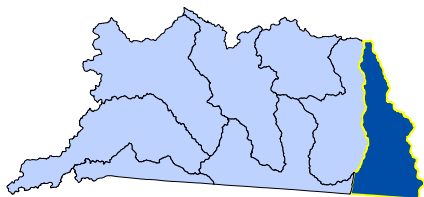


BUFFALO, KINGS & BULLOCK CREEK WATERSHED



HUC's 0305010508, 0305010509 & 0305010511

Includes Muddy Fork, Potts Creek, Beason Creek & Lake York

GENERAL WATERSHED DESCRIPTION

This 10-digit set of HUC's drain to the far eastern side of Cleveland County and portions of Lincoln and Gaston Counties. The Buffalo Creek, Kings Creek and Bullock Creek watersheds contain habitat characteristics of the Northern Piedmont, the Southern Outer Piedmont, and Kings Mountain ecoregions. Major waterbodies draining these watersheds include Muddy Fork, Buffalo, and Beason Creeks. Nearly 50 percent of these watersheds are forested with another 40 percent containing pastureland (Figure 6-1). The City of Kings Mountain is the largest urbanized area (Figure 6-2).

WATER QUALITY OVERVIEW

Of the 140 stream miles in the Buffalo, Kings and Bullock Creek watershed, 63 stream miles were monitored by DWQ. Of these waters, 83 percent are Supporting, 16 percent are Impaired and one percent is not rated for aquatic life. The majority of impairments and impacts are associated with habitat degradation. Fecal coliform bacteria, nutrient impacts and turbidity were also issues in this watershed.

Biological monitoring was conducted at nine basinwide sites; two were sampled for the first time in 2005. One additional benthic site was sampled as part of a special study in Potts Creek to evaluate chemical contaminants from a former textile facility. One ambient monitoring station is located in Buffalo Creek near the state line.

WATERSHED AT A GLANCE

COUNTIES

Cleveland, Lincoln, Gaston

MUNICIPALITIES

Kings Mountain, Cherryville, Belwood, Shelby, Waco, Gastonia, Earl, Grover

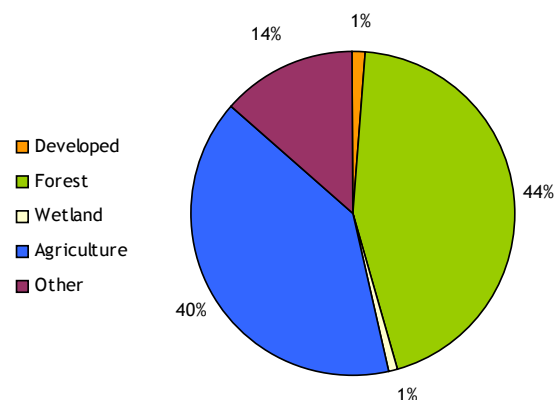
PERMITTED FACILITIES

NPDES WWTP:	7
NPDES Nondischarge:	0
NPDES Stormwater:	28
Animal Operations:	1

MONITORED STREAM MILES (AL)

Total Streams:	64.3 mi
Total Supporting:	53.8 mi
Total Impaired:	9.7 mi
Total Not Rated:	0.8 mi

FIGURE 6-1: BUFFALO, KINGS & BULLOCK CREEK WATERSHED LAND COVER

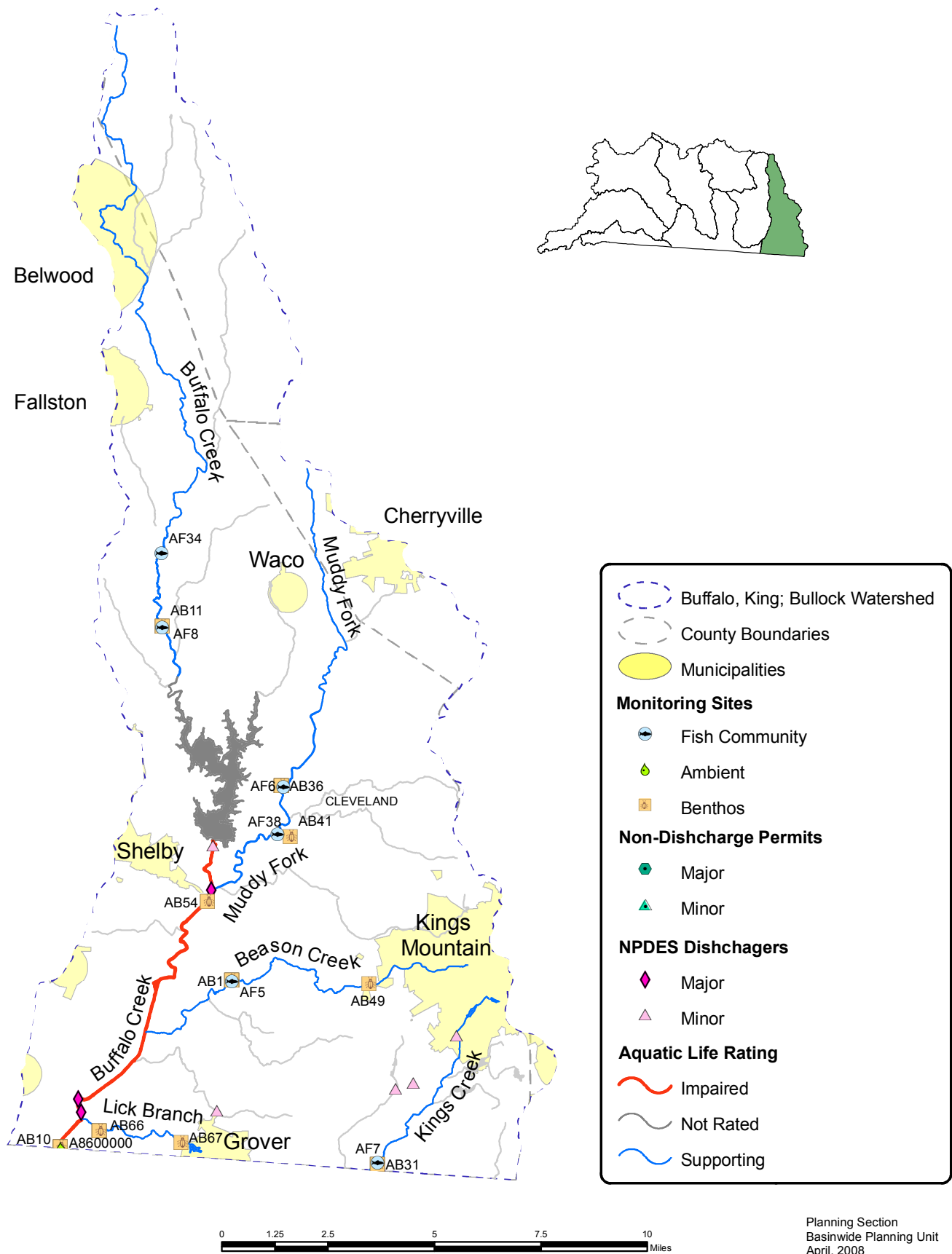


NRI: National Land Cover Data, 2001

Overall, three sites improved, three sites declined, two sites were sampled for the first time, and one remained unchanged. Sedimentation and habitat degradation were noted in several stream segments and a portion of Buffalo Creek below the reservoir is impaired in the aquatic life category due to a water quality standards violation for turbidity.

There are three major and four minor NPDES Discharger Permits within this watershed. The Pilot Creek Wastewater Treatment Plant received two minor color compliance violations. Currently, there is no standard for color. One Animal Operations Permit is issued for a cattle operation on Muddy Fork Creek. The majority of the Stormwater Permits can be found between the Town of Grover and the Town of Kings Mountain.

FIGURE 6-2: BUFFALO, KINGS & BULLOCK CREEKS WATERSHED, HUC's 0305010508, HUC 0305010509 & 0305010511



Planning Section
Basinwide Planning Unit
April, 2008

How to Read this Document

This document was written to correspond with our new [Online Geographic 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 6-A](#) provides descriptions of Use Support ratings for all monitored waterbodies in the subbasin.

[Appendix 6-B](#) provides a summary of each ambient data monitoring station.

[Appendix 6-C](#) provides summaries of biological and fish assessment monitoring sites.

TABLE 6-1: MONITORED STREAM SEGMENTS IN THE BUFFALO, KINGS & BULLOCK CREEK WATERSHEDS

AU NUMBER	STREAM NAME	LENGTH (MILES)	CLASS.	2008 IR CATEGORY	IMPAIRED	IMPACTED	POTENTIAL STRESSORS (POTENTIAL SOURCES)	DWQ SUBBASIN
9-53-(1)	Buffalo Creek	9.7	C	2	-	-		03-08-05
9-53-(2.9)	Buffalo Creek	0.8	WS-III; CA	3a	-	X		03-08-05
9-53-(5)	Buffalo Creek	20.8	WS-III	5	X	-	Fecal Coliform Bacteria Habitat Degradation (Impervious Surface, Stormwater Runoff), Turbidity	03-08-05
9-53-11	Lick Branch	3.3	C	2	-	-		03-08-05
9-53-6	Muddy Fork	13.9	C	2	-	-	Habitat Degradation, Nutrient Impact (Row Crop Agriculture, Stormwater Runoff)	03-08-05
9-53-8	Beason Creek	10.3	C	2	-	-		03-08-05
9-54	Kings Creek	5.5	C	2	-	-		03-08-05

*The 2008 IR Categories definitions can be found on the first page of Appendix 6-A

CURRENT STATUS OF IMPAIRED & IMPACTED WATERS

BUFFALO CREEK AU#: 9-53-(1), 9-53-(2.9), 9-53-(5)

Two benthic and one fish site were sampled on Buffalo Creek. Sites AB11 and AF8 are co-located at SR 1908 and both resulted in Good bioclassifications. Substrate was a mix of bedrock (50 percent), sand (20 percent), boulders (10 percent), rubble (10 percent) and gravel (10 percent). Primary habitat problems included lack of root mats, undercut streambanks, and impacts to the riparian zone on the right bank. Conductivity has been very stable over time and the watershed has remained mostly forested. Site AB11 declined from the Excellent it received in 2000. Seasonality

may have played a slight role in the decline, but the increased flows that were measured throughout the basin during 2005 may also be impacting the aquatic communities. In periods of increased precipitation, there is the potential for increased pollution runoff.

Buffalo Creek was first sampled for fish in 1964 by WRC. Only eight species were collected with the bluehead chub being the most abundant species and the stream was described by the biologists as "turbid". Seventeen species were documented in Buffalo Creek in 2000 and 2004. Even though overall diversity was low, the site received the higher bioclassification in 2004 (Good) than in 2000 (Good-Fair). In 2004, there was a higher percentage of insectivores and a lower percentage of omnivores-herbivores.

Site AB10 is located below Kings Mountain reservoir, near the North Carolina - South Carolina state line (NC 198). Substrate is mostly sand (80 percent) with lesser amounts of gravel (10 percent) and silt (10 percent). Land use in the immediate area consists of residential and commercial areas associated with the US 74 corridor along with agricultural and forestland. Habitat problems include extensive streambank erosion and lack of pools and riffles. Site AB10 has been sampled six times since 1983. In 2005, site AB10 declined from the Good it received in 1995 and 2000 to a Good-Fair. Again, seasonality and increased streamflows may have contributed to the decline in bioclassification.

Site AA8 is co-located with site AB10. 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 Buffalo Creek is Impaired for aquatic life due to exceedences in the water quality standard for turbidity.

Recommendations: Cleveland County should implement a Sediment and Erosion Control Local Program to help control construction site sediment from entering surface waters. As development increases, a local program is necessary to ensure appropriate BMPs are being installed and maintained properly. More information on local programs can be found on the Division of Land Resources web site.

Muddy Fork AU#: 9-53-6

Muddy Fork is a tributary to Buffalo Creek below the Kings Mountain Reservoir. Muddy Fork drains eastern Cleveland and western Gaston counties, west of the Town of Cherryville. Fish (AF6) and benthic (AB31) samples were collected. Fish were sampled for the first time in 1964. Fourteen species were collected and like many of the sites sampled throughout the basin, bluehead chub was the dominant species. Muddy Creek was sampled in 2000 and 2004. The 2004 site was 1.7 miles upstream of the site that was sampled in 2000 and did not include the Persimmon Creek sub-watershed. Site AF6 received a Good-Fair fish bioclassification, which is a decline in the Good rating it received in 2000. The slight difference was due to the absence of bluegill, which were collected in 2000. Bluehead chub continue to be the dominant species. They are also an indicator of nutrient enrichment from nonpoint sources.

Site AB31 is located nearly two miles downstream of site AF6. Land use in the immediate area consists of residential properties with scattered tracts of agriculture and forestland. Primary habitat problems included moderate streambank erosion and lack of pools and riffles. Substrate was mostly sand (60 percent) with rubble (20 percent) and gravel (20 percent). Site AB31 has been sample five times since 1983 and received an Excellent during the most recent sampling event. Several pollution intolerant taxa were collected at the site including two long-lived, intolerant stonefly species. This suggests that Muddy Fork is stable and has overall favorable water quality conditions. Like the upstream segment, this section of Muddy Fork receives a fair amount of nonpoint source runoff. Urban and agricultural BMPs should be installed to protect the existing aquatic habitat.

Potts Creek AU#: 9-53-6-3

Potts Creek was sampled at site AB41 as part of a special study requested by the DWQ Mooresville Regional office. The site is approximately four miles downstream of the former Cinderella Mills (textile plant) where tetrachloroethylene (TCE) was released into several of the surrounding tributaries. Site AB41 received a Good rating and the data indicates that there are no adverse effects on Potts Creek from the chemical release.

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

SIGNIFICANT NON-COMPLIANCE ISSUES

No significant non-compliance issues were identified for the permitted NPDES WWTP facilities in these 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:

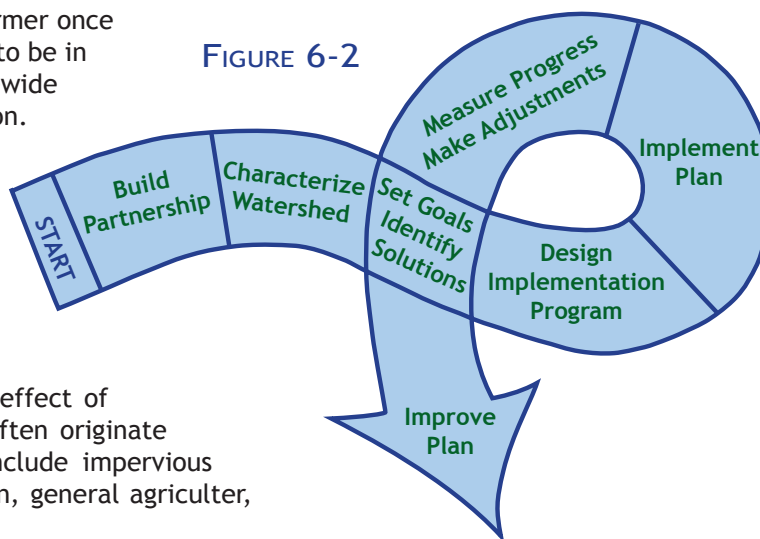
- Erosion Reduction/Nutrient Loss Reduction in Fields;
- Sediment/Nutrient Delivery Reduction from Fields;
- Stream Protection from Animals;
- Proper Animal Waste Management; and
- Agricultural Chemical (agrichemical) Pollution Prevention.

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, \$83,244 was allocated for BMPs in the Buffalo Creek watershed. Table 6-2 summarizes the cost and total BMPs implemented.

TABLE 6-2: BMPs INSTALLED THROUGH NCACSP

PURPOSE OF BMP	0305010508	
	TOTAL IMPLEMENTED	COST
Erosion Reduction/Nutrient Loss Reduction in Fields	93.7 acres	\$13,546
Sediment/Nutrient Delivery Reduction from Fields	4 units	\$30,655
Stream Protection from Animals	21 units 7,311 linear feet	\$32,778
Proper Animal Waste Management	2 units	\$6,265
Agricultural Chemical Pollution Prevention	--	--
Total Costs		\$83,244
BENEFITS 0305010508		
Total Soil Saved (tons)	2,102	
Total Nitrogen (N) Saved (lb.)	3,516	
Total Phosphorus (P) Saved (lb.)	204	
Total Waste-N Saved (lb.)	26,770	
Total Waste-P Saved (lb.)	44,616	

FIGURE 6-2



RECOMMENDATIONS

Habitat Degradation

In most cases habitat is degraded by 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 agriculture, 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 6-2 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.

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 this 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 over 7,300 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 contaminants 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>.
- NCDENR Division of Water Quality. February 2003. *Broad River Basinwide Water Quality Plan*. <http://h2o.enr.state.nc.us/basinwide/Broad/2002/plan.htm>.
- 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.
- Waters, T.F. 1995. Sediment in streams—Sources, biological effects, and control. American Fisheries Society Monograph 7. American Fisheries Society, Bethesda, MD.