-13-9] was sampled in 2006 and was noted to have narrow riparian zone with shrubby vegetation and likely impacted from flashy flow conditions and upstream developments. The Creek is Not Rated. Burlingame Creek [AU# 4-13-10] was also sampled in 2006 and is currently Not Rated. The biologist noted upstream development occurring. Rock Creek [AU# 4-13-11] has a drainage area of 1.2mi^2 and is rated as Not Impaired; stream conditions included bank erosion, riparian impacts from developments, silty gravel instream habitat with woody debris and leaf packs. The sampling location is downstream of golf course and established large residential lots.

The lower reach of Horsepasture River [AU# 4-13-(12.5], from N.C. Hwy. 281 to North-South Carolina State Line) is classified as B, Tr, ORW and the upper 0.6 mi are Special Management Strategy Area. Benthos sample site (HB2) was established in 1984 and is a basinwide sample site that is sampled every five years, ratings have fluctuated over the years from Fair to Excellent. The most recent 2009 macroinvertebrate sample resulted in Good rating. In 2006 a sample was taken downstream of site HB2 resulting in an Excellent bioclassification. This portion of the river also runs through Nantahala National Forest, Wildlife Resources Commission Toxaway Gamelands and is part of the Horsepasture River Gorge Significant Natural Heritage Area.

Whitewater River Subwatershed (HUC 030601010104)



Thompson River [AU# 4-14-6] is supplementally classified for the protection of trout. The river runs through the Nantahala National Forest and is part of Thompson River Gorge Significant Natural Heritage Area. The 2009 macroinvertebrate sample resulted in an Excellent bioclassification although is rated as Not Impaired because of its small stream status. Below the biological sample site their is a trout farm that holds minor discharge permit.

Whitewater River (AU# 4-14-(1.5)) is classified as C;TR; HQW. The 2009 macroinvertebrate sample resulted in an Excellent bioclassification. There are two minor discharges in headwater tributaries one for a golf course and one for a water treatment plant. Wade Hampton Golf Club WWTP performs whole effluent toxicity testing and had one incidence of toxicity to sensitive aquatic species between 2005-2009. The river makes up part of the Nantahala National Forest, The Nature Conservancy's Silver Run Preserve and Sassafras Mountain Significant Natural Heritage Area.

High Quality Water & Outstanding Resource Water Management Strategies

HQW & ORWs

HQW classification is intended to protect waters with water quality higher than the state's water quality standards. In the Savannah River basin, waters classified as Water Supply I and II (WS-I and WS-II), ORW, and waters designated by the NC Wildlife Resources Commission (WRC) as native (wild) trout waters are subject to HQW rules. Streams petitioned for WS-I or WS-II or which are considered Excellent based on biological and physical/chemical water quality parameters may qualify for the HQW supplemental designation.

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 (BOD5). 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. There are two development options outlined in the rule:

- 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.

Trout (Tr) Waters

Trout (Tr) waters 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, under the NC Sedimentation and Pollution Control Act, 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 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) or the following link: **http://portal.ncdenr.org/c/document_library/get_file?uuid=f4f0b765-7892-4681-885b-95f4ef26f806&groupId=38364.**

References & Websites

Griffith, G., J. Omernik, and J. Comstock. 2002. Ecoregions of North Carolina. U.S. Environmental Protection Agency, Office of Research and Development, NHEERL, Western Ecology Division, Corvallis, Oregon. http://www.epa.gov/wed/pages/ecoregions/ncsc_eco.htm

NC Division of Water Quality

Biological Assessment- http://portal.ncdenr.org/c/document_library/get_file?uuid=de0dbb2d-3417-44c4-9736-1710d2e18d43&groupId=38364

Ambient Report- http://portal.ncdenr.org/c/document_library/get_file?uuid=ac3b7afe-e2f1-4d1e-93df-c2ba9d897888&groupId=38364

Lakes & Reservoir Assessment- http://portal.ncdenr.org/c/document_library/get_file?uuid=0b586b2a-6851-4783-a4e1-a7f58b2549f4&groupId=38364

303(d) List- http://portal.ncdenr.org/web/wq/ps/mtu/assessment

Impaired & Impacted Survey- http://portal.ncdenr.org/web/wq/ps/bpu/about/impactedstreamssurvey

Classification Rules- http://portal.ncdenr.org/web/wq/ps/csu/rules

NPDES Stormwater- http://portal.ncdenr.org/web/wq/ws/su/npdessw

State Stormwater- http://portal.ncdenr.org/web/wq/ws/su/statesw

NPDES Wastewater-http://portal.ncdenr.org/web/wq/swp/ps/npdes

Nondischarge- http://portal.ncdenr.org/web/wq/aps/lau

ORW Rules- http://portal.ncdenr.org/c/document_library/get_file?folderId=285750&name=DLFE-14959.pdf

SAV Classifications- http://portal.ncdenr.org/c/document_library/get_file?folderId=285751&name=DLFE-8492.pdf

Trout Rules- http://portal.ncdenr.org/c/document_library/get_file?uuid=f4f0b765-7892-4681-885b-95f4ef26f806&groupId=38364

NCDENR Office of Environment Education and Public Affairs
http://www.eenorthcarolina.org/images/River%20Basin%20Images/Savannah_2012.pdf

Jackson- Macon Conservation Alliance-
http://www.j-mca.org/

Georgia Environmental Protection Division

TMDL- http://www.gaepd.org/Files_PDF/techguide/wpb/TMDL/Savannah/Final_Savannah_Fecal_TMDL.pdf