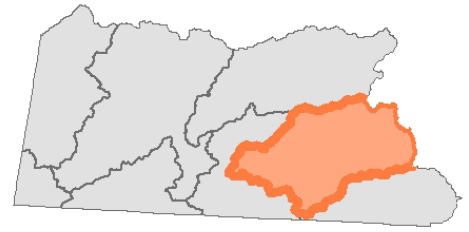


TUSQUITEE CREEK WATERSHED



HUC 0602000202

Includes: Major Streams- Hiwassee River, Tusquitee Creek & Fires Creek

WATERSHED AT A GLANCE

COUNTY:	AREA	2006 LAND COVER:	PERMITTED FACILITIES:
Cherokee, Clay	109 sq mi.	Agriculture.....9%	NPDES
MUNICIPALITIES:	POPULATION:	Developed.....4%	Wastewater Discharge.....5
Hayesville	2000....4,855	Forested.....86%	Wastewater Nondischarge....0
EPA LEVEL IV ECOREGIONS:	2010....5,674	Shrub.....1%	Stormwater.....3
Broad Basins, High Mtns., Southern Crystalline Ridges & Mtns, Southern Metasedimentary Mtns			Animal Operations.....0

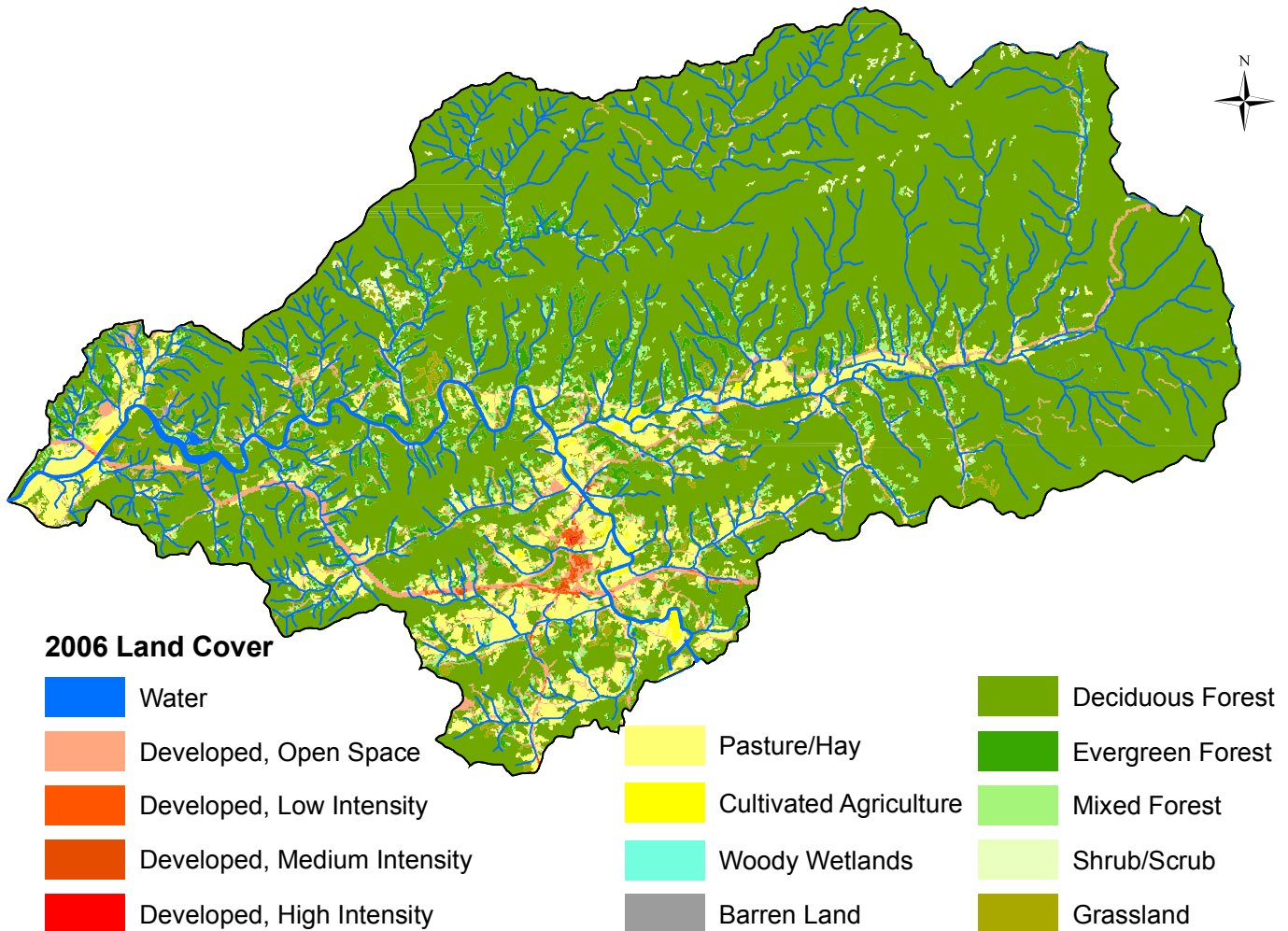
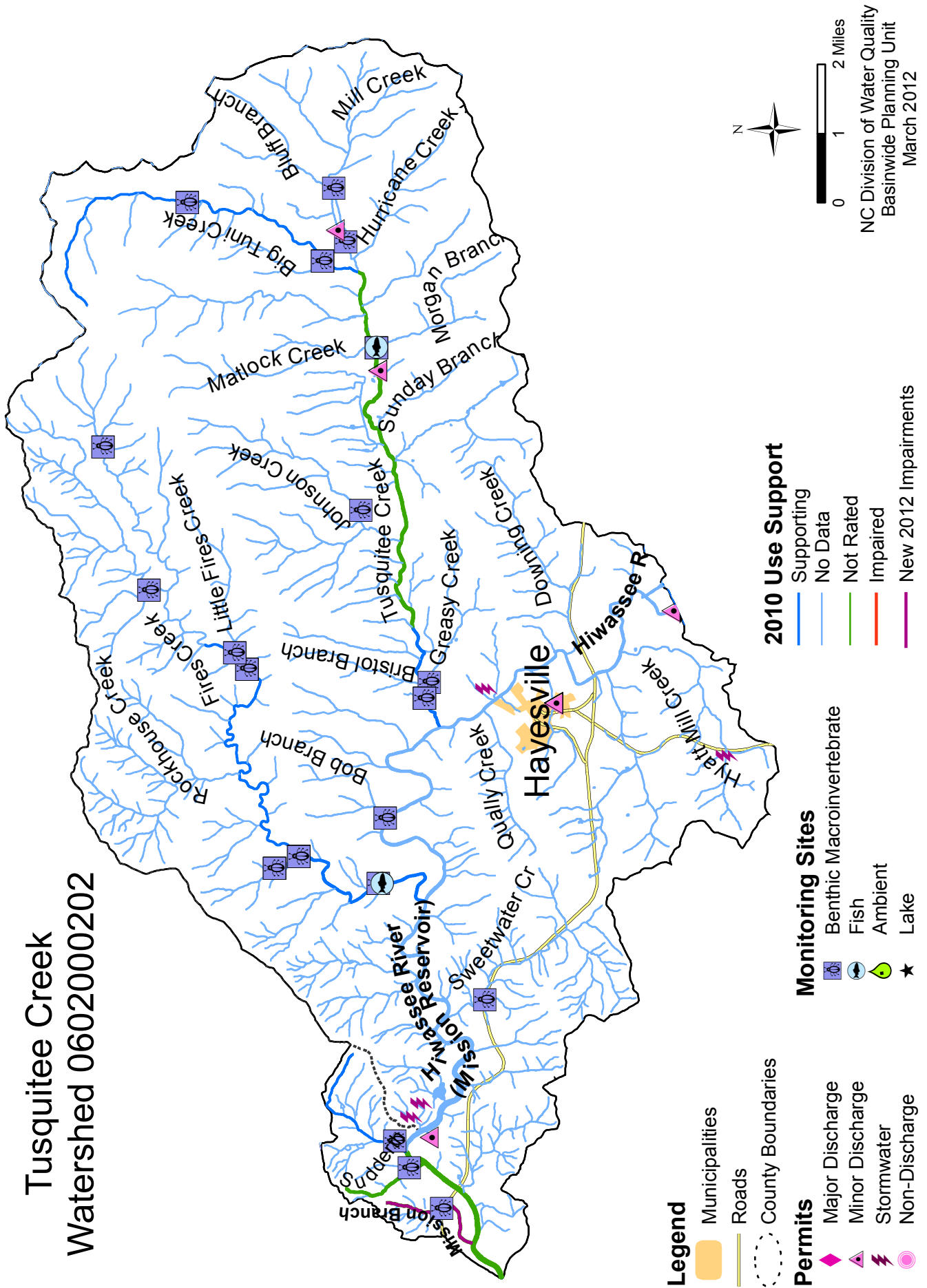


FIGURE 1-1: TUSQUITEE CREEK WATERSHED MAP

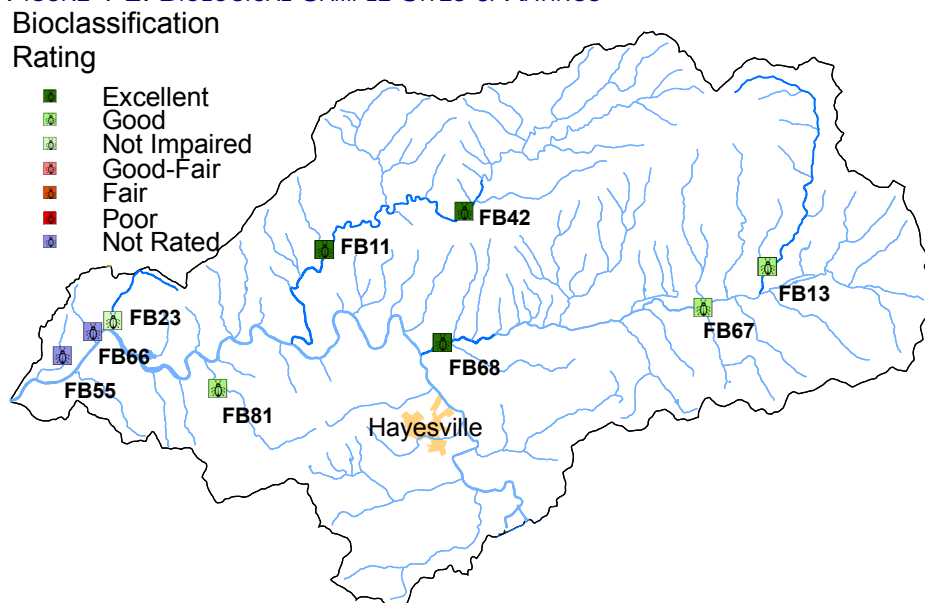
Tusquitee Creek Watershed 0602000202



WATER QUALITY MONITORING

There are no ambient stations in this watershed. Although biological samples have been taken throughout the watershed since the 1980's. Basinwide sites were first sampled in 1994 and the three most recent basinwide benthic macroinvertebrate samples were taken in 2009; two resulted in Excellent Bioclassifications and one in a Good rating. Special studies resulted in four additional benthic samples taken in this watershed since 1996. Site specific information is available in Appendix and the Biological Assessment Report is available here: <http://portal.ncdenr.org/web/wq/ess/reports>. Figure 1-2 shows the most recent benthic site rating in this watershed at sites sampled since 1994.

FIGURE 1-2: BIOLOGICAL SAMPLE SITES & RATINGS



Biological Monitoring

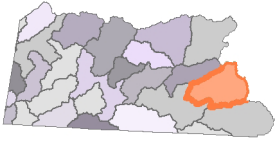
Biocriteria have been developed using the diversity, abundance, and pollution sensitivity of the organisms that inhabit flowing waterbodies in NC. One of five bioclassifications are typically assigned to each water body sampled: Excellent, Good, Good-Fair, Fair and Poor. Not Impaired and Not Rated designations 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.

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. Detailed maps of each of the watersheds are found in Appendix 1C or by clicking on the following small maps.

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>.

TUSQUITEE CREEK (HUC 060200020201)



The downstream reach of Tusquitee Creek [AU 1-21-(16.5)] has consistently had an Excellent rating from the macroinvertebrate samples, 2009 included. This lower 1.7 mile reach is classified as WS-IV;Tr,HQW, while the middle reach of 5.8 miles is C;Tr,HQW and the upper 4.1 miles is C;Tr.

There are two minor WWTP discharge permits: a single family residence (NCG550427) and Tusquitee Trout Ranch Inc.(NCG530130) discharges fish pond, rinsing and packing runoff to Tusquitee Creek.

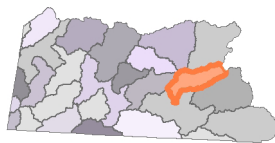
Steep access roads, impervious surfaces, and lack of sediment controls are causing increased sedimentation in Tusquitee Creek. This formerly pristine watershed now bears unstable abandoned logging roads and large-scale residential developments that are currently for sale. Local Soil and Water Conservation District employees have noted sediment problems after rain events on Tusquitee Creek, suggesting that runoff from prior logging roads and residential construction may be causing sedimentation. Citizens also report a lack of awareness and enforcement of HQW rules in place to protect the watershed. This demonstrates a critical need for an ambient monitoring station and/or sediment monitoring station on Tusquitee Creek. The creek is noted to have a narrow riparian zone and is experiencing some bank erosion.

Big Tuni Creek [AU# 1-21-5] flows through a predominantly forested drainage area. The macroinvertebrate sample taken in 2009 resulted in Good bioclassification which is a decrease from the Excellent status it held from samples taken in 1989 and 2004. This decline is likely related to weather conditions during the previous fall when large storms damaged roads, bridges and blew down trees in the headwaters.

Actions Needed:

Protection of existing water quality in the watershed is the highest priority. The gently sloped valley is attractive for residential development and sediment and erosion control laws must be enforced. A plan to educate local citizens, landowners, and developers about HQW regulations is necessary. Working farm easements on properties in the watershed could be used to protect against the negative water quality impacts associated with increased residential development.

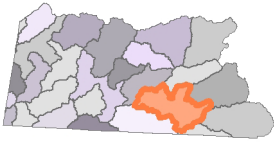
FIRES CREEK (HUC 060200020202)



Almost this entire subwatershed is part of the Nantahala National Forest. Fires Creek, Laurel Creek, Rockhouse Creek, Coldspring Branch and all other streams in this subwatershed, carry the supplemental classification of Outstanding Resource Waters (ORW). The ORW classification is intended to protect unique and special resource waters having excellent water quality and being of exceptional state or national ecological significance. The Fires Creek watershed is also designated a

Significant Natural Heritage Area by the NC Natural Heritage Program. The 2009 macroinvertebrate and fish sample results indicate Excellent water quality conditions in Fires Creek [AU# 1-27-(5.5), WS-IV;Tr, ORW], although the fish sample is considered Not Rated due to limited criteria for rating high gradient mountain trout waters. Fires Creek is protected for maintaining water supply and trout habitat in addition to its ORW designation. Development of private lands has resulted in increased erosion and sedimentation in the lower portion of the Fires Creek watershed. Strict erosion control enforcement and site-specific stormwater control requirements are critical to protecting water quality as future development of private lands occurs in this Outstanding Resource watershed.

SWEETWATER CREEK (HUC 060200020203)



This subwatershed is named after Sweetwater Creek a 3.5 mi. tributary to the Hiwassee River, which is the main hydrologic feature in this subwatershed. The majority of the watershed falls within a Water Supply IV area. Hayesville, with a population of 311 people is the only municipality within this hydrologic unit. The 2010 census shows a decline in the town's population while growth has occurred throughout the non-incorporated areas of the watershed. The Sweetwater Creek subwatershed is where Chatuge Lake drains into the Hiwassee River.

The Hiwassee River [AU#s, 1-(15), 1-(16.5)a ,1-(16.5)b], between Chatuge and Mission Dams is Not Rated as there are no biological or ambient monitoring stations on it. The Town of Hayesville WWTP (NC0026697) discharges into the Hiwassee River in AU# 1-(16.5)a. This facility does not have a history of violations but they are in need of an upgrade to prevent future violations; upgrades needed include screening, disinfection and sludge handling processes. In September 2011, fecal coliform bacteria samples were collected in AU# 1-(16.5)b and the data indicates bacteria levels that exceed our current water quality standards assessment criteria. The Hiwassee River is heavily used for recreation (tubing, canoeing, kayaking, fly and float fishing) and would benefit from the establishment of instream monitoring stations.

The next 1.5 mile reach of the Hiwassee River [AU# 1-(16.5)c] is also Not Rated; as two small tributaries Mission Branch and Sudderth Branch [AU# 1-39] were sampled in a [2006 special study](#) resulting in Not Rated Bioclassification. However, Mission Branch [AU# 1-41] was sampled for bacteria contamination; five fecal coliform bacteria samples between May 24- June 12, 2007 detected bacteria levels that exceed state standards with a maximum coliform count of 2400 and a geometric mean of 631. Tributaries including: Sweetwater, Blair, South Fork Blair, Town and Hyatt Mill Creeks have been identified as contributing to water quality degradation. Enforcement of soil and erosion control plans, BMPs to reduce sedimentation in streams and additional monitoring are needed.

Calhoun Branch [AU# 1-38] also sampled as part of the [EEP special study](#) was rated as Not Impaired, with noted stream channelization, lack of riparian vegetation and minimal macroinvertebrate habitat. Just upstream of the confluence of Calhoun Branch and Tusquitee Creek, Duke Energy holds a discharge permit for cooling and condensation water and there are two stormwater discharge permits.

Sweetwater Creek [AU # 1-32] received a Good bioclassification from a macroinvertebrate sample taken in 2009. The 2007 Basin Plan notes the need for a special study to investigate sedimentation within this subwatershed.

NOTABLE WATERS

Table 1-1 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 1-1: NOTABLE WATERBODIES

STREAM NAME	AU#	CLASS.	STRESSOR	SOURCE	STATUS	ACTIONS NEEDED
Blair Creek	1-17	WS-IV	habitat degradation	agriculture, stormwater	Not Rated	S&E, R, BMPs
Calhoun Branch	1-38	WS-IV	habitat degradation	agriculture	Not Impaired	BMPs
Fires Creek	1-27-(5.5)	WS-IV;Tr,ORW	sediment	development	Supporting	P, S&E, M
Hiwassee River	1-(15) 1-(16.5)a 1-(16.5)b	C WS-IV WS-IV	habitat degradation, fecal coliform bacteria	agriculture, development, highway impacts, stormwater, WWTP	Not Rated	P, R, S&E, M, BMPs
Hyatt Mill Creek	1-16	C	habitat degradation	stormwater, development livestock access	Not Rated	S&E, R, BMPs
Mission Branch	1-41	WS-IV	fecal coliform bacteria	stormwater, failing septic systems	Impaired	BMPs
S Fk Blair Creek	1-17-2	WS-IV	sediment	livestock access, stormwater	Not Rated	S&E, M,
Sweetwater Creek	1-32	WS-IV	sediment	roads, development, livestock access, stormwater	Not Rated	S&E, M, BMPs, R
Town Creek	1-19	WS-IV	habitat degradation	stormwater, development, livestock access, septic systems, roads	Not Rated	S&E, M, BMPs, R
Tusquitee Creek	1-21-(4.5)	C;Tr,HQW	sediment	development, forestry	Supporting	P, S&E, M, F

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 = R= restoration, P= protection, SC= stormwater controls, SS= stressor study, E= education, LO= local ordinance, BMPs, SSP= species protection plan, F= forestry BMPs, Ag= Agriculture BMPs, NMC= nutrient mgnt controls, S&E soil and erosion control, M= monitoring

MANAGEMENT STRATEGIES FOR WATER QUALITY PROTECTION

Fires Creek and Tusquitee Creek watersheds are classified as Outstanding Resource Waters and High Quality Waters, respectively. Trout (Tr), High Quality Water (HQW) and Outstanding Resource Water (ORW) are supplemental classifications to the freshwater classification(s) placed on a waterbody. Figure 1-3 shows stream classifications in this watershed. Management strategies are associated with the supplemental HQW and ORW classifications and are intended to protect water quality. Below is a brief summary of these strategies and the administrative code under which the strategies are found. More detailed information can be found in the document entitled Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina (NCDENR-DWQ, 2004). This document is available on-line at <http://portal.ncdenr.org/web/wq/ps/csu/rules>.

HQW & ORWs

HQW classification is intended to protect waters with water quality higher than the state's water quality standards. In the Hiwassee 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 (NH₃-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 if needed 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 (DLR), under the NC Sedimentation and Pollution Control Act (SPCA), has requirements to protect trout streams from land disturbing activities. Under G.S. 113A-57(1), “waters that have been classified as trout waters by the Environmental Management Commission (EMC) shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the twenty-five percent of the buffer zone nearest the land-disturbing activity, whichever is greater.” The Sedimentation Control Commission, however, can approve land-disturbing activities along trout waters when the duration of the disturbance is temporary and the extent of the disturbance is minimal. This rule applies to Tr streams as well as unnamed tributaries flowing to the classified 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

FIGURE 1-3: STREAM CLASSIFICATIONS & SPECIAL MANAGEMENT AREAS

