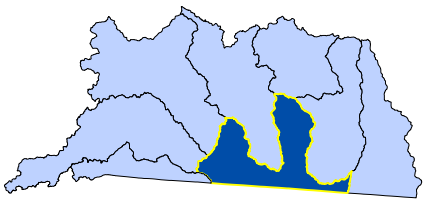
Sandy Run-Broad River Watersheds



HUC's 0305010505 and 0305010516

Includes Broad River, Floyds Creek, Richardson Creek & Sandy Run Creek

General Watershed Description

The Sandy Run Creek-Broad River and Broad River watersheds are located in southern Rutherford County and the far southwest corner of Cleveland County. Found in the Southern Outer Piedmont, elevations are less than 1,000 feet, and land cover is predominantly forested. Urban areas can be found along Interstate-85 corridor, and agricultural lands are scattered throughout the watershed. Along with the lower portion of the Broad River, major tributaries include Floyds Creek, Richardson Creek and Sandy Run Creek (Figure 2-2). There are seven municipalities in this watershed; however, Mooresboro is the only municipality located completely with in the watershed. In 2005, census data reports the total population of the seven municipalities was 16,657, which had only grown 2.6 percent since 2000. Land cover as of 2001 indicates less than one percent of this watershed is urban development (Figure 2-1).

Watershed at a Glance

Counties

Rutherford, Cleveland

Municipalities

Mooresboro, and portions of Boiling Springs, Earl, Ellenboro, Lattimore, Spindale and Forest City

Permitted Facilities

NPDES WWTP:	3
NPDES Nondischarge:	1
NPDES Stormwater:	16
Animal Operations:	3

Monitored Stream Miles (AL)

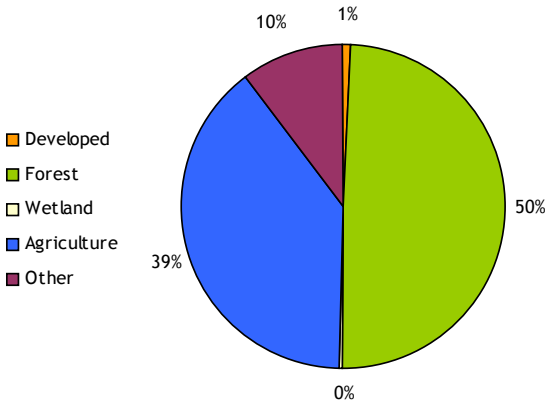
Total Streams:	63.08 mi
Total Supporting:	40.28 mi
Total Impaired:	22.8 mi
Total Not Rated:	0 mi

Water Quality Overview

Of the 168 stream miles in the Sandy Run-Broad River watershed, 63 miles were monitored by DWQ. Of these monitored streams, currently 63 percent are Supporting their designated uses, and 36 percent are Impaired. Habitat degradation, fecal coliform bacteria and turbidity are the leading causes of aquatic life impairments in this watershed. More specific information about these impairments are discussed later in this chapter.

Biological monitoring was conducted at five basinwide sites. One ambient station was also monitored in the Sandy Run-Broad River watershed. Based on biological monitoring, a portion of Sandy Run Creek is Impaired in the aquatic life category. In addition, ambient monitoring shows that a portion of the Broad River is also Impaired due to a water quality standards violation for turbidity (Table 2-1).

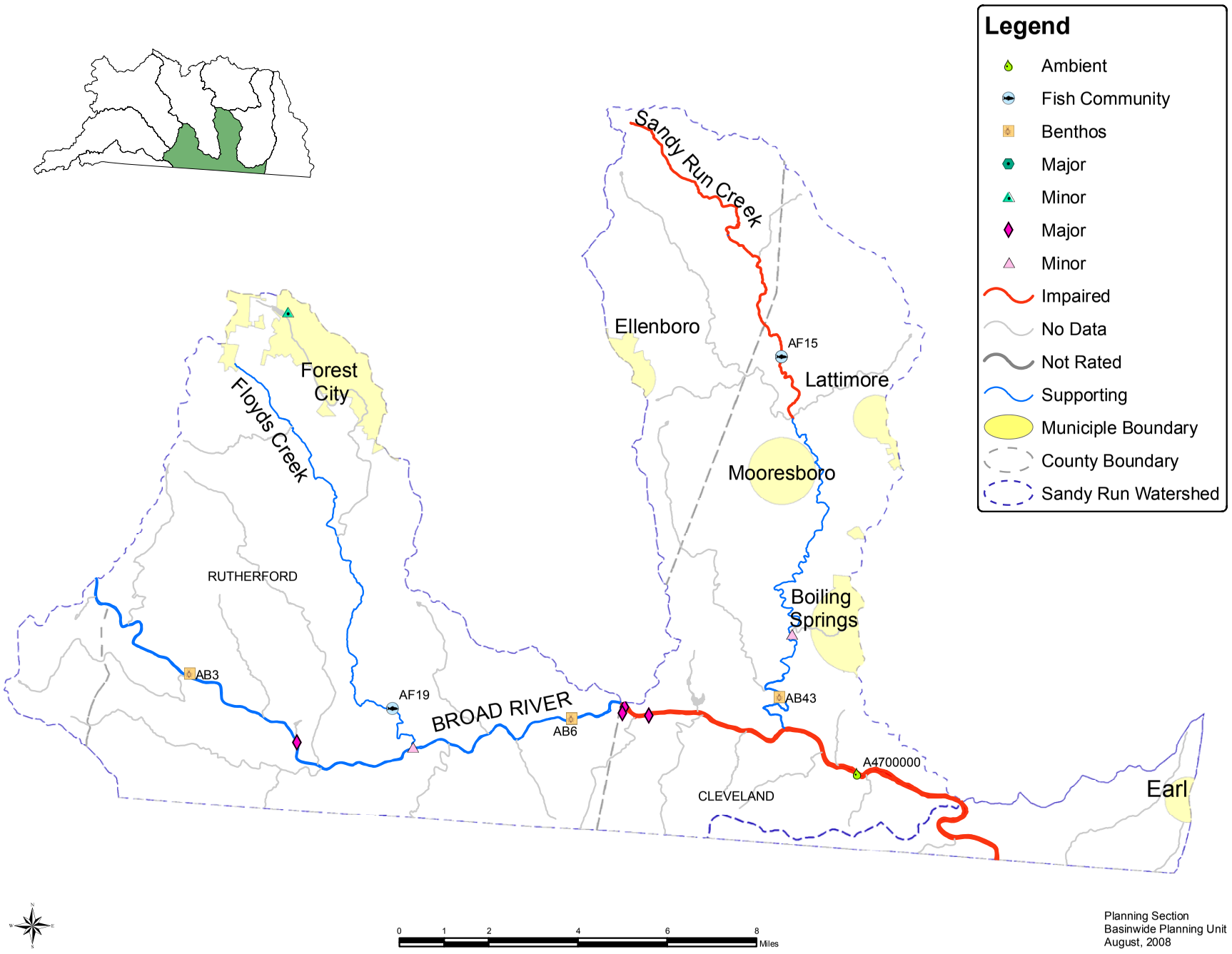
Figure 2-1: Sandy Run-Broad River Watershed Land Cover



* NRI: National Land Cover Data, 2001

Currently, there are one minor and two major NPDES permits in this watershed. The Harris Industrial and Commercial Plant (NC0083275) had one violation since 2000. This facility is no long in operation as of December 2006. The Duke Energy-Cliffside Steam Station (NC0005088) reported a fish kill caused by low flow of the river and high ambient temperatures in 2006. Flooding in 2005 caused damage to the Broad River with 5,000,000 gallons of untreated wastewater with a minimal amount untreated sewage. Plant employees worked nonstop to make temporary repairs to eliminate unwanted discharges and keep the facility operational. The other permit, Boiling Springs WWTP (NC0071943) had no violations. There are also 16 NPDES General Stormwater Permits, one NPDES Nondischarge Permit and three Animal Operations Permits in the Sandy Run-Broad River watershed.

Figure 2-2: Sandy Run Creek-Broad River & Broad River Watersheds, HUC 030501050505 & 030501050516



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 2-A provides descriptions of Use Support ratings for all monitored waterbodies in the subbasin.
Appendix 2-B provides a summary of each ambient data monitoring station.
Appendix 2-C provides summaries of biological and fish assessment monitoring sites.

Table 2-1: Monitored Stream Segments in Sandy Run-Broad River Watershed

Assessment Unit Number	Stream Name	Length (miles)	Class.	2008 IR Category	Impaired	Impacted	Potential Stressors (Potential Sources)	DWQ Subbasin
9-(25.5)a	BROAD RIVER	15.68	WS-IV	2	-	-		03-08-02
9-(25.5)b	BROAD RIVER	12.4	WS-IV	5	X	-	**Fecal Coliform Bacteria** **Turbidity** (Mining Operations)	03-08-02
9-37	Floyds Creek	12.5	C	2	-	-		03-08-02
9-46a	Sandy Run Creek	10.4	C	5	X	-	**Habitat Degradation** (General Agriculture/ Pasture, Natural Causes)	03-08-04
9-46b	Sandy Run Creek	12.1	C	2	-	-		03-08-04

*The 2008 IR Categories definitions can be found on the first page of Appendix 2-A

Current Status Impaired & Impacted Waters

Sandy Run Creek AU#: 9-46a

One fish (AF15) and one benthic (AB43) site were sampled in Sandy Run Creek. Site AF15 is located in the headwaters, and the habitat score (39 out of 100) was the lowest of any of the fish community sites sampled in the basin. The site received a Fair rating, dropping from the Good it received in 2000. This was also the greatest decline in rating of any of the fish community sites collected in the Broad River basin (nearly 80 percent). Only eight species were collected and the most abundant species was the bluehead chub (60 percent), an indicator of nutrient enrichment. The abundance of periphyton (algae attached to substrate like rocks) growth also suggests excess nutrient are entering the system. In 2000 and 2005, DWQ biologists noted that cattle had direct and easy access to the stream. Animal access is likely contributing excess nutrients and fecal coliform bacteria and impacting streambank stability. Recent hydrologic events, including drought (1998-2002) and flooding (2004 hurricane season), may have also contributed to the decline in this fish community. Sandy Run Creek, from its source to Mayne Creek, is Impaired in the aquatic life category.

Located approximately 10.5 miles downstream from site AF15, site AB43 was rated Good, matching the rating it received in 2000. Biological data collected since 1995 indicates that water quality in this downstream reach is steadily improving. Since the last assessment period, equipment and treatment upgrades to the Boiling Springs WWTP have been completed

and may be contributing to water quality improvements. This downstream portion of Sandy Run Creek is Supporting in the aquatic life category.

Recommendations: Restore vegetated areas along streambanks to filter excess nutrients from agricultural and pasture lands. Install fencing along this segment with animal operations. Fencing will prevent farm animals from eroding streambanks and depositing harmful bacteria into the surface water. DWQ will work to install a new ambient monitoring station within this segment to begin tracking turbidity.

Broad River AU#: 9-(25.5)b

Two benthic sites (AB3 and AB6) and one ambient monitoring station (AA4) were evaluated in the Broad River. Site AB3 has consistently received a Good-Fair rating (1995, 2000 and 2005). During the last assessment (2000), a new bridge was being constructed and flows were significantly reduced. Consequently, the benthic community included many species that can survive under very low flow conditions. Sampling in 2005, however, showed that the change in species was not permanent and most of the species absent in 2000 were collected again in 2005. Substrate was mostly sand (80 percent) with a small amount of boulder and rubble (10 percent each). The drainage area at site AB3 is approximately 539 square miles.

Site AB6 near the Cliffside Steam Station, is the most downstream benthic site that is sampled on the Broad River. This benthic community was rated Good-Fair. Site AB6 has been sampled nine times since 1983. Seven of the nine samples resulted in a Good-Fair rating with the exception of a Fair in 1983 and a Good in 2000. Substrate was mostly rubble (35 percent) and gravel (40 percent) with smaller amounts of sand and silt (20 and 35 percent). The habitat score (51 out of 100) was slightly higher than the upstream site at AB3 (habitat score 44 out of 100). Site AB6 experiences considerable diurnal flow fluctuations from power plant operations (Duke Power) located upstream, and the current here can be very swift and dangerous. The drainage area at this point is approximately 609 square miles.

Site AA4 near Boiling Springs is the most downstream ambient station monitored on the Broad River. The water quality standard for turbidity was exceeded in 12.1 percent of the samples that were collected from January 2002 through December 2006. Therefore, this section of the Broad River is Impaired for aquatic life due to exceedences in the water quality standard for turbidity.

In addition, 26 percent of the samples collected exceeded 400 colonies of fecal coliform bacteria/100 milliliters (ml) of water. Current methodology requires additional bacteriological sampling for streams with a geometric mean greater than 200 colonies/100 ml or when concentrations exceed 400 colonies/100 ml in more than 20 percent of the samples. These additional assessments are prioritized such that, as monitoring resource become available, the highest priority is given to those streams where the likelihood of full-body contact recreation is greatest. No portion of the Broad River is classified for primary recreation (Class B); therefore, it was not prioritized for additional sampling during this assessment period. Potential sources of elevated bacteria levels include failing septic systems, straight pipes, and nonpoint source runoff from pasture and forestlands. This section of the Broad River is Not Rated for recreation.

Recommendations: Urban and agricultural BMPs should be carefully installed and maintained throughout the watershed because of the moderate to steep slopes and the high erosion potential of soils. Install fencing along this segment with animal operations. Fencing will prevent farm animals from eroding streambanks and depositing harmful bacteria and excess nutrients into the surface water. DWQ will work with Duke Power to stabilize flow released from the dam.

Recommendations for this watershed can be found later in this chapter.

Significant Non-Compliance Issues

No significant non-compliance issues were identified in the Sandy Run-Broad River or the Broad River watersheds.

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 (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 (agrichemical) Pollution Prevention

Table 2-2: BMPs Installed through NCACSP

Purpose of BMP	Total Implemented	Cost
Erosion Reduction/Nutrient Loss Reduction in Fields	159.16 acres	$28,903
Sediment/Nutrient Delivery Reduction from Fields	-- --	-- --
Stream Protection from Animals	11 units 975 linear feet	$19,544 --
Proper Animal Waste Management	-- --	-- --
Agricultural Chemical Pollution Prevention	--	--
Total Costs		**$48,447**
Benefits	0305010505 - 16	
Total Soil Saved (tons)	922	
Total Nitrogen (N) Saved (lb.)	2,206	
Total Phosphorus (P) Saved (lb.)	326	
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, $48,447 was provided for BMPs in the Second Broad River watershed. Table 2-2 summaries the cost and total BMPs implemented.

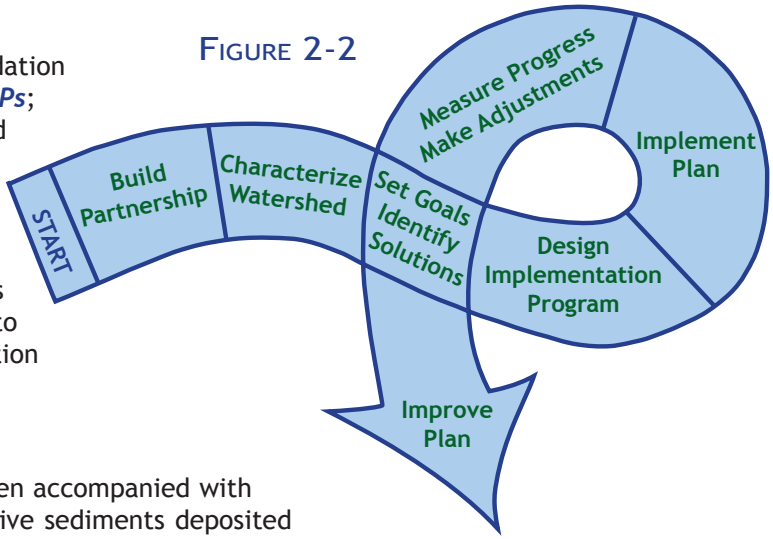
Recommendations

Habitat Degradation

In most cases habitat is degraded be the cumulative effect of several stressors acting in concert. These stressors often originate in the upland portions of the watershed and may include impervious surfaces, sedimentation and erosion from construction, general agriculter, and other land disturbing activities.

Many tools are available to address habitat degradation including: ***urban stormwater BMPs***; ***agricultural BMPs***; ordinance and/or rule changes at the local, state, and federal level; volunteer activism; and education programs. Figure 2-2 illustrates the general process for ***developing watershed restoration plans***. This process can and should be applied to streams impaired or impacted by habitat degradation. Interested parties should contact the ***Basinwide Planning Program*** to discuss opportunities to begin the planning and restoration process in their chosen watershed.

Figure 2-2



Turbidity

Turbidity is a measure of cloudiness in water and is often accompanied with excessive sediment deposits in the streambed. Excessive sediments deposited

on stream and lake bottoms can choke spawning beds (reducing fish survival and growth rates), impair fish food sources, fill in pools (reducing cover from prey and high temperature refuges), and reduce habitat complexity in stream channels. Excessive suspended sediments can make it more difficult for fish to find prey and at high levels can cause direct physical harm, such as clogged gills. Sediments can cause taste and odor problems, block water supply intakes, foul water treatment systems, and fill reservoirs (USEPA, 1999 and Waters, 1995).

Soil erosion is the most common source of turbidity and sedimentation and while some erosion is a natural phenomenon, human land use practices accelerate the process to unhealthy levels. Construction sites, mining operations, agricultural operations, logging operations, excessive stormwater flow off impervious surfaces are all potential sources. The distribution of turbidity violations and sample locations make it difficult to isolate a single source of erosion in this watershed. It appears, however, violations are highest near agricultural areas, and transitional suburban areas. Violations are lowest in the upper watershed where land cover is predominantly forest. This trend demonstrates the importance of ***protecting and conserving stream buffers and natural areas***. Information about starting a Sediment and Erosion Control Local Program can be found on the ***Division of Land Quality's*** web page.

Fecal Coliform Bacteria

The fecal coliform standard for freshwater is 200 colonies per 100 milliliters (ml) of water based on at least five consecutive samples taken during a 30-day period, not to exceed 400 colonies per 100 ml in more than 20 percent of the samples during the same period. There are no waters Impaired for fecal coliform bacteria in the Sandy Run-Broad River watershed. However, fecal coliform bacteria concentrations were above the 400 colonies/100 milliliter (mL) water quality guideline in more than 20 % of at least one ambient monitoring stations in this watershed.

The presence of fecal coliform bacteria in the aquatic environment indicates that the water has been contaminated from the fecal material of humans or other warm-blooded animals. Elevated fecal coliform bacteria numbers can indicate contamination by harmful pathogens or disease causing bacteria or viruses that also exists in fecal material. Livestock and family pets are large contributors to this problem. As seen in Table 2-1, the Agriculture Cost Share Program has installed close to 1,000 linear feet of fencing along streams to help keep livestock out of the streams. This will significantly decrease the amount of fecal coliform bacteria contaminating the streams. Many municipalities have been placing pet waste bag and trash bins in public parks and along green ways to encourage and educate the public on the importance of keeping the waste out of the streams.

Nutrient Impact

Nutrients refer to phosphorus (P) and nitrogen (N), which are common components of fertilizers, animal and human waste, vegetation, aquaculture and some industrial processes. Nutrients in surface waters come from both point and nonpoint sources including agriculture and urban runoff, wastewater treatment plants, forestry activities and atmospheric deposition. While nutrients are beneficial to aquatic life in small amounts, excessive levels can stimulate algal blooms and plant growth, depleting dissolved oxygen in the water column.

Nutrient impacts in this watershed are mainly from agriculture, commercial and residential property stormwater runoff. Riparian buffers are needed along streams to filter excess nutrients and other contaminates before the runoff reaches the stream. Excessive fertilizing of residential lawns and golf courses also significantly impacts water quality. Education, along with encouraging the use of riparian buffers, can reduce the amount of phosphorus and nitrogen entering surface waters.

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***.

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U.S. Environmental Protection Agency (USEPA) 1999. Protocol for Developing Sediment TMDLs. First Edition. EPA 841-B-99-044. U.S. EPA, Office of Water, Washington D.C.

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