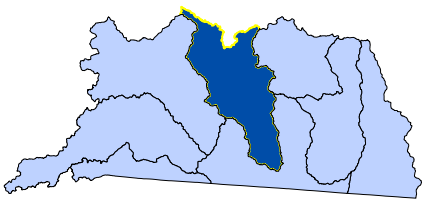
Catheys Creek (Hollands Creek) Watershed



HUC 030501050403

(Part of the Second Broad River Watershed)

General Watershed Description

Catheys Creek is a tributary to the Second Broad River. It is located in central Rutherford County and originates in a forested area north of the Town of Rutherfordton near the McDowell-Rutherford county line. The stream flows southeast until it reaches the Second Broad River, just north of Forest City. Catheys Creek, Mill Creek, Hollands Creek and Case Branch were all sampled during the most recent assessment period (Figure 9-1). Land use throughout the watershed is a mix of commercial and residential properties with agricultural (row crops and pasture) and forested land in the headwaters.

Watershed at a Glance

Counties

Rutherford

Municipalities

Ruth, Rutherfordton, Spindale, Forest City

Permitted Facilities

NPDES WWTP:	3
NPDES Nondischarge:	0
NPDES Stormwater:	6
Animal Operations:	0

Monitored Stream Miles (AL)

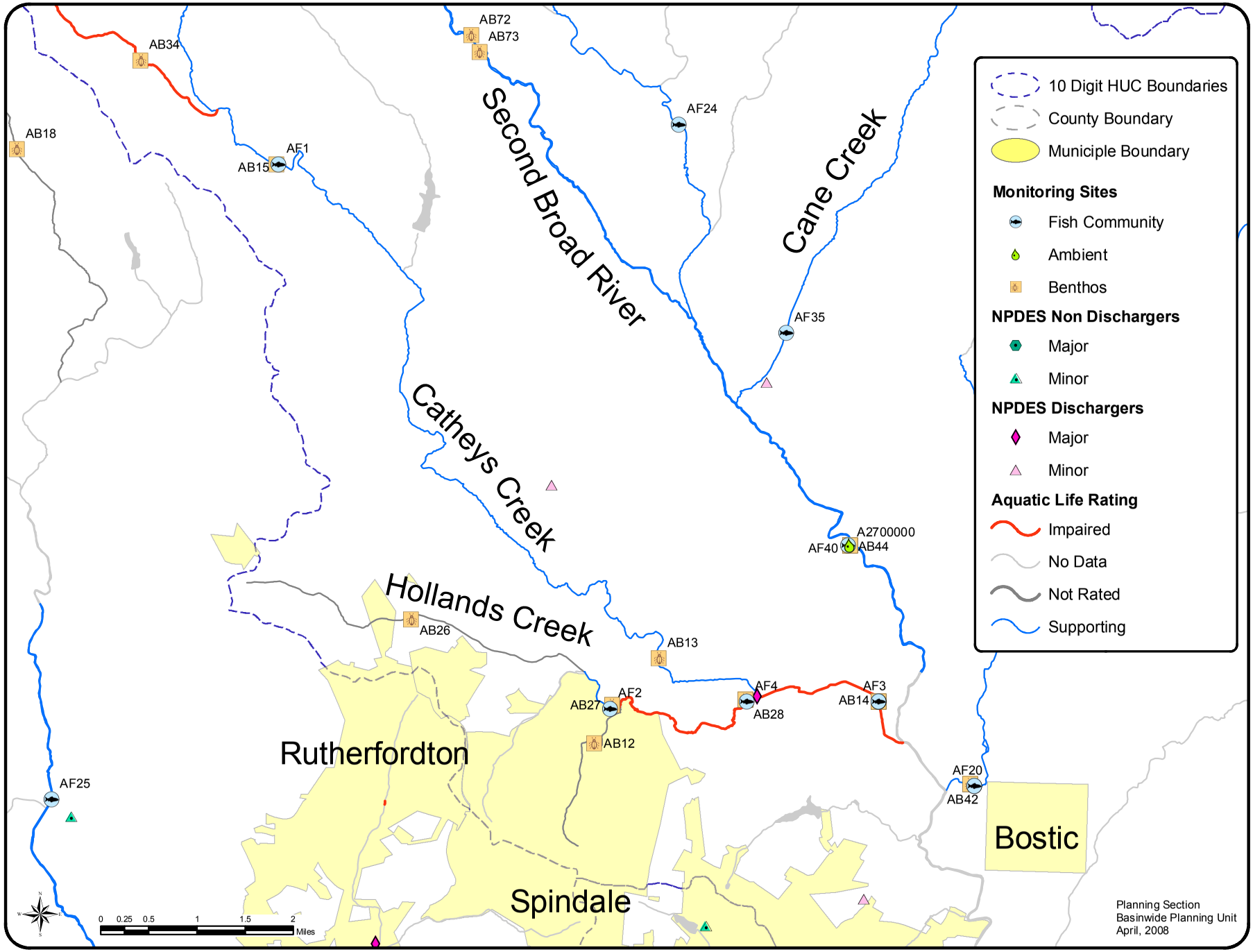
Total Streams:	32.2 mi
Total Supporting:	17.8 mi
Total Impaired:	8.6 mi
Total Not Rated:	5.9 mi

Water Quality Overview

In addition to basinwide sampling, DWQ collected benthic and fish samples throughout the watershed in 2003 and 2004 as part of a special study for the Watershed Restoration Program (WRP), now the Ecosystem Enhancement Program (EEP) (***NCDENR DWQ, August 2003 and NCDENR DWQ, April 2004***). Chemical and physical parameters were also evaluated through ambient monitoring sites (***December 2004***). Data collected during these studies were evaluated and used to determine causes and sources of degradation and to develop a watershed management plan (***August 2005***). 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 segments are supporting; however, portions of both Catheys and Hollands Creeks are Impaired in the aquatic life category. Mill Creek is also Impaired in the aquatic life category (Table 9-1).

Figure 9-2: Part of the Second Broad River: HUC 030501050403



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 9 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***".

Table 9-1: Monitored Stream Segments In The Catheys Creek Watershed

Assessment Unit Number	Stream Name	Length (miles)	Class.	2008 IR Cat.*	Impaired	Impacted	Potential Stressors (Potential Sources)	DWQ Subbasin
9-41-13-(0.5)	Catheys Creek	15.2	WS-V	2	-		**Fecal Coliform Bacteria** (Animal Operations) **Habitat Degradation** (General Agriculture/ Pasture, Stormwarer 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, Stormwarer 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, Stormwarer Runoff) **Natural Impacts** (Stormwater Runoff)	03-08-02
9-41-13-7-(3)b	Hollands Creek	2.2	C	5	X		**Habitat Degradation** (Impervious Surface, Stormwarer Runoff)	03-08-02
9-41-13-7-4	Case Branch (Cox Branch)	1.9	C	3a	-			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

Catheys Creek watershed as a whole shows signs of moderate functional degradation in terms of water quality, hydrology and habitat. Sedimentation was identified as a significant problem throughout the entire watershed, and when compared to the upstream (rural) areas of the watershed, nutrients, metals, fecal coliform bacteria and turbidity were higher at sites sampled within and downstream of Spindale. Field assessments also revealed stream channel and floodplain alterations from historic mining operations and the clearing of several large forested tracts were contributing to an increased amount of nonpoint source runoff and sedimentation. Several opportunities were identified for better management of land and water resources. A few of these are discussed under ***Local Initiatives***, and all are listed in the Watershed Management Plan (***EarthTech, August 2005***).

Biological Monitoring

A total of six benthic sites were sampled in Catheys and Hollands Creeks in June 2003. The sites were sampled shortly after heavy rain events, and DWQ biologists noted that the stream water levels were high, indicating a recent rain event. Many of the streams were also turbid. In March 2004, a total of four fish sites were sampled in both creeks. DWQ biologists noted that habitat quality varied from very good to very poor depending on land use, 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.

Catheys Creek

Sites AB15 and AF1 are the most upstream sites in Catheys Creek watershed. They were selected to represent that portion of the watershed above the urban areas of Spindale and Rutherfordton where land use is a combination of agriculture and forest with some residential areas. Site AB15 received a Good-Fair benthic bioclassification. Site AF1 received a Good fish bioclassification. Embedded, sandy substrate and a lack of cobble-riffle habitats contributed to the poor instream habitat.

Benthic samples were also collected on Catheys Creek upstream and downstream of the confluence with Hollands Creek. Site AB13 is upstream of the confluence and land use in the immediate vicinity is a mix of forest, agriculture, and residential properties. Site AB13 received a Good-Fair benthic bioclassification. Major habitat concerns included eroding streambanks and the lack of instream habitat (i.e., infrequent pools).

Sites AB14 and AF3 are downstream of the confluence. These sites are also downstream of permitted WWTP facilities and approximately 1.5 miles upstream from the confluence with the Second Broad River. Land use is a mix of hayfields (inactive pasture), residential properties and forestland. In June 2003, DWQ biologists noted that the streambanks had been severely scoured (likely during recent rain events), and many were eroding. Site AB14 received a Good-Fair, an improvement from the Fair it received in 2000. Site AF3 received a Fair, an improvement from the Poor it received in 2000. Even though both sites improved, this section of Catheys Creek (AU# 9-41-13-(6)b) is still Impaired for aquatic life due to the Fair fish bioclassification.

Hollands Creek

Site AB26 is the most upstream site sampled on Hollands Creek. Stream width here was less than 3 meters (drainage area less than 3 square miles); therefore, a bioclassification could not be assigned to this site (Not Rated). A few rubble-boulder riffles were found, but most of the streambed was sand and red silt. DWQ biologists noted that much of the streambed silt likely originated from streambank erosion. Even though site AB26 was Not Rated, biologists believe that the low taxa richness and abundance suggest water quality and/or habitat problems. The Catheys Creek Technical Advisory Committee identified the headwaters of Hollands Creek as a focus area for stream restoration in the Catheys Creek watershed management plan published in ***August 2005***.

Sites AB27 and AF2 had a habitat that was quite different from other sites on either Hollands or Catheys Creeks. Most streams throughout the river basin are very sandy with silt, but this stream segment consisted of a mostly boulder and rubble substrate with moderate gradient plunge pools and rocky runs. This reflects a change in geology rather than a change in land use. Site AB27 received a Good-Fair benthic bioclassification. Site AF2 received a Good-Fair fish bioclassification. During the time of fish sampling, DWQ biologists observed periphyton (algae) covering all of the instream substrate. Periphyton growth is an indicator of nutrient enrichment from point source and/or nonpoint source runoff.

Downstream, the boulder-rubble substrate found at sites AB27 and AF2 was replaced by an unstable sand-silt substrate at sites AB28 and AF4. Site AB28 received a Good-Fair benthic bioclassification. No significant changes in water quality were identified; however, the Good-Fair was an improvement from the Fair bioclassification this site received in 2000. Site AF4 received a Fair fish bioclassification. Instream habitats were extremely poor and included one plunge pool created by concrete slabs used for channel stabilization. Streambanks were highly eroded, and the riparian zone consisted primarily of lawns with a few trees. This section of Hollands Creek (AU# 9-41-13-7-(3)b) remains Impaired in the aquatic life category.

Mill Creek

Mill Creek is a tributary to Catheys Creek and was sampled in an effort to find a high quality site in the upper part of the watershed. DWQ biologists noted that the stream had good habitat characteristics, but only eleven species were collected. Many of these were pollution tolerant species. A high water temperature (22°C/72°F) recorded during the time of sampling suggested an upstream impoundment or discharge of some kind. Although the biologists did not note a pond, impoundment or discharge pipe during the time of sampling, a review of 1993 land use maps indicated that there is a pond in the upper part of the Mill Creek sub-watershed. Site AB34 received a Fair benthic bioclassification. Mill Creek (AU# 9-41-13-3) is Impaired in the aquatic life category. The Catheys Creek Technical Advisory Committee identified Mill Creek as a focus area for stream restoration in the Catheys Creek watershed management plan published in ***August 2005***.

Case Branch

Case Branch (also known as Cox Branch) is a tributary to Hollands Creek and drains the northern portion of Spindale. Land use consists of residential and commercial properties. It was sampled as an urban reference stream. Biologists expected to find severe water quality problems. Conductivity was high (124 μmhos/cm), but habitat was surprisingly good and a few pollution intolerant species were identified. Stream width here was less than 3 meters; therefore, a bioclassification could not be assigned to site AB12 (Not Rated).

Case Branch was also identified as a potential problem area during the assessment phase of EEPs local watershed planning process. In May 2004, DWQ and EEP staff walked much of Case Branch and its tributaries to pinpoint pollution sources. Problem areas that were identified include a DOT stormwater pond near partially uncovered salt piles and construction materials (i.e., metal, bricks, concrete, and other refuse) in two unnamed headwater tributaries. DWQ and EEP staff also noted that both unnamed headwater tributaries had deeply incised streambanks (15 to 20 foot high) (***NCDENR DWQ, November 2004***). The Catheys Creek Technical Advisory Committee identified Case Branch as a focus area for stream restoration in the Catheys Creek watershed management plan published in ***August 2005***.

Chemical-Physical Parameters

To provide supplemental information to support the EEP local watershed planning efforts in the Catheys Creek watershed, DWQ conducted chemical-physical monitoring at seven sites – two on Catheys Creek, one on Hollands Creek, and five on unnamed tributaries. Periodic sampling was conducted under baseflow conditions at five sites from January to August 2004. Sampling was also conducted under stormflow conditions on three different occasions during the same time period. Baseflow is defined as conditions present at least 48 hours after a measurable precipitation event. Stormflow samples are collected during the rising stream stage event, during or after a precipitation event. Fecal coliform bacteria, suspended residue, total phosphorus, total Kjeldahl nitrogen (TKN), ammonia nitrogen, copper, zinc, manganese, iron, and aluminum were consistently higher in stormwater samples than samples collected under baseflow conditions. These results are consistent with other studies and illustrate how sediment and other pollutants can enter a waterbody (***December 2004***).

Sampling also indicates that chromium, mercury and copper may be metals of concern to this watershed, particularly around areas known for historic gold mining operations. Mercury used in the mining process may remain in the floodplain soils and in the streambeds. Further testing (i.e., sediment toxicity testing) is needed to determine if the levels are harmful to aquatic life. Fish tissue samples are also suggested in order to establish the level of mercury and other metals in the fish thus allowing the determination of a human health hazard for fish consumption (***NCDENR DWQ, December 2004***).

Under baseflow conditions, ambient monitoring showed that the water quality standard for fecal coliform bacteria was exceeded at five sites. 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. None of the waters in the Catheys Creek watershed are 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 (***NCDENR DWQ, December 2004***).

Significant Non-Compliance Issues

No significant compliance issues were identified for the permitted facilities in the Catheys Creek watershed; however, two facilities received several notices of violations (NOVs) during the last two years of the assessment period.

The White Oak Manor WWTP (Permit NC0030139) received NOVs for exceedences in TSS and fecal coliform bacteria. The facility is permitted to discharge 0.015 million gallons per day (MGD) to Catheys Creek. The most recent inspection (August 2006) resulted in an NOV being issued for improper equipment operation (i.e., grease removal and secondary clarifier sludge removal). Solids were also observed in the streambed below the outfall.

The United World Mission WWTP (Permit NC0032174) received NOVs for exceeding the permit limit for ammonia. It is permitted to discharge 0.02 MGD to Cherry Creek. Technical assistance provided by DWQ staff (June 2007) determined that the violation was due to a combination of regular maintenance and improper chemical treatment after the maintenance was performed.

DWQ Asheville Regional staff will continue to work with both facilities to ensure that the facilities remain in full compliance with permit limits.

Local Initiatives and Recommendations

Watershed Management Plan

In collaboration with local stakeholders and resource professionals, EEP, the Watershed Education for Communities and Officials (WECO) and Earth Tech were able to develop the ***Catheys Creek Watershed Management Plan***. The planning efforts included public meetings, the formation of a technical advisory committee (TAC), spatial analysis and field sampling to accurately characterize watershed issues. Follow the link above for a full copy of the report.

Sedimentation, point source pollution, stormwater runoff and historic mining activities were identified as the primary factors affecting watershed function in the Catheys Creek watershed. Accelerated stream channel erosion was observed at many sites and was attributed to past channelization and livestock access in the upper reaches and high-velocity flows from stormwater runoff in the lower reaches. Drainage from large pasture areas with livestock, faulty/vandalized sewer collection and septic systems and straight piping are believed to be contributing to high fecal levels. Chromium, mercury and copper may be a concern due to historic gold mining operations throughout the watershed. Because of the potential for metal contamination in the floodplain soils and streambeds, specific site investigations should include interviews to determine the history of mining on the property as well as visual inspections for clues such as spoil piles and channel alterations. Typical stream channel and floodplain restoration projects can cause tremendous disturbance to the streambed and floodplain soils and could potentially release buried sediment-bound metals into the environment. Toxicity tests are also recommended to determine impacts on the aquatic life.

As part of the planning process, the Catheys Creek watershed was divided into fourteen sub-watersheds. By using geographic data (i.e., land cover, soils, terrestrial habitat and hydrography), water quality data, interviews and visual observations, it allowed for more specific watershed characterization and identification of stressors and sources on the sub-watershed scale. The sub-watersheds were ranked based on water quality, hydrology and habitat function. Four sub-watersheds were identified for focused restoration plans and included the Mill Creek sub-watershed, the William Branch sub-watershed, the headwaters of Hollands Creek sub-watershed, and the Case Branch sub-watershed.

Causes and sources were identified along with goals, strategies and BMPs; thus resulting in specific recommendations for these four sub-watersheds. Many of the goals included reducing stormwater runoff, reducing the sediment load, and reducing the nitrogen, phosphorus and metals entering the surface waterbody. Many of the BMPs included livestock exclusion and buffer restoration, streambank stabilization, bioretention areas, construction wetlands, and wet detention ponds (***EarthTech, August 2005***).

References

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