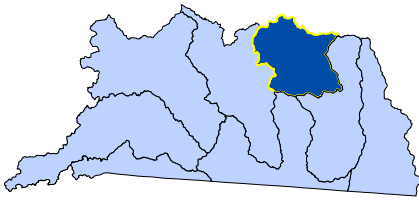


# FIRST BROAD RIVER HEADWATERS WATERSHED



HUC 0305010506

*Includes Brier Creek, Wards Creek, North Fork First Broad River & Hinton Creek*

## GENERAL WATERSHED DESCRIPTION

The First Broad River and its tributaries originate in Rutherford County and flow into the Broad River in Cleveland County just above the North Carolina-South Carolina state line. Tributaries to the First Broad River headwaters include the North Fork First Broad River, Brier Creek, Wards Creek, Hinton Creek and Duncans Creek (Figure 4-2). Portions of northeastern Rutherford County and northwestern Cleveland County contain large forested areas associated with the South Mountains and the South Mountains State Park. In addition, some agricultural (i.e., row crops, pastureland) and residential areas are located throughout the watershed. Land cover for this watershed is mostly forest and agriculture (Figure 4-1).

## WATER QUALITY OVERVIEW

Of the 186 stream miles in the First Broad River headwaters watershed, 62.6 miles were monitored by DWQ. This watershed is mostly (76 percent) rated as Supporting for aquatic life. The First Broad River is the only Impaired waterbody which accounts for 24 percent of monitored waters. It is Impaired due to a standards violation for low pH (Table 4-1).

Biological monitoring was conducted at eight basinwide sites, four of which were sampled for the first time in 2005. One ambient station is also located in this watershed.

### WATERSHED AT A GLANCE

#### COUNTIES

Rutherford, Cleveland

#### MUNICIPALITIES

Casar, Polkville

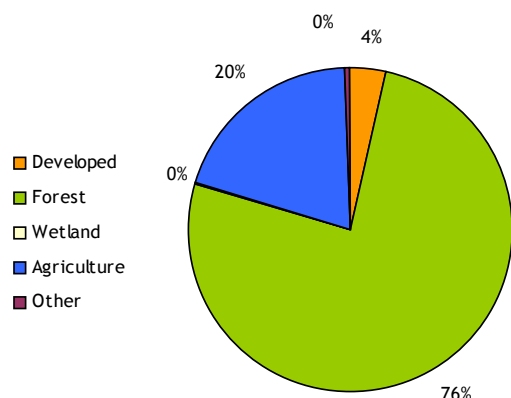
#### PERMITTED FACILITIES

NPDES WWTP:	2
NPDES Nondischarge:	2
NPDES Stormwater:	1
Animal Operations:	4

#### MONITORED STREAM MILES (AL)

Total Streams:	62.6 mi
Total Supporting:	47.6 mi
Total Impaired:	15.0 mi
Total Not Rated:	0 mi

FIGURE 4-1: FIRST BROAD RIVER HEADWATERS WATERSHED LAND COVER

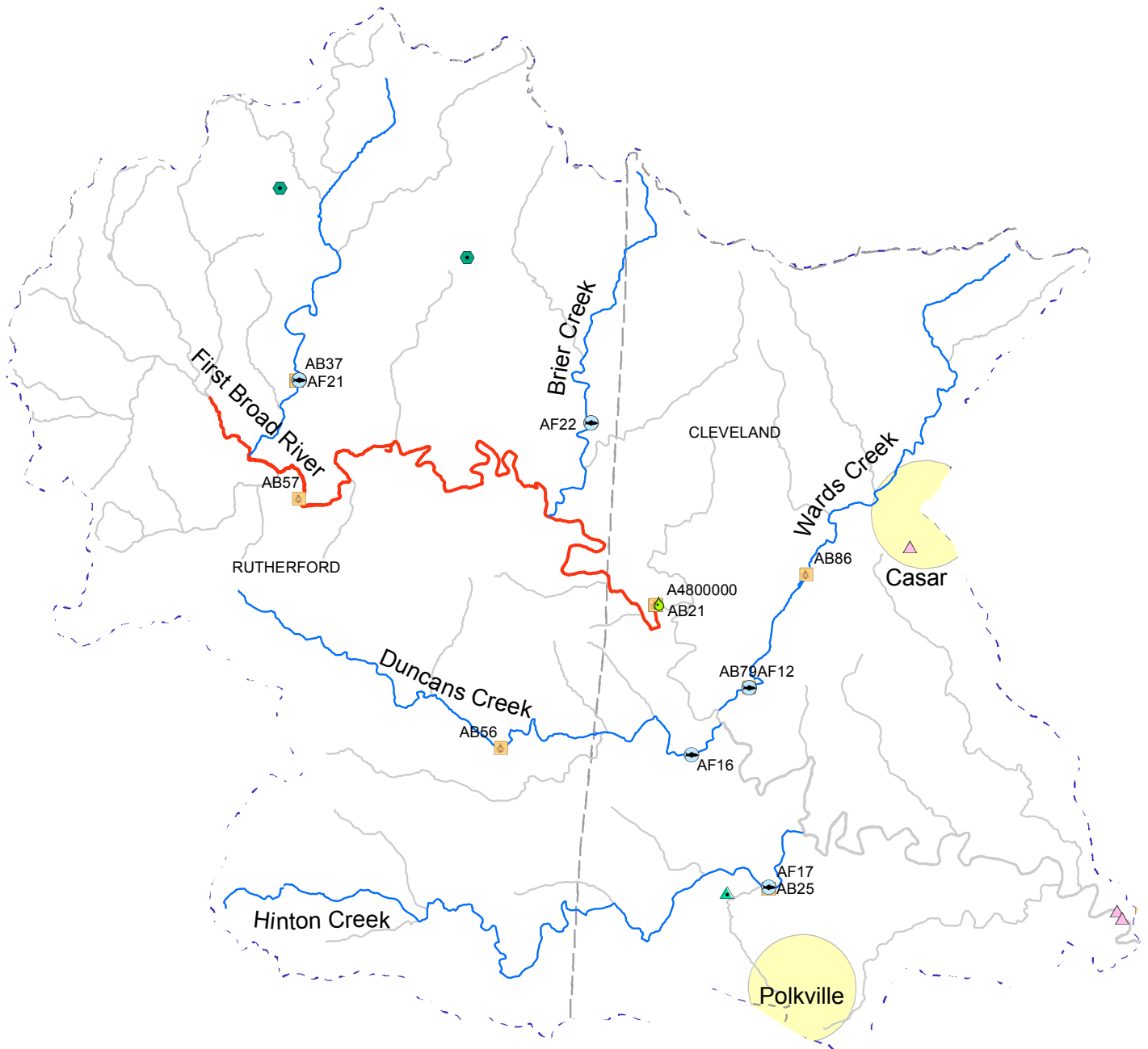


NRI: National Land Cover Data, 2001

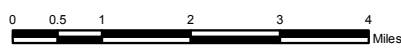
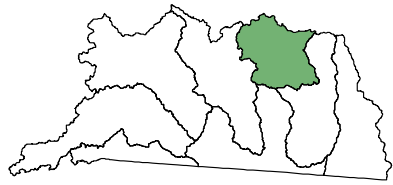
No significant water quality changes were identified in the First Broad River headwaters and some biological monitoring sites even improved. Biologists note that the improvements to biological communities could possibly be the result of higher flows in 2005 versus those measured in 2000 (97 cubic feet per second (cfs) compared to 49 cfs). In protected catchments, such as the First Broad River and Hinton Creek, increased stream flow can result in better physical conditions instream (i.e., increased availability of wetted habitat, increased levels of dissolved oxygen). This can result in more favorable conditions for benthic colonization.

Three minor NPDES Discharge Permits are found in this watershed. Only one of these permits has significant non-compliance issues. For more information on the Cleveland County Wastewater Treatment Plant's compliance violations, see page 4.4. There are also four Animal Operations Permits within this watershed. These are mostly cattle operations.

FIGURE 4-2: FIRST BROAD RIVER HEADWATERS WATERSHED, HUC 0305010506



Legend	
	Watershed Boundary
	County Boundaries
	Municipality
Non-Discharger Permits	
	Major
	Minor
NPDES Discharger Permit	
	Major
	Minor
Monitoring Sites	
	Fish Community
	Ambient
	Benthos
Aquatic Life	
	Impaired
	Not Rated
	Supporting



Planning Section  
Basinwide Planning Unit  
April, 2008

### How to Read this Document

This document was written to correspond with our new **Geographic Online Document Distribution (OGDD)** tool using Google Earth™. If you are unable to use Google Earth™, this document provides maps and associated water quality information and a discussion of water quality trends occurring in the watershed. Google Earth™ is an independent software program which can be downloaded to a personal, business, and most local and state government computers; the program allows you to view satellite imagery of the earth’s surface along with location identifiers. DWQ’s Basinwide Planning Unit created a “transparency” add on layer to Google Earth™ with basinwide water quality data, which allows a user to locate their watershed, pinpoint a waterbody and use support ratings, find a location of a permit and provides links to PDF watershed reports. For more information on how to download Google Earth™ and DWQ’s data visit **DWQ’s Basinwide Planning’s OGDD** website. Please contact Melanie Williams for more information at melanie.williams@ncmail.net or 919-807-6447.

Impaired streams are those streams not meeting their associated water quality standards in more than 10 percent of the samples taken within the assessment period (January 1, 2002 through December 31, 2006) and impacted streams are those not meeting water quality standards in 7 to 10 percent of the samples. The **Use Support** report provides information on how and why water quality ratings are determined and DWQ’s “**Redbook**” describes in detail water quality standards for each waterbody **classification**. For a general discussion of water quality parameters, potential issues, and rules please see “**Supplemental Guide to North Carolina’s Basinwide Planning: Support Document for Basinwide Water Quality Plans**”.

**Appendix 4-A** provides descriptions of Use Support ratings for all monitored waterbodies in the subbasin.

**Appendix 4-B** provides a summary of each ambient data monitoring station.

**Appendix 4-C** provides summaries of biological and fish assessment monitoring sites.

**TABLE 4-1: MONITORED STREAM SEGMENTS IN THE FIRST BROAD RIVER HEADWATERS WATERSHED**

AU NUMBER	STREAM NAME	LENGTH (MILES)	CLASS. *	2008 IR CATEGORIES	IMPAIRED	IMPACTED	POTENTIAL STRESSORS (POTENTIAL SOURCES)	DWQ SUBBASIN
9-50-(1)	First Broad River	15.0	WS-V;Tr	5	X	-	Low pH	03-08-04
9-50-12	Wards Creek	10.2	C	2	-	-		03-08-04
9-50-13	Duncans Creek	10.1	C	2	-	-		03-08-04
9-50-15	Hinton Creek	13.2	C	2	-	-		03-08-04
9-50-4	North Fork First Broad River	7.5	C;Tr,ORW	2	-	-		03-08-04
9-50-8	Brier Creek	6.7	C;Tr	2	-	-		03-08-04

\*The 2008 IR Categories definitions can be found on the first page of Appendix 4-A

## CURRENT STATUS OF IMPAIRED & IMPACTED WATERS

### NORTH FORK FIRST BROAD RIVER AU#: 9-50-4

The North Fork First Broad River is in the headwaters of the First Broad River and drains the northeastern corner of Rutherford County and the South Mountains. Benthic (AB37) and fish (AF21) sites were sampled in the North Fork First Broad River. Several pollution intolerant benthic species were collected at site AB37 resulting in an Excellent bioclassification. Substrate was an unembedded mix of boulder (10 percent), rubble (40 percent), gravel (30 percent) and sand (20 percent). The habitat score was 90.

Site AF21 also received an Excellent bioclassification. The percentage of pollution tolerant fish in the river has always been low (usually 1 to 2 percent) and is the lowest of any of the streams sampled in the basin. DWQ documented a reproducing population of rainbow trout, thus supporting the supplemental trout (Tr) classification. A reproducing population of smallmouth bass was also identified. Both species prefer cold to cool water with low turbidity. Due to excellent water quality and the benthic and fish habitats identified in this watershed, the North Fork First Broad River was given the supplemental classification of Outstanding Resource Water (ORW) in January 2005.

## FIRST BROAD RIVER (HEADWATERS) AU#: 9-50-(1)

Sites AA5 and AB21 are the most upstream sites sampled on the First Broad River. Site AB21 has been sampled six times since 1986 with all six samples resulting in a Good bioclassification. In 2005, the site improved to an Excellent rating, and several pollution intolerant species were collected for the first time. The substrate was a mix of boulder (10 percent), rubble (20 percent), gravel (40 percent) and sand (30 percent). No major habitat problems were noted along this reach of the First Broad River (habitat score 88).

Despite the Excellent benthic bioclassification, ambient monitoring at site AA5 shows that the water quality standard for pH (<6.0) was exceeded in 17.2 percent of the samples collected from January 2002 through December 2006. Therefore, this section of the First Broad River is Impaired for aquatic life due to exceedences of the water quality standard for pH.

## HINTON CREEK AU#: 9-50-15

Hinton Creek drains rural northeastern Rutherford County and a small area of northwestern Cleveland County. Benthic (AB25) and fish (AF17) sites were sampled in 2005. Site AB25 received an Excellent bioclassification. This is a dramatic improvement from the Good-Fair bioclassification it received in 1995 and 2000. Several pollution intolerant species were collected for the first time. The substrate was a mix of gravel (40 percent), sand (50 percent) and silt (10 percent). Overall, habitat quality was good (habitat score 70); however, well-developed pool habitats and boulder-rubble riffles were absent. The improvement is likely the result of higher flows in 2005 versus those measured in 2000 (97 cubic feet per second (cfs) compared to 49 cfs). In protected watersheds (such as in the First Broad River headwaters), increased streamflow can improve instream physical conditions (i.e., increase availability of wet habitat and increased dissolved oxygen levels), which often results in more favorable conditions for macroinvertebrate colonization.

Site AF17 received a Good bioclassification. Sixteen species were collected in 2005 and the dominant species was the bluehead chub (a nutrient indicator species). Hinton Creek was sampled as a new potential regional reference site; however, the habitat score (61) failed to qualify the site for regional reference. Physical effects from the extremely high flows during the 2004 hurricanes were evident throughout the sampling reach.

## **SIGNIFICANT NON-COMPLIANCE ISSUES**

Several limit violations are on file for both chlorine and total suspended solids (TSS) from the Cleveland County Water Treatment Plant (WTP) (Permit NC0051918). Effluent from the WTP discharges into the First Broad River. Notes from the most recent inspection (January 2007) recommended that the WTP should consider adding additional lagoon storage space. The facility has historically had problems with storing the filter backwash. With more water being treated and distributed, the current lagoon capacity is likely inadequate. It is also recommended that the permit reflect the liquid sodium bisulfite dechlorination process that was recently installed as part of an authorization to construct permit (Permit 05198A01).

No significant non-compliance issues were identified at the Casar Elementary School WWTP (Permit NC0066397).

## **LOCAL INITIATIVES**

### NC AGRICULTURE COAST SHARE PROGRAM

The NC Agriculture Cost Share Program (NCACSP) was established in 1984 to help reduce agricultural nonpoint runoff into waters of the state. The program helps owners and renters of established agricultural operations improve their on-farm management by using approved agricultural BMPs. BMPs include vegetative, structural or management systems that can improve the efficiency of farming operations while reducing the potential for surface and groundwater contamination. The NCACSP is implemented by the Division of Soil and Water Conservation (DSWC), which divides the approved BMPs into five main purposes or categories:

- Erosion Reduction/Nutrient Loss Reduction in Fields
- Sediment/Nutrient Delivery Reduction from Fields
- Stream Protection from Animals
- Proper Animal Waste Management
- Agricultural Chemical (agricultural) Pollution Prevention

**TABLE 4-2: BMPs INSTALLED THROUGH NCACSP**

PURPOSE OF BMP	TOTAL IMPLEMENTED	COST
Erosion Reduction/Nutrient Loss Reduction in Fields	151 linear feet	\$9,830
Sediment/Nutrient Delivery Reduction from Fields	-- --	-- --
Stream Protection from Animals	4 units 1,200 linear feet	\$7,435
Proper Animal Waste Management	--	--
Agricultural Chemical Pollution Prevention	--	--
Total Costs		\$17,265
<b>BENEFITS</b>	<b>0305010506</b>	
Total Soil Saved (tons)	97	
Total Nitrogen (N) Saved (lb.)	191	
Total Phosphorus (P) Saved (lb.)	225	
Total Waste-N Saved (lb.)	--	
Total Waste-P Saved (lb.)	--	

The NCACSP is a voluntary program that reimburses farmers up to 75 percent of the cost of installing an approved BMP. The cost share funds are paid to the farmer once the planned BMP is completed, inspected and certified to be in accordance with NCACSP standards. The annual statewide budget for BMP cost sharing is approximately \$6.9 million. During this assessment period, \$17,265 was allocated for BMPs in the First Broad River headwaters watershed. Table 4-2 summarizes the cost and total BMPs implemented.

## REFERENCES & SUPPORTING DOCUMENTATION

- NCDENR Division of Water Quality. April 2006. *Basinwide Assessment Report - Broad River Basin*. <http://h2o.enr.state.nc.us/esb/Basinwide/Broad2006FinalAll.pdf>.
- NCDENR Division of Water Quality. February 2003. *Broad River Basinwide Water Quality Plan*. <http://h2o.enr.state.nc.us/basinwide/Broad/2002/plan.htm>.