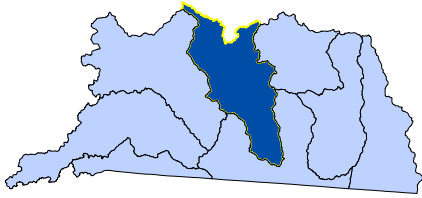


SECOND BROAD RIVER WATERSHED



HUC 0305010504

Includes Big Camp Creek, Catheys Creek, Roberson Creek & Second Broad River

GENERAL WATERSHED DESCRIPTION

The Second Broad River begins in the southern McDowell County mountains and ends at its confluence with the Broad River in the Rutherford County piedmont region. Most of the land is forested; however, large urbanized areas of Rutherfordton, Spindale and Forest City are also located in the watershed (Figure 3-1). Tributaries include Big Camp Creek, Cane Creek, Catheys Creek, Roberson Creek, Puzzle Creek, Webbs Creek and Hills Creek (Figure 3-2). Many are low gradient streams that are either extremely sandy or rocky depending on the local geology.

WATER QUALITY OVERVIEW

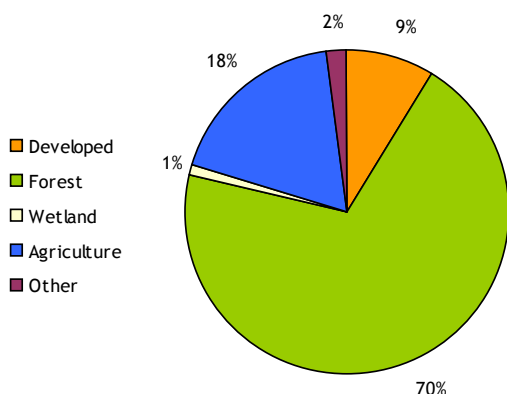
Of the 237 stream miles in the Second Broad River watershed, 84.5 miles were monitored by DWQ. This watershed is mostly (83 percent) rated as Supporting for aquatic life. Only 10 percent of these monitored waters are rated as Impaired and 7 percent are Not Rated. Of the Impaired or impacted streams, 72 percent had a habitat degradation stressor, 21 percent had a fecal coliform stressor, and 16 percent had a nutrient impact stressor.

Biological monitoring was conducted at seven basinwide sites. Eleven biological samples were also collected as part of a special study in the Catheys Creek (Hollands Creek) watershed. More information on the special study can be found in the Catheys Creek watershed [Chapter](#). Two ambient stations are also monitored

in the Second Broad River watershed.

<u>WATERSHED AT A GLANCE</u>	
<u>COUNTIES</u>	
McDowell, Rutherford	
<u>MUNICIPALITIES</u>	
Rutherfordton, Ruth, Spindale, Forest City, Bostic, Alexander Mills	
<u>PERMITTED FACILITIES</u>	
NPDES WWTP:	8
NPDES Nondischarge:	0
NPDES Stormwater:	18
Animal Operations:	6
<u>MONITORED STREAM MILES (AL)</u>	
Total Streams:	84.5 mi
Total Supporting:	70.1 mi
Total Impaired:	8.6 mi
Total Not Rated:	5.9 mi

FIGURE 3-1: SECOND BROAD RIVER WATERSHED LAND COVER

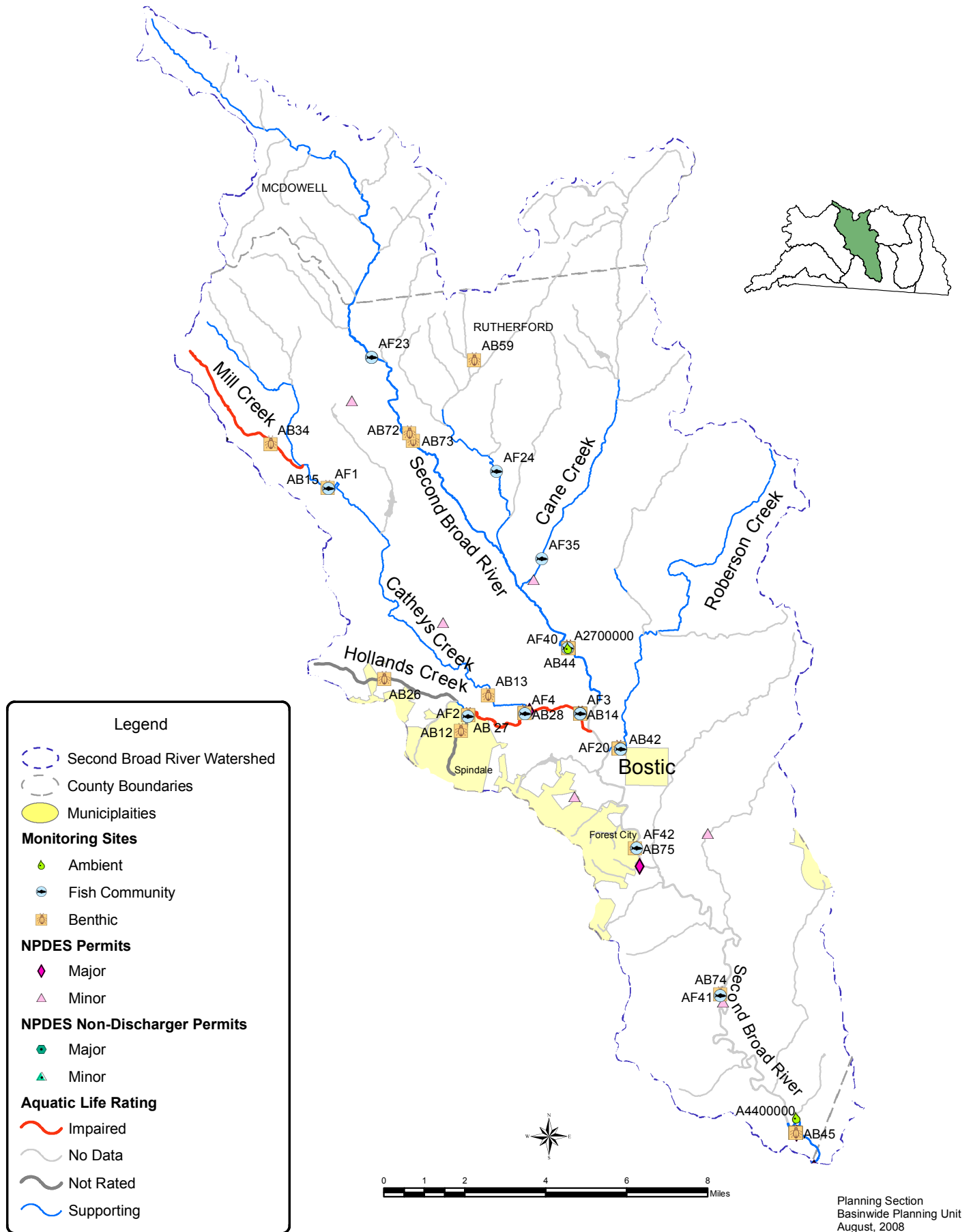


NRI: National Land Cover Data, 2001

No significant water quality changes were identified in the Second Broad River; however, several streams are impacted, and Catheys Creek, Hollands Creek and Mill Creek are Impaired (Table 3-1).

There are three major and five minor NPDES Discharger Permits within the Second Broad River watershed. None of these facilities had significant compliance issues during this planning period. There are six Animal Operations Permits located mostly in the northern headwaters of this watershed.

FIGURE 3-2: SECOND BROAD RIVER WATERSHED, HUC 0305010504



Planning Section
Basinwide Planning Unit
August, 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 3-A provides descriptions of Use Support ratings for all monitored waterbodies in the subbasin.

Appendix 3-B provides a summary of each ambient data monitoring station.

Appendix 3-C provides summaries of biological and fish assessment monitoring sites.

TABLE 3-1: MONITORED STREAM SEGMENTS IN THE SECOND BROAD RIVER WATERSHED

AU NUMBER	STREAM NAME	LENGTH (MILES)	CLASS.	2008 IR CAT.*	IMPAIRED	IMPACTED	POTENTIAL STRESSORS (POTENTIAL SOURCES)	DWQ SUBBASIN
9-41-(0.5)	Second Broad River	15.8	WS-V	2	-	-		03-08-02
9-41-(10.5)	Second Broad River	9.9	WS-IV	2	-	-	Habitat Degradation	03-08-02
9-41-(24.7)	Second Broad River	2.2	WS-IV	2	-	-	Habitat Degradation	03-08-02
9-41-11-(2.5)	Big Camp Creek	5.1	WS-IV	2	-	-	Habitat Degradation	03-08-02
9-41-12-(5.5)	Cane Creek	6.3	WS-IV	2	-	-		03-08-02
9-41-13-(0.5)	Catheys Creek	15.2	WS-V	2	-	-	Fecal Coliform Bacteria (Animal Operations) Habitat Degradation (General Agriculture/ Pasture, Stormwater Runoff)	03-08-02
9-41-13-(6)a	Catheys Creek	1.9	C	2	-	-	Habitat Degradation (General Agriculture/ Pasture, Impervious Surface)	03-08-02
9-41-13-(6)b	Catheys Creek	1.9	C	5	X	-	Fecal Coliform Bacteria Habitat Degradation (General Agriculture/ Pasture, Stormwater Runoff)	03-08-02
9-41-13-3	Mill Creek	4.5	WS-V	5	X	-	Habitat Degradation (Impoundment)	03-08-02
9-41-13-7-(1)	Hollands Creek	3.9	WS-V	3a	-	-	Habitat Degradation (Impervious Surface)	03-08-02
9-41-13-7-(3)a	Hollands Creek	0.7	C	2	-	-	Fecal Coliform Bacteria Habitat Degradation (Impervious Surface, Natural Conditions, Stormwater Runoff) Natural Impacts (Stormwater Runoff)	03-08-02

*The 2008 IR Categories definitions can be found on the first page of Appendix 3-A

AU NUMBER	STREAM NAME	LENGTH (MILES)	CLASS.	2008 IR CAT.*	IMPAIRED	IMPACTED	POTENTIAL STRESSORS (POTENTIAL SOURCES)	DWQ SUBBASIN
9-41-13-7-(3)b	Hollands Creek	2.2	C	5	X	-	Habitat Degradation (Impervious Surface, Stormwater Runoff)	03-08-02
9-41-13-7-4	Case Branch (Cox Branch)	1.9	C	3a	-	-		03-08-02
9-41-14	Roberson Creek (Robinson Creek)	12.9	WS-V	2	-	-	Habitat Degradation Natural Impacts	03-08-02

*The 2008 IR Categories definitions can be found on the first page of Appendix 3-A

CURRENT STATUS OF IMPAIRED & IMPACTED WATERS

SECOND BROAD RIVER AU#: 9-41-(0.5), 9-41-(10.5), 9-41-(24.7)

DWQ collected data from five stations on the Second Broad River - one fish site (AF23), two benthic sites (AB44 and AB45) and two ambient monitoring stations (AA2 and AA3). Site AF23 is the most upstream sampling location and receives runoff from rural residential areas located in southern McDowell County and a small portion of northern Rutherford County. It is a regional reference site for fish community sampling and has rated Good for the last two assessments (2000 and 2005) with no substantial changes.

Sites AB44 and AA2 are co-located approximately 10 miles downstream of site AF23 near the Town of Logan. Site AB44 has consistently rated Good-Fair (1995, 2000 and 2005) and includes a mix of both pollution tolerant and intolerant species. The substrate is mostly sand (70 percent) with small amounts of rubble (5 percent), gravel (15 percent) and silt (10 percent). Heavy sedimentation has destroyed riffles and lead to a low habitat score (51 out of 100). DWQ biologists also noted severe streambank erosion. No water quality standards were exceeded at site AA2.

Sites AB45 and AA3 are co-located near the Cliffside Steam Station, just upstream of the Cliffside Sanitary District WWTP (Permit NC0004405). Site AB45 has been sampled eight times since 1983, and over time, water quality has improved but not above a Good-Fair rating. The substrate is a mix of rubble (55 percent), gravel (20 percent), sand (10 percent), boulder (10 percent) and silt (5 percent). Infrequent pools, streambank erosion and a narrow riparian zone lowered the habitat score (72). Conductivity was extremely high at the time of sampling (226 μ mhos/cm) and the water was tinted red. At this time, there is no indication of the causes of the high conductivity or the red tint. No water quality standards were exceeded at site AA3.

The monitored segments of the Second Broad River are Supporting in the aquatic life category; however, due to their Good-Fair bioclassifications, they are considered waters with noted impacts. Stormwater runoff from agricultural, commercial and residential properties is most likely impacting the aquatic habitats in the Second Broad River and the surrounding watersheds.

BIG CAMP CREEK AU#: 9-41-11-(2.5)

Big Camp Creek drains rural northern Rutherford County. Site AF24 was sampled for the first time in 2005 and received a Good-Fair. The total number of species (including darters, sunfish, bass and trout) and the number of pollution intolerant species were lower than expected. Sedimentation is a concern for this watershed despite its rural characteristics. Big Camp Creek is Supporting in the aquatic life category; however, due to the Good-Fair bioclassification, it is considered a stream with noted impacts.

CATHEYS CREEK (HOLLANDS CREEK) AU#: 9-41-13-(0.5), 9-41-13-(6)a, 9-41-13-(6)b, 9-41-13-7-(1), 9-41-13-7-(3)a; 9-41-13-7-(3)b

One basinwide site (AB14) and several benthic, fish and ambient sites were sampled in Catheys Creek watershed as part of a special study for the Ecosystem Enhancement Program (EEP). DWQ biologists noted that habitat quality varied from very good to very poor depending on land cover, geology, slopes, soils and streamflow. Most low gradient streams around Spindale and Rutherfordton are extremely sandy, often lacking aquatic habitat areas. Higher gradient streams, or those in the more forested areas of the watershed, have a rocky substrate. Sedimentation, point source pollution, stormwater runoff and historic mining activities were identified as the primary factors affecting watershed function in the Catheys Creek watershed.

Several of the streams in the Catheys Creek watershed are Supporting in the aquatic life category; however, portions of both Catheys and Hollands Creeks are Impaired. Mill Creek is also Impaired in the aquatic life category. More information on the Catheys Creek watershed can be found in [Chapter 9](#).

Recommendations for Hollands Creek (AU# 9-41-13-7-(3)b): Continue to implement the *Catheys Creek Watershed Management Plan*. Replace hard stream stabilization structures with natural stabilization methods. Increase the area of vegetation (with trees and shrubs) along residential portions of this segment to filter stormwater runoff. Encourage homeowners not to mow all the way down to the stream and to plant native vegetation along streambanks.

MILLS CREEK AU#: 9-41-13-3

Site AB34 was sampled for the first time during this assessment period. It was sampled in efforts to locate an area of good water quality in the upper portion of the Catheys Creek segment. The site received a Fair bioclassification. This is most likely due to an upstream impoundment causing increased water temperatures. More detailed information can be found in Chapter 9.

Recommendations: Continue to implement the *Catheys Creek Watershed Management Plan*. Increase shaded area around the upstream pond by planting trees and shrubs to lower water temperatures.

ROBERSON CREEK AU#: 9-41-14

Roberson Creek is a tributary to the Second Broad River and drains east central Rutherford County. Benthic (AB42) and fish (AF20) samples were collected in 2005. Like many of the other streams in the basin, the substrate is mostly sand (50 percent) with some gravel (40 percent) and silt (10 percent). Site AB42 received a Good-Fair. This site has remained unchanged since 1995; however, overall declines in species abundance and richness indicate that the biological integrity is decreasing.

Site AF20 received a Good; however, the total number of fish collected and the number of species with multiple age groups decreased substantially between 2000 and 2005. This resulted in a 75 percent decline in the number of fish collected. Of the 21 species known from the site, abundance declined in 17 species, and four species were not collected. The bluehead chub (an indicator of nutrient enrichment) was the most abundant species. DWQ biologists noted that the decline in abundance and the loss of age classes has been observed at other sites where the flow has fluctuated dramatically (i.e., from extremely low flows to extremely high flows). This may have happened in Roberson Creek; however, future investigation is needed to determine the cause of the decline. The total drainage area at the sampling sites is 26 square miles.

Roberson Creek is Supporting in the aquatic life category; however, due to the Good-Fair benthic bioclassification, it is considered a stream with noted impacts.

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

SIGNIFICANT NON-COMPLIANCE ISSUES

No significant non-compliance issues were identified for the permitted facilities in the Second Broad River watershed. Notice of violation (NOV) letters were sent to three NPDES WWTP facilities during the last two years of the assessment period; however, with recommended operational changes, all are in full compliance with permit limits. Two of these facilities are located in the Catheys Creek watershed. More information on these facilities can be found in [Chapter 9](#).

LOCAL INITIATIVES

USDA - NRCS ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP)

The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides assistance to farmers and ranchers who face threats to soil, water, air and related natural resources on their land. Through EQIP, the Natural Resources Conservation Service (NRCS) provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet federal, state, tribal and local environmental requirements. Program priorities include reducing point and nonpoint sources of pollution; reducing groundwater contamination; conserving ground and surface water resources; reducing emissions; reducing soil erosion and sedimentation; and promoting species habitat conservation.

In 2001, areas north and east of the Broad River in Rutherford County were identified as an EQIP priority area. This includes all or part of the Mountain Creek, Cleghorn Creek, McKinney Creek, Floyds Creek, Catheys Creek, Second Broad River, Cane Creek, Camp Creek, Puzzle Creek, Roberson Creek, Hills Creek and Big Horse Creek watersheds. The priority area covers approximately 220,800 acres (345 square miles) of privately owned land. Primary resource concerns included streambank stabilization, sedimentation, livestock exclusion and establishment of resource management systems on pasturelands.

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 landowners 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 (agricultural) 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, \$41,815 was provided for BMPs in the Second Broad River watershed. Table 3-2 summarizes the cost and total BMPs implemented.

TABLE 3-2: BMPs INSTALLED THROUGH NCACSP

PURPOSE OF BMP	TOTAL IMPLEMENTED	COST
Erosion Reduction/Nutrient Loss Reduction in Fields	20.8 acres	\$5,378
Sediment/Nutrient Delivery Reduction from Fields	--	--
Stream Protection from Animals	11 units 2,518 linear feet	\$18,666 --
Proper Animal Waste Management	1 unit --	\$17,771 --
Agricultural Chemical Pollution Prevention	--	--
Total Costs	--	\$41,815
BENEFITS		0305010504
Total Soil Saved (tons)	331	
Total Nitrogen (N) Saved (lb.)	3,686	
Total Phosphorus (P) Saved (lb.)	1,827	
Total Waste-N Saved (lb.)	1,008	
Total Waste-P Saved (lb.)	619	

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.

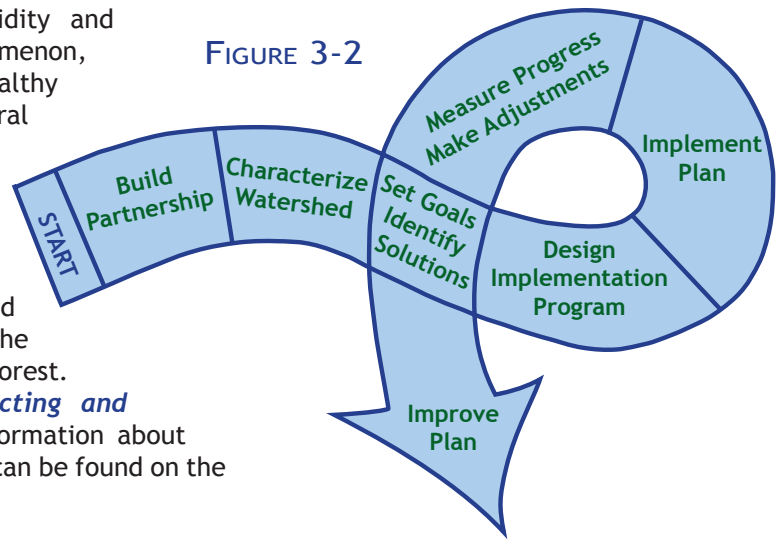
Many tools are available to address habitat degradation including: *urban stormwater BMPs*; *agricultural BMPs*; ordinance and/or rule changes at the local, state, and federal level; volunteer activism; and education programs. Figure 3-2 illustrates the general process for *developing watershed restoration 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.

FIGURE 3-2



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 Second 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 over 2,500 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

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