Chapter 2
French Broad River Subbasin 04-03-02

Including the: French Broad River, Hominy and South Hominy Creeks, Mud Creek Watershed, Cane Creek, Newfound Creek, Reems Creek, Sandymush Creek, Bent Creek, Swannanoa River, Ross Creek, Lake Julian, Moore Creek, Canie Creek, Burnett Reservoir and Lake Kenilworth

2.1 Subbasin Overview

Subbasin 04-03-02 at a Glance

Land and Water Area

Total area:	806 mi²
Land area:	801 mi²
Water area:	5 mi²

Population Statistics

2000 Est. Pop.: 218,920 people
Pop. Density: 282 persons/mi²

Land Cover (percent)

Forest/Wetland:	74%
Surface Water:	1%
Urban:	3%
Cultivated Crop:	1%
Pasture/ Managed Herbaceous:	21%

Counties

Buncombe, Haywood, Henderson, Madison, and Transylvania

Municipalities

Asheville, Black Mountain, Biltmore Forest, Canton, Fletcher, Hendersonville, Laurel Park, Montreat, Weaverville and Woodfin

In this subbasin, the French Broad River is a very wide river capable of supporting many species of warmwater gamefish. Of the five counties located in this subbasin, Buncombe and Henderson counties are expected to experience the largest increase in population by the year 2020 (22.3 and 28.7 percent increase, respectively). Population growth in these counties is expected to occur around Asheville and Hendersonville, which are the largest urbanized areas in the subbasin. Since 1990, Asheville has experienced a population increase of 11.4 percent, Hendersonville an increase of 50.2 percent, and Black Mountain has increased by 35.7 percent. The French Broad River, because of its proximity to these large urban areas, is a popular water-based recreational resource, and many of the tributaries have viable populations of brook trout. For more information related to population growth and trends, refer to Appendix I.

There are 67 individual NPDES wastewater discharge permits in this subbasin with a total permitted flow of 55.4 MGD. The largest is the Metropolitan Sewerage District – Water Reclamation Facility (MSD-WRF) in Buncombe County (40.0 MGD). There are also two individual NPDES stormwater permits. Significant issues related to compliance with NPDES permit conditions are discussed in the following sections. Asheville, Biltmore Forest, Black Mountain, as well as Buncombe and Henderson counties, will be required to develop stormwater programs under Phase II. Refer to Appendix VI for more information on NPDES permit holders and to Section 13.2 for information related to the state's stormwater programs. There are seven registered animal operations in this subbasin.

A map including the locations of NPDES discharges and water quality monitoring stations is presented in Figure 6. Table 6 contains a summary of assessment units and lengths, streams monitored, monitoring data types, locations and results, along with use support ratings for waters in this subbasin. Refer to Appendix X for a complete listing of monitored waters and more information about use support ratings.

Figure 6 French Broad River Subbasin 04-03-02

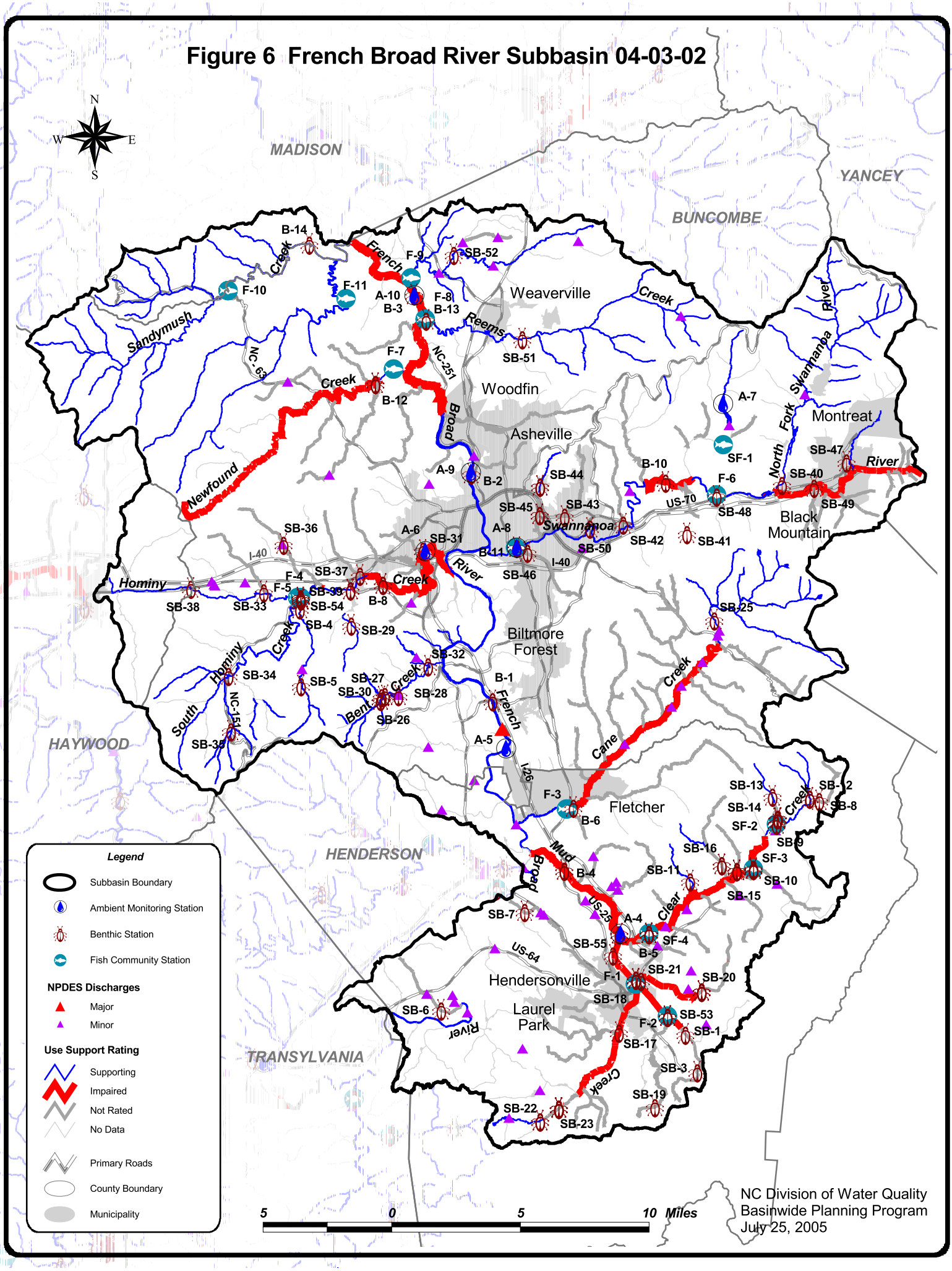

Table 6 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 040302

Assessment Unit #	Name	Length/Area		AL	REC	Benthic Community			Fish Community			Ambient Data	
6-(27)d	FRENCH BROAD RIVER	4.4	Miles	S	S							A-3	nce
6-(54.5)b	FRENCH BROAD RIVER	8.2	Miles	S	I	B-1	GF	2002				A-5	Bacteria
6-(54.5)c	FRENCH BROAD RIVER	18.3	Miles	S	S	B-2	G	2002				A-9	nce
6-(54.5)d	FRENCH BROAD RIVER	6.4	Miles	I	S	B-3	F	2002				A-10	nce
6-(54.5)e	FRENCH BROAD RIVER	3.9	Miles	I	S	B-3	F	2002				A-10	nce
6-47	Gash Creek	3.7	Miles	NR	ND	SB-6	NR	2002					
6-51	Mill Pond Creek	3.1	Miles	NR	ND	SB-7	NR	2002					
6-55-11-(1)a	Clear Creek	2.7	Miles	NR	ND	SB-8	NR	2000					
6-55-11-(1)b	Clear Creek	2.5	Miles	S	ND	SB-9	GF	2000	SF-2	GF	2001		
6-55-11-(1)c	Clear Creek	2.1	Miles	I	ND	SB-10	P	2001	SF-3	F	2001		
6-55-11-(5)	Clear Creek	6.5	Miles	I	ND	B-5	P	2000	SF-4	GF	2001		
6-55-11-11	Harper Creek	2.6	Miles	S	ND	SB-11	E	2000					
6-55-11-2	Laurel Fork	2.3	Miles	S	ND	SB-12	E	2000					
6-55-11-3a	Cox Creek	1.5	Miles	S	ND	SB-13	NI	2000					
6-55-11-3b	Cox Creek	1.1	Miles	NR	ND	SB-14	NR	2001					
	Cox Creek	1.1	Miles	NR	ND	SB-14	NR	2000					
6-55-11-7	Mill Creek	2.4	Miles	NR	ND	SB-15	NR	2001					
6-55-11-8	Kyles Creek	4.1	Miles	NR	ND	SB-16	NR	2001					
6-55-8-1-2-(1)	King Creek [McCabe Pond, Jordans Lake, Bonclarken Lake, Madonna Lake (Highlands Lake)]	4.8	Miles	NR	ND	SB-19	NR	2000					
6-55-8-1a	Bat Fork	4.8	Miles	NR	ND	SB-3	NR	2000					
	Bat Fork	4.8	Miles	NR	ND	SB-1	NR	2001					
6-55-8-1b	Bat Fork	1.5	Miles	I	ND	SB-53	NR	2001	F-2	P	2002		
6-55-8-2a	Devils Fork	3.4	Miles	NR	ND	SB-20	NR	2000					
6-55-8-2b	Devils Fork	2.7	Miles	I	ND	SB-21	P	2000					
6-55a	Mud Creek	2.4	Miles	S	ND	SB-22	NI	2000					
6-55b	Mud Creek	1.9	Miles	NR	ND	SB-23	NR	2000					
6-55c	Mud Creek	11.0	Miles	I	S	SB-55	F	2000	F-1	P	2002	A-4	nce

Table 6 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 040302

Assessment Unit #	Name	Length/Area		AL	REC	Benthic Community			Fish Community			Ambient Data	
6-55c	Mud Creek	11.0	Miles	I	S	SB-17	F	2001	F-1	P	2002	A-4	nce
	Mud Creek	11.0	Miles	I	S	SB-18	P	2001	F-1	P	2002	A-4	nce
6-55d	Mud Creek	2.2	Miles	I	ND	B-4	P	2000					
6-57-(1)	Cane Creek	7.4	Miles	S	ND	SB-25	G	1999					
6-57-(9)a	Cane Creek	9.6	Miles	I	ND	B-6	F	2002					
6-57-(9)b	Cane Creek	2.4	Miles	S	ND				F-3	G	2002		
6-67-(1)	Bent Creek	3.5	Miles	S	ND	SB-27	E	2001					
	Bent Creek	3.5	Miles	S	ND	SB-26	E	2001					
	Bent Creek	3.5	Miles	S	ND	SB-26	NI	2001					
6-67-(7)	Bent Creek	3.0	Miles	S	ND	SB-28	GF	2001					
6-67-10	Wesley Creek (Bent Creek Ranch Lake)	1.9	Miles	S	ND	SB-32	NI	2001					
6-67-6	Boyd Branch	1.3	Miles	S	ND	SB-30	E	2001					
6-76-12	Canie Creek	2.3	Miles	NR	ND	SB-31	NR	2002					
6-76-4	Webb Branch	3.8	Miles	NR	ND	SB-33	NR	2002					
6-76-5	South Hominy Creek	12.4	Miles	S	ND	SB-54	GF	2002	F-5	G	2002		
6-76-5-3	Stony Fork	4.5	Miles	S	ND	SB-35	G	2002					
6-76-5-4	Warren Creek	3.5	Miles	S	ND	SB-34	G	2002					
6-76-5-8	Beaverdam Creek	6.2	Miles	S	ND	SB-5	NI	2002					
	Beaverdam Creek	6.2	Miles	S	ND	SB-4	G	2002					
6-76-6	Pole Creek	5.3	Miles	NR	ND	SB-36	NR	2002					
6-76-7a	Bill Moore Creek (Enka Lake)	2.9	Miles	S	ND	SB-29	NI	2002					
6-76-8	Moore Creek	3.2	Miles	NR	ND	SB-37	NR	2002					
6-76a	Hominy Creek	9.7	Miles	S	ND	SB-38	G	2002					
6-76b	Hominy Creek	3.1	Miles	S	ND				F-4	GF	2002		
6-76c	Hominy Creek	3.3	Miles	S	ND	SB-39	GF	2002					
6-76d	Hominy Creek	7.8	Miles	I	S	B-8	F	2002				A-6	nce
6-78-11-(13)	North Fork Swannanoa River	5.3	Miles	S	ND	SB-40	GF	2002					
6-78-15-(1)	Beetree Creek (Beetree Reservoir)	5.0	Miles	S	S							A-7	nce

Table 6 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 040302

Assessment Unit #	Name	Length/Area		AL	REC	Benthic Community			Fish Community			Ambient Data	
6-78-19	Christian Creek (Davis Lake)	4.5	Miles	S	ND	SB-41	G	1999					
6-78-20	Grassy Branch	4.2	Miles	NR	ND	SB-42	NR	1999					
6-78-22	Haw Creek	4.6	Miles	NR	ND	SB-43	NR	1999					
6-78-23a	Ross Creek (Lake Kenilworth)	2.6	Miles	S	ND	SB-44	NI	2002					
6-78-23b	Ross Creek (Lake Kenilworth)	1.1	Miles	NR	ND	SB-45	NR	2002					
6-78-23c	Ross Creek (Lake Kenilworth)	12.0	Acres	NR	ND							Lake Monitoring	nce
6-78-24	Sweeten Creek (Busbee Reservoir)	3.8	Miles	NR	ND	SB-46	NR	1999					
6-78-6-(4)	Flat Creek	3.0	Miles	S	ND	SB-47	GF	1999					
6-78a	Swannanoa River	7.0	Miles	I	ND	SB-49	F	2002					
6-78b	Swannanoa River	4.6	Miles	S	ND	SB-48	GF	2002	F-6	G	2002		
6-78c	Swannanoa River	2.6	Miles	I	ND	B-10	F	2002					
6-78d	Swannanoa River	11.5	Miles	S	S	SB-50	GF	2002				A-8	nce
	Swannanoa River	11.5	Miles	S	S	B-11	GF	2002				A-8	nce
6-84a	Newfound Creek	3.9	Miles	I	ND	B-12	F	2002					
6-84b	Newfound Creek	1.3	Miles	I	ND	B-12	F	2002					
6-84c	Newfound Creek	2.3	Miles	I	ND	B-12	F	2002					
6-84d	Newfound Creek	4.4	Miles	I	ND	B-12	F	2002					
6-84e	Newfound Creek	1.7	Miles	S	ND				F-7	G	2002		
6-87-(1)	Reems Creek	10.2	Miles	S	ND	SB-51	E	2002					
6-87-(10)	Reems Creek	4.5	Miles	S	ND	B-13	GF	2002	F-8	G	2002		
6-88	Flat Creek	11.1	Miles	S	ND	SB-52	GF	2002	F-9	G	2002		
6-92-(1)	Sandymush Creek	9.8	Miles	S	ND	B-14	G	2002					
6-92-(9)	Sandymush Creek	10.7	Miles	S	ND	B-14	G	2002	F-10	G	2002		
6-92-13	Turkey Creek	9.1	Miles	S	ND				F-11	G	2002		

Table 6 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 040302

Assessment Unit #	Name	Length/Area	AL	REC	Benthic Community	Fish Community	Ambient Data

Assessment Unit # - Portion of DWQ Classified Index where monitoring is applied to assign a use support rating.

Use Categories:	**Monitoring data type:**	**Bioclassifcations:**	**Use Support Ratings 2004**:	**Ambient Data**
AL - Aquatic Life	F - Fish Community Survey	E - Excellent	S - Supporting	nce - no criteria
REC - Recreation	B - Benthic Community Survey	G - Good	I - Impaired	ce - criteria exce
	SF - Special Fish Community Study	GF - Good-Fair	NR - Not Rated	
	SB - Special Benthic Community Study	F - Fair	ND - No Data	
	A - Ambient Monitoring Site	P - Poor		
		NI - Not Impaired		

There were 63 benthic macroinvertebrate community samples and 16 fish community samples (Figure 6 and Table 6) collected during this assessment period. Data were also collected from eight ambient monitoring stations and two lakes. Many of these observations are corroborated by data collected by the VWIN program (see Appendix V). Refer to the *2003 French Broad River Basinwide Assessment Report* at http://www.esb.enr.state.nc.us/bar.html and Appendix IV for more information on monitoring.

Waters in the following sections are identified by assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, 303(d) Impaired waters list and the various tables in this basin plan. The assessment unit number is a subset of the DWQ index number (classification identification number). A letter attached to the end of the AU# indicates that the assessment is smaller than the DWQ index segment. No letter indicates that the assessment unit and the DWQ index segment are the same.

Use support ratings for all waters in subbasin 04-03-02 are summarized in Section 2.2. Recommendations, current status and future recommendations for waters that were previously or newly Impaired are discussed in Section 2.3. Waters with noted water quality impacts are discussed in Section 2.4. Water quality issues related to the entire subbasin are discussed in Section 2.5. Refer to Appendix X for a complete list of monitored waters and more information on use support ratings.

2.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 04-03-02 in the aquatic life, fish consumption, recreation and water supply categories. There are no fish consumption advisories in this subbasin; therefore, all waters are No Data in the fish consumption category. In the water supply category, all waters are Supporting on an evaluated basis based on reports from DEH regional water treatment plant consultants.

There were 336.7 stream miles (35.7 percent) and 12.0 freshwater acres (2.7 percent) monitored during this assessment period in the aquatic life category. In the recreation category, 76.5 stream miles (8.1 percent) were monitored. A total of 83.8 stream miles (8.9 percent) are Impaired. This includes 8.2 miles Impaired for recreational use. Refer to Table 7 for a summary of use support ratings for waters in subbasin 04-03-02.

2.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2000) or are newly Impaired based on recent data. If previously identified as Impaired, the water will either remain on the state's 303(d) list or will be delisted based on recent data showing water quality improvements. If the water is newly Impaired, it will likely be placed on the 2006 303(d) list. The current status and recommendations for addressing these waters are presented below, and each is identified by an assessment unit number (AU#). Information regarding 303(d) listing and reporting methodology is presented in Appendix VII.

Table 7 Summary of Use Support Ratings by Category in Subbasin 04-03-02

Use Support Rating	Aquatic Life	Fish Consumption	Recreation	Water Supply
Monitored Waters				
Supporting	201.5 mi	0.0	68.3 mi	0.0
Impaired	74.6 mi	0.0	8.2 mi	0.0
Not Rated	60.6 mi 12.0 ac	0.0	0.0	0.0
Total	**336.7 mi 12.0 ac**	**0.0**	**76.5 mi 0.0 ac**	0.0
Unmonitored Waters				
Supporting	150.7 mi	0.0	0.0	68.6 mi 325.9 ac
Impaired	0.0	0.0	0.0	0.0
Not Rated	181.9 mi 30.8 ac	0.0	0.0	0.0
No Data	274.3 mi 397.6 ac	943.6 mi 440.4 ac	867.1 mi 440.4 ac	0.0
Total	**606.9 mi 428.4 mi**	**943.6 mi 440.4 ac**	**867.1 mi 440.4 ac**	**68.6 mi 325.9 ac**
Totals				
All Waters*	**943.6 mi 440.4 ac**	**943.6 mi 440.4 ac**	**943.6 mi 440.4 ac**	**68.6 mi 325.9 ac**

* Total Monitored + Total Unmonitored = Total All Waters.

2.3.1 Mud Creek Watershed

Mud Creek [AU# 6-55c and d]

2000 Recommendations

Mud Creek was Impaired due to habitat degradation from point and nonpoint sources of pollution. Nonpoint sources included urban and stormwater runoff as well as agricultural land use. The Hendersonville Wastewater Treatment Plant (WWTP) was operating under a Special Order of Consent (SOC) during the 2000 basin plan. The facility was under construction to increase its flow capacity and was meeting the effluent limits of the SOC. Local agencies were to assist in providing technical assistance and financial support for best management practices (BMPs) associated with a local dairy operation. Land-of-Sky Regional Council of Governments was to form a stakeholder group that was to develop an implementation plan to improve the water quality throughout the watershed.

Current Status

Mud Creek, from Little Mud Creek to the French Broad River (13.2 miles), is currently Impaired because of Poor or Fair bioclassification at sites B-4, SB-17, SB-18, SB-55, and F-1. Additional

sites at SB-22 and SB-23 are Not Rated (1.9 miles) and Not Impaired (2.7 miles) because data from these sites were inconclusive or too small to rate.

Most of the data collected in this watershed during the assessment period was part of the DWQ Watershed Assessment and Restoration Program (WARP) funded by the Clean Water Management Trust Fund (CWMTF). This intensive survey collected the following data: benthic macroinvertebrate; stream habitat assessment; morphology and riparian zone condition; water quality sampling to evaluate stream chemistry and toxicity; and characterization of watershed land use, conditions and pollution sources (NCDENR-DWQ, October 2002b). The study area included the Mud Creek watershed and its major tributary streams (discussed below).

The study found that aquatic organisms in the creek are impacted by toxicity, habitat degradation, storm flow scour from urban areas, and widespread stream degradation. Pesticides and urban toxicants are thought to be the cause of toxicity. Channelization, lack of riparian vegetation, and upland sedimentation are all potential causes of habitat degradation. Nutrient overloading is also widespread. The biological community may also have been adversely impacted by a four-year drought (1998 to 2002), although nonpoint source runoff impacts may have been minimized during this time.

A group of local stakeholders have organized as the Mud Creek Watershed Restoration Council. This group has developed a watershed plan and is moving into the implementation phase with the support of a full-time watershed coordinator housed at the Henderson County Cooperative Extension Service Center (NCCES). Working with the council, the NC Ecosystem Enhancement Program (EEP) helped develop a local watershed plan. The plan identifies sources of habitat and water quality impacts and makes recommendations to address these issues. Refer to *Current Water Quality Initiatives* for more information.

Hendersonville WWTP completed construction activities in March 2002. The newly constructed aeration facility is producing high quality effluent. The SOC has been removed and the facility is currently meeting its operating limits.

2005 Recommendations

DWQ will continue to monitor water quality in the Mud Creek watershed to study the causes of toxicity. Management strategies were developed as part of the WARP study, and DWQ recommends that the following strategies be implemented:

- Feasible and cost-effective stormwater retrofit projects should be implemented throughout the developed portions of the watershed.
- A program to address toxic inputs from developed areas should be created and implemented including source reduction and stormwater treatment methods.
- Stream channel restoration activities.
- BMPs to prevent pesticides from entering streams, including practices applicable to apple orchards.
- BMPs to minimize livestock access to streams.
- Post-construction stormwater management strategies, especially in rapidly developing areas, should be developed by Henderson County or the local municipality.

- Henderson County should develop local sediment and erosion control programs or NC Division of Land Resources (DLR) should refine its present program, with specific provisions to address smaller sites and road and site development on steep slopes.
- A watershed education program should be developed.

DWQ encourages the efforts of the Mud Creek Watershed Restoration Council and will partner with them as they implement management strategies in the watershed.

Water Quality Initiatives

Several water quality initiatives are underway throughout the Mud Creek watershed. Henderson County Soil and Water Conservation District (SWCD) in conjunction with the NRCS has closed three abandoned animal waste systems; installed 19 agrichemical handling facilities; converted 70 acres of conventional till vegetables to no-till farmland; purchased two precision sprayers to reduce pesticide over spray; installed 2,663 feet of fence to exclude livestock; and installed five watering tanks. Over $600,000 of funds from EQIP and the NC Agriculture Cost Share Program (NCACSP) was spent to install the BMPs. The district is currently seeking additional funds to purchase more precision sprayers and to examine the use of pheromone mediating mating disruptors.

In addition to the local SWCD, the Mud Creek Watershed Restoration Council was formed and consists of a diverse group that strives to improve and protect water quality throughout the Mud Creek watershed. The council has developed management strategies grouped into the following four categories: 1) stormwater; 2) nonpoint source pollution from agricultural activities; 3) habitat degradation; and 4) upland sources of sediment (Mud Creek Watershed Restoration Council, April 2003). Goals and objectives for each of these categories are listed below.

(1) *Stormwater*: Strategies are listed to address the volume, velocity and quality of post-construction runoff from existing and future roads and commercial and residential development.

- Educate citizens and businesses on stormwater issues and BMPs; create an awards program.
- Develop or refine stormwater management and floodplain development ordinances.
- Reduce impervious surfaces that create stormwater runoff and pollution; review building codes for low impact development opportunities.

(2) *Nonpoint Source Pollution from Agricultural Activities*: Strategies are listed to reduce pesticides, nutrients, sediment, and bacteria and other agriculture related nonpoint source pollution.

- Promote innovative pest management practices to minimize pesticide drift.
- Work with willing landowners to stabilize streams, establish vegetative buffers, and implement animal waste practices.

(3) *Habitat Degradation*: Strategies include those that improve aquatic habitat needed by aquatic organisms to survive and reproduce in a stream. The recommendations address the causes of habitat degradation including sedimentation, bank erosion, channelization, lack of riparian vegetation, loss of riffles or pools, loss of woody habitat, and streambed scour (i.e., flow that washes away habitat).

- Restore the most critically eroding streams and restore native vegetation along all streams.
- Educate landowners about the importance of riparian buffers.
- Protect high priority wetlands and riparian buffers in the watershed.

(4) *Upland Sources of Sedimentation*: Strategies also include those that reduce sediment pollution from construction activities and unpaved roads and driveways.

- Consider the benefits of a local sediment and erosion control program.
- Educate excavators and the public about how to control erosion.
- Reduce sediment pollution from unpaved roads, eroding roadbanks and roadside ditches.

Land use/cover information for the watershed was determined using 2001 aerial photography with an Integrated Pollution Source Identification (IPSI) system developed by the Tennessee Valley Authority (TVA). IPSI is a geographical information database that utilizes a number of physical factors to aid in identifying and prioritizing issues affecting water quality. From IPSI, it was determined that 45 percent of the land area is forest; 25 percent is used for residential, commercial or industrial purposes, and 23 percent consists of agricultural use including row crops, orchards, and cattle and horse pastures. Significant channelization and floodplain alteration has occurred throughout the watershed during the last 150 years. Woody debris is sparse, and the aquatic habitat is generally poor throughout the watershed. Without appropriate water quality protection, increasing urbanization in the watershed will likely exacerbate existing water quality problems. For additional information on local water quality initiatives in the Mud Creek watershed and contact information, refer to Chapter 16.

Because of the water quality problems noted throughout the Mud Creek watershed, it has been identified by NCEEP as one of 28 local watersheds in the basin with the greatest need and opportunity for stream and wetland restoration efforts. A local watershed plan was completed in 2003 and incorporated into the management strategies listed above. NCEEP is initiating two wetland restoration projects (totaling 15 acres) and one 2,000 linear foot stream restoration project in the Mud Creek watershed. Construction will begin in 2005. For a copy of the local watershed plan, visit www.nceep.net/services/lwps/Mud_Creek/mudcreek.htm.

Bat Fork [AU# 6-55-8-1b]

2000 Recommendations

Bat Fork was Impaired due to habitat degradation from nonpoint source inputs including agriculture as well as urban and nonurban development. Bat Fork could benefit from local initiatives that might include the formation of a citizens group to conduct stream cleanup efforts, assess the watershed for specific pollution sources, and identify possible solutions to nonpoint sources of pollution. Local agencies could pursue funding opportunities to reduce nonpoint

source pollution and to implement a watershed-wide education effort. DWQ will work with these various agencies to conduct further monitoring and assist with locating sources of funding.

Current Status
Bat Fork, from SR 1779 to Johnson Drainage Ditch (1.5 miles), is currently Impaired due to a Poor bioclassification at site F-2. Upstream sites, from source to SR 1779 (4.8 miles), are Not Rated due to the small stream size at sites SB-1 and SB-3. Bat Fork was sampled as part of the Mud Creek WARP study. A number of stressors impact Bat Fork, including toxicants, severe habitat degradation, and widespread stream degradation. Habitat degradation was the most severe and likely due to channelization, removal of riparian vegetation, upland sediment sources, and livestock access to the stream. In 2002, the lower Bat Fork monitoring site had the lowest scoring habitat in the basin.

Since March 2000, the General Electric (GE) Lighting Plant has been sending remediated groundwater and process waters to Hendersonville's WWTP. This change in operations has reduced impacts to Bat Fork, although the plant still discharges permitted stormwater to the creek. A local initiative is underway (the Mud Creek Watershed Restoration Project) which should address water quality concerns throughout the entire Mud Creek watershed and include Bat Fork.

2005 Recommendations
DWQ will continue to monitor the water quality in Bat Fork. It is recommended that local agencies work with landowners to install BMPs to improve the riparian zone and limit livestock access to streams. Since much of the stream is channelized with unstable streambanks, stream restoration activities are also desirable. For additional recommendations and water quality initiatives, refer to the Mud Creek recommendations listed above.

Devils Fork [AU# 6-55-8-2b]

Current Status and 2005 Recommendations
Devils Fork is Impaired, from the first unnamed tributary west of SR 1006 to Johnson Drainage Ditch (2.7 miles), due to a Poor bioclassification at site SB-21. This segment is located in a commercial/industrial section of Hendersonville where channelization has impacted water quality and riparian habitats. Upstream, Devils Fork, from source to the first tributary west of SR 1006 (3.4 miles), is currently Not Rated because of a Not Rated bioclassification. Although the monitoring site (SB-20) in this upstream segment is classified Not Rated, it was characterized by a degraded aquatic community.

Devils Fork was sampled as part of the Mud Creek WARP study. The study determined that Devils Fork suffers from exposure to toxicants, habitat degradation and nutrient enrichment. Upstream toxicants are likely pesticides from orchards and/or row crops, and downstream toxicants are from these same agricultural activities as well as urban areas. As with Bat Fork, habitat degradation was caused by channelization, removal of riparian vegetation, and upland sediment sources. It is recommended that local agencies work with landowners to install BMPs to improve the riparian zone and complete stream restoration activities. As Devils Fork is part of the Mud Creek watershed, refer to the Mud Creek recommendations and water quality initiatives listed above.

Clear Creek [AU# 6-55-11-(1)c and 6-55-11-(5)]

2000 Recommendations
Clear Creek is a large tributary of Mud Creek and consists of forested and agricultural land use. Special studies revealed that pesticide runoff from apple orchards were impacting the aquatic organisms in the stream. Local agencies should pursue funding opportunities to reduce nonpoint source pollution and implement BMPs. DWQ will work with the various agencies to conduct further monitoring and assist with locating sources of funding.

Current Status
Clear Creek, from Puncheon Camp Creek to Mud Creek (8.6 miles), is currently Impaired because of Poor bioclassification at sites B-5 and SB-10 and a Fair bioclassification at site SF-3. Although characterized by impacted aquatic communities, upper segments of Clear Creek, from source to Puncheon Camp Creek (5.2 miles), are Not Rated due to the small stream size at SB-8 and Supporting due to Good-Fair bioclassification at SB-9 and SF-2.

Clear Creek was sampled as part of the Mud Creek WARP study. The study determined that the primary cause of impairment in the lower segment is exposure to toxicants most likely associated with farming activities. Habitat degradation and elevated nutrients are secondary issues for the biological community. In addition, two tributaries leading to Clear Creek (Cox Creek and Mill Creek) were identified and characterized by degraded biological communities similar to those identified in lower Clear Creek.

NCEEP helped develop a local watershed plan in concert with the Mud Creek Watershed Restoration Council. These plans identify sources of water quality impacts and make recommendations to address these impacts. In the Clear Creek watershed, 1,300 feet of stream restoration has been completed, and 6.4 acres of buffers have been installed as a result of the work of the council.

2005 Recommendations
DWQ will continue to monitor the water quality in Clear Creek. High concentrations of metals were found during storm events, and further study is needed to identify the source of these metals and their impact on water quality. It is recommended that local agencies work with landowners to install BMPs on apple orchards and tomato farms to reduce the amount of pesticides entering the stream. For additional recommendations and water quality initiatives, refer to Mud Creek *2005 Recommendations*.

2.3.2 Hominy Creek [AU# 6-76d]

2000 Recommendations
Hominy Creek was Impaired due to nonpoint source pollution most likely associated with urban and nonurban development and agricultural activities. Funding and implementation of agricultural BMPs, including chemical handling facilities, is needed in order to reduce habitat degradation and impacts to water quality from nonpoint sources. DWQ will work with the various agencies to conduct additional monitoring and assist agency staff with locating sources of water quality protection funding.

Current Status

Hominy Creek, from the source to Moore Creek (16.1 miles), is Supporting due to a Good-Fair bioclassification at SB-39 and F-4 and a Good bioclassification at site SB-38. Hominy Creek, from Moore Creek to the French Broad River (7.8 miles), however, is currently Impaired due to a Fair bioclassification at site B-8. This site is near the community of Enka, downstream of the BASF discharge. Conductivity was much higher below the discharge, and there were many pollution tolerant macroinvertebrates collected, which suggests that this portion of Hominy Creek may be impacted by toxicity. The stream also has showed evidence of severe habitat degradation including bank erosion and poor riparian buffers. The downstream portion of Hominy Creek is urbanized. A special study found that many of the problems facing Hominy Creek may be attributed to development directly next to the stream (NCDENR-DWQ, 2002a).

2005 Recommendations

DWQ will continue to monitor water quality in Hominy Creek and work with other local agencies to study the toxic impacts affecting this stream. BASF is no longer discharging to Hominy Creek, which may result in a higher bioclassification rating during the next sampling cycle. It is recommended that local agencies work with landowners to install BMPs to improve the riparian zone and complete stream restoration activities. These practices will improve habitat and stabilize eroding banks. In addition, care should be taken during development to minimize erosion and sedimentation of the stream, and an area of natural vegetation should be maintained adjacent to the stream. It is recommended that local efforts work together and focus on this watershed for water quality improvement.

Water Quality Initiatives

Through the NC Agriculture Cost Share Program (NCACSP) and Agriculture Sediment Initiative, the Buncombe County Soil and Water Conservation District (BCSWCD) was provided $35,000 in cost share funding for BMPs in the Hominy Creek watershed. Implementation of several BMPs is currently underway. For more information on either of these programs, refer to Chapter 11.

Because of the water quality impairment noted above, Hominy Creek has been identified by NCEEP as one of 28 local watersheds in the basin with the greatest need and opportunity for stream and wetland restoration efforts. This watershed will be given higher priority than nontargeted watersheds for implementation of NCEEP restoration projects.

2.3.3 French Broad River [AU# 6-(54.5)b, d and e]

Current Status

The French Broad River [AU# 6-(54.5)b], from Mud Creek to NC 146 (8.2 miles), is Supporting in the aquatic life category due to a Good-Fair bioclassification at site B-1. This same segment, however, is Impaired in the recreation category due to a standards violation for fecal coliform bacteria. During annual screening in 2002, the ambient monitoring station (A-5) at Glenn Bridge Road (SR 3495) near Skyland exceeded the water quality screening criteria for fecal coliform bacteria. Subsequent monitoring of five samples in 30 days is required by DWQ assessment methodology to confirm the fecal coliform levels and determine if it exceeds the state standard. This additional monitoring reported fecal coliform bacteria levels above the standard. Excessive rainfall in the two years of monitoring (Fall 2002 through 2003) caused extremely high flows in

the French Broad River. The associated nonpoint runoff from the precipitation events may have caused the higher than normal bacteria levels.

Regional DWQ staff and the Buncombe County Metropolitan Sewerage District – Water Reclamation Facility (MSD-WRF) are working to identify possible sources of the elevated fecal coliform bacteria. The specific source has not been identified; however, the regional staff and MSD-WRF were able to eliminate an MSD-WRF pump station as a potential source. This pump station force main crosses the French Broad River, and no leaks or damage was found in the line. Given that land use in this segment of the river is dominated by agricultural pastureland, it is likely that the potential source of fecal coliform bacteria is associated with nonpoint source runoff during heavy rain events.

From NC 146 to Craggy Dam (17.9 miles), the French Broad River [AU# 6-(54.5)c] is Supporting in the aquatic life category due to a Good bioclassification at site B-2. No standards violations were reported for fecal coliform bacteria at the ambient monitoring station A-9; therefore, this segment is also Supporting in the recreation category. This site has been sampled seven times since 1983 and has steadily increased from Fair (1983 and 1985) to Good-Fair (1987, 1992 and 1997) to the most recent Good (2002) bioclassification. Like much of the French Broad River, this section receives runoff from both point and nonpoint sources including the City of Asheville and surrounding agricultural land. Substrate was a good mix of boulders and rubble, and the macroinvertebrate community has been fairly stable since 1992.

The French Broad River [AU# 6-(54.5)d and e], from Craggy Dam to Sandymush Creek (10.3 miles), is Impaired in the aquatic life category due to a Fair bioclassification at site B-3. Craggy Dam (Section 14.2) is a "run-of-river" dam that could potentially slow the flow of the river during drought conditions, consequently impacting the benthic community downstream. Specific conductivity was slightly higher at this site than at the upstream site B-2 (~90 μmhos/cm compared to ~50 μmhos/cm). The stream substrate was a good mix of boulders and rubble.

Like much of the river, this section is impacted by runoff from both point and nonpoint sources (i.e., agriculture, stormwater, etc.) and has historically received Fair (1990 and 1992) and/or Good-Fair (1997) bioclassifications. The improvement to Good-Fair in 1997 was most likely associated with treatment and operation upgrades at MSD-WRF. No violations of the discharge permit were reported from 2000 to 2002, and information provided by MSD-WRF shows that instream waste concentration of the discharge was less than 5% of the river's flow during July 2002. This section of the river also receives water from Newfound Creek and Reems Creek. Both of these watersheds have historically been impacted by both urban and agricultural runoff. For more information on either of these watersheds, refer to Sections 2.3.5 and 2.4.1, respectively.

Overall, the aquatic community in this stretch of the river has historically received low (Fair) and/or marginal (Good-Fair) bioclassifications. Based on these low and marginal bioclassifications, this segment is considered Impaired based on the most recent sampling data. DWQ will continue to monitor this segment of the French Broad River and continue to work with the City of Asheville as they develop a Phase II stormwater program to minimize impacts from both point and nonpoint sources.

2005 Recommendations

A total maximum daily load (TMDL) should be developed to identify and address the elevated fecal coliform bacteria levels found in the river from Mud Creek to NC 146 (8.2 miles). It is recommended that the adjacent segments of the French Broad River be included in this TMDL so that the source of the fecal coliform can be identified and targeted for reduction. Prior to scheduling and developing a TMDL, DWQ staff will continue to work with other agencies and organizations to attempt to track and remedy sources of bacteria. Continued follow-up monitoring is being conducted in this more normal flow year of 2004 to assess the persistence of fecal coliform bacteria.

DWQ will also continue to monitor benthic macroinvertebrates along the entire mainstem of the French Broad River and work with local agencies to identify impacts from point and nonpoint sources.

Water Quality Initiatives

MSD-WRF is continually investing funds into its aggressive sewer rehabilitation program and has completed several projects throughout the county. The results have reduced the amount of sanitary sewer overflows, and no permit violations were reported from 2000 to 2002. For more information about MSD-WRF, visit their website at www.msdbc.org.

2.3.4 Swannanoa River [AU# 6-78a and c]

2000 Recommendations

Swannanoa River was not Impaired, but impacts to water quality are evident along the entire length of the river. DWQ recommends a strategy of monitoring the river to identify sources of sediment. Sediment controls should be enhanced and in accordance with regulations or ordinances to prevent further impacts to habitat and water quality along the Swannanoa River.

Current Status

The Swannanoa River, from source to the North Fork Swannanoa River (7.0 miles), is currently Impaired because of Fair bioclassification at site SB-49. The river is also Impaired from Beetree Creek to Bull Creek (2.6 miles) due to a Fair bioclassification at site B-10.

Segments of the Swannanoa River, from the North Fork of the Swannanoa River to Beetree Creek (4.6 miles) and from Bull Creek to the French Broad River (11.5 miles), are currently Supporting because of Good-Fair bioclassification at sites B-11, SB-48 and SB-50 and a Good bioclassification at site F-6.

Much of the data collected in this watershed during the assessment period was part of special study to prioritize projects for conservation and restoration (NCDENR-DWQ, January 2003). All of the sample sites on the Swannanoa River indicate water quality problems. These include: habitat degradation; poor riparian buffer zones; nutrient enrichment; sedimentation; channelization; and toxicity. Many of these problems may be attributed to urban/residential runoff and development. The lower portion of the river (near Biltmore Forest) has improved over time, progressing from Poor or Fair in the 1980s to Good-Fair in the 1990s. The middle section, however, still has a Fair bioclassification, and there are indications of water quality decline over time.

2005 Recommendations

DWQ will continue to monitor water quality in the Swannanoa River watershed. It is recommended that additional monitoring sites be included in the next cycle of basin sampling to determine the quality of headwater streams. Evaluating these type of streams will require the development of a headwater stream sampling protocol and criteria (see Appendix IV). Once data have been compiled on these headwater streams, it is recommended that the headwaters be prioritized and targeted for conservation easements.

It is also recommended that the municipalities along the river develop local stormwater plans to address problems generated due to the changing land use in this watershed. Local planning efforts, including zoning ordinances, should be considered to protect natural resources and guide development. In addition, local governments and organizations should work to demonstrate innovative BMPs on new developments. These pilot projects would be useful tools in trying new practices and learning what works for developments in Western North Carolina. All of these projects could be incorporated into Buncombe County's NDPES Phase II stormwater program. The projects could be very effective if Black Mountain, Swannanoa and other communities joined in this effort to create a regional initiative.

Water Quality Initiatives

Throughout the Swannanoa River watershed, there are a variety of county and local initiatives underway. On the county level, Buncombe County has an agreement in place with many of the municipalities along the river to handle erosion control plans associated with new construction activities. Working with the Buncombe County Soil and Water Conservation District (BCSWCD), amendments were added to the county erosion control and subdivision ordinances to limit the density of development on steep slopes (scale related to percent slope). These efforts should help control nonpoint runoff from new development sites along the river.

Two other major funding initiatives are underway in the Swannanoa River watershed and include projects under Section 319 and CWMTF for the Swannanoa Watershed Urban Cost Share Program and the Azalea Park-Blue Ridge Parkway Restoration Project, respectively. These projects are both being managed by a full-time watershed coordinator with RiverLink, who has also been tasked with assessing nonpoint source activities and water quality impacts throughout the entire Swannanoa River watershed.

As part of the Swannanoa Watershed Urban Cost Share Program, a watershed assessment was completed using the Integrated Pollution Source Index (IPSI) developed by the Tennessee Valley Authority (TVA). IPSI is a geographical information database that utilizes a number of physical factors to aid in identifying and prioritizing issues affecting water quality. With this information, RiverLink was able to identify nonpoint source pollution problems within urbanized areas of the Swannanoa River watershed and determine which areas are best suited for restoration and preservation activities.

Besides the IPSI, funding provided for the Swannanoa Watershed Urban Cost Share Program was used for two projects in the Town of Black Mountain and three projects in the Haw Creek watershed (AU# 6-78-22). These projects are described below.

Near the headwaters in the Town of Black Mountain, RiverWalk Park was constructed to address nonpoint source pollution, particularly runoff associated with impervious surfaces and rooftops

from the Bi-Lo shopping complex. The park treats runoff from approximately 1.5-acres of impervious surfaces. One wetland and one bio-retention pond (rain garden) were constructed and were designed to hold water for 24 hours. Besides runoff treatment, the park will also serve as an educational BMP site for local schools, government officials and local citizens. The park was constructed with $37,000 of Section 319 grant money and involved the help of the Town of Black Mountain, the Urban Forestry Division, Quality Forward, Montreat College, Warren Wilson College, and numerous local volunteers.

The second project in Black Mountain is located behind the Black Mountain Center for the Arts. This project is located in the downtown area and catches runoff from three rooftops and the surrounding parking areas. Two rain gardens and one vegetated swale were constructed. Rain barrels have also been incorporated into the project. The project is being used as an urban stormwater BMP demonstration project and was constructed with $47,200 of Section 319 grant money.

The projects in the Haw Creek watershed are also demonstration projects and include both public and private property. At the Evergreen Community Charter School, two rain gardens, two vegetated swales, and one stormwater wetland are being constructed. The rain gardens and stormwater wetland will capture the majority of the runoff from the rooftop and parking areas during storm and rain events. In addition, the rain gardens and wetland are being incorporated into an environmental curriculum in the charter school and will include subjects such as water quality and aquatic habitats. This project was constructed using $60,000 of Section 319 grant money.

At the Charlie Bullman Athletic Field, invasive species will be removed and the native habitat will be restored. The athletic field is located in a residential area, adjacent to elementary schools, and is a part of the local parks system. Instream structures will be used to address 90-degree bends in the creek and eroding streambanks will be stabilized. Riffles and pools will also be added to improve the aquatic habitat. Each season 6 to 8 dump truck loads of clay are needed to maintain the fields. Vegetated swales and bio-retention cells (ponds) will be used to catch sediment runoff from the athletic fields. Sediment caught in the cells can be used again to maintain the fields. This project was funded using $40,000 of Section 319 grant money.

The third project in the watershed is located on private property and is located at the confluence of the mainstem of Haw Creek and a smaller tributary. Both streams receive runoff from local roads. Invasive plant species will be removed and native species will be planted to stabilize streambanks. A small wetland currently located on the site will be expanded and used to facilitate treatment of road runoff. Conservation easements will also be marked to protect the newly installed BMPs. This project is designed to demonstrate how homeowners can improve water quality in their own backyards. This project was constructed using $23,800 of Section 319 grant money.

Grant money from the CWMTF was used for the Azalea Park-Blue Ridge Parkway Restoration Project. Located in the area of Azalea Road, the Swannanoa River in this stretch is suffering from eroding streambanks and severe aquatic habitat decline. The goal of the project was to stabilize eroding banks, replant the riparian zone with native vegetation, modify the floodplain, and improve the stream habitat with the use of instream structural devices such as crossvanes and j-hooks to recreate pools and riffles throughout the project site. As a result, the project will

restore 1.3 miles of the mainstem of the Swannanoa River. This project should be completed in 2006 and will improve water quality by reducing sediment loading into the river system. It will also enhance recreational fishing opportunities.

Riverlink is also working with different groups and landowners to protect additional headwaters near the Town of Black Mountain and identifying potential BMP sites along private lands in the City of Asheville.

Because of the water quality impairments noted above, the Swannanoa River has been identified by NCEEP as one of 28 local watersheds in the basin with the greatest need and opportunity for stream and wetland restoration efforts. This watershed will be given higher priority than nontargeted watersheds for implementation of NCEEP restoration projects.

2.3.5 Newfound Creek [AU# 6-84a, b, c and d]

2000 Recommendations

Newfound Creek, although not considered Impaired based on 1997 data, remains on the state's 303(d) list. Sedimentation, turbidity, fecal coliform bacteria, and bank destabilization continue to be a concern for Newfound Creek. DWQ is proceeding with the development of a TMDL for fecal coliform bacteria.

Current Status

Newfound Creek, from source to Dix Creek (11.9 miles), is currently Impaired because of a Fair bioclassification at site B-12. The lower segment of Newfound Creek, from Dix Creek to the French Broad River (1.7 miles), is Supporting based on a Good bioclassification at site F-7.

The creek suffers from severe habitat degradation including streambank erosion, embedded substrate and poor riparian buffers. Samples collected in Newfound Creek show that the creek still has nutrient and organic enrichment problems, both of which are likely associated with agricultural land use (primarily dairy and beef cattle operations). Dairy waste management in the watershed has been effective in reducing the amount of organic particulates and increasing dissolved oxygen concentrations. The biological community may also have been adversely impacted by urban and residential development, as well as a four-year drought (1998 to 2002).

In February 2005, the U.S. Environmental Protection Agency (EPA) approved a TMDL for fecal coliform bacteria in Newfound Creek. The TMDL recommends a 92.8% reduction in fecal coliform bacteria loading to Newfound Creek. BMPs for animal operations, riparian buffers, and identification and repair of aging and/or failing septic systems should achieve the reduction goal. For more information on TMDL reports or to review a copy of the Newfound Creek TMDL, visit http://h2o.enr.state.nc.us/tmdl/.

2005 Recommendations

DWQ will continue to monitor water quality and fecal coliform bacteria levels in Newfound Creek. DWQ encourages the implementation of the Newfound Creek nonpoint source strategy plan and will assist agency personnel in locating sources of water quality protection funding. It is recommended that local agencies work with landowners to install BMPs to improve the riparian zone and limit livestock access to streams. Stream restoration activities are also desirable along the creek as the banks are eroding and unstable. As this watershed continues to

develop, a local sediment and erosion control program should be developed and implemented. This will likely require additional staffing at the local level.

Water Quality Initiatives

Many efforts by citizens and local agencies have been undertaken to improve water quality in the Newfound Creek watershed. Several dairies and dischargers have ceased operation; sedimentation and erosion control efforts are ongoing; and efforts are underway to improve on-site wastewater systems.

The Buncombe County Soil and Water Conservation District (BCSWCD) has developed a Newfound Creek watershed program and has a full-time watershed coordinator working in this area. A nonpoint source strategy plan was completed in 2000 through a CWMTF grant of $118,865. Activities underway include: watershed education and outreach; water quality monitoring; and BMP installation. Over $100,000 from the NC Agriculture Cost Share Program (NCASCP) has been spent in the watershed for BMPs. The Pigeon River Fund has also contributed $23,900 towards this project for workshops, water quality monitoring equipment, watershed signs, newsletters, and brochures.

A grant through EPA Section 319 ($416,250) provided funding for staff and equipment, helped gain a new USGS gauge on Jenkins Valley Road, provided funding for an Integrated Pollution Source Inventory (IPSI) by TVA, and funding for the installation of several BMPs. Under the grant, BCSWCD installed 31 BMPs on a total of 10 acres of land. Total annual soil loss before the BMPs were installed was 2,606.1 tons/site. After installation, 89.9 tons/site were reported. As a direct result of the district's efforts in the watershed, an estimated 2,156 tons/year of soil was eliminated from Newfound Creek and its tributaries. Projects included a variety of urban and agricultural BMPs such as septic system repairs, critical area treatments, and direct streambank stabilization along the mainstem of Newfound Creek.

In 2003, BCSWCD received a $415,000 CWMTF grant for additional BMPs and continued funding for a watershed coordinator. This existing grant allows for BMPs to be installed through May 2006. Through IPSI, BCSWCD identified severely eroded perennial streams, and the watershed coordinator is working with targeted community members to install BMPs along these streambanks.

Current water quality monitoring (November 2004) through the BCSWCD indicates Newfound Creek is still impacted by nonpoint sources including fecal coliform bacteria and sediment loss from urban development. Water quality monitoring stations are located at eight different sites throughout the Newfound Creek watershed where BMPs were or have the potential to be installed. BCSWCD is diligently encouraging landowners to improve water quality through conservation easements, cost share assistance and community outreach funded through the CWMTF. Education outreach in the form of Erosion Control Workshops, parent meetings at local schools, newsletter distributions, and site visits have increased the visibility of the watershed. For more information, refer to the *Newfound Creek Watershed Non-Point Source Strategy Plan: Preliminary Plan* (BCSWCD, December 2000) or visit http://www.buncombecounty.org/governing/depts/Soil/watershed.htm.

Because of the water quality impairment noted above, Newfound Creek has been identified by NCEEP as one of 28 local watersheds in the basin with the greatest need and opportunity for

stream and wetland restoration efforts. This watershed will be given higher priority than nontargeted watersheds for implementation of NCEEP restoration projects.

2.3.6 Ross Creek [AU#6-78-23b and c]

2000 Recommendations
A management strategy or TMDL approach will be used under the 303(d) process to address urban runoff, sediment and nutrient loads in Ross Creek. DWQ will coordinate and collaborate with local agencies over the next basinwide cycle to make progress towards this end.

Current Status
From I-240 to the backwaters of Lake Kenilworth (1.1 miles), Ross Creek is Not Rated due to a Not Rated bioclassification at site SB-45. This Not Rated segment of Ross Creek is located near Tunnel Road, a heavily urbanized area in the City of Asheville. In this area, potential impacts include urban stormwater runoff from a high percentage of impervious surfaces draining to the creek. DWQ noted evidence of habitat degradation including poor riparian zones, steep and eroding banks, and embedded substrate. Conductivity is also high, double that of the upstream monitoring site. Ross Creek was sampled as part of a special study to evaluate water quality concerns throughout the Swannanoa River watershed (NCDENR-DWQ, March 2003).

Ross Creek (Lake Kenilworth) is currently Not Rated (12.0 acres) due to lack of adequate number of samples. Potential problems associated with eutrophication were noted.

2005 Recommendations
DWQ will continue to monitor Ross Creek and will work with local agencies to identify the source of the high conductivity found in the downstream site. DWQ encourages the implementation of the Ross Creek Watershed Initiative developed by the Land-of-Sky Regional Council of Governments. DWQ will assist local personnel in locating sources of water quality protection funding for this watershed. It is also recommended that local agencies work to improve the riparian zone and design stream restoration activities to stabilize the eroding banks. This urban watershed would benefit from a local stormwater program including retrofitting sites with BMPs to improve water quality. Asheville is required to develop a Phase II stormwater program, and the Ross Creek watershed should be considered a priority for retrofit opportunities.

Water Quality Initiatives
Land-of-Sky Regional Council of Governments obtained funding from several sources, including the Pigeon River Fund and a Federal 205(j) grant, to address stakeholder awareness of this stream's urban characteristics and to develop a restoration plan for Ross Creek. Since initial funding of this project, the following activities have been conducted: intensive stream monitoring; a stream cleanup day; curb markings along Ross Creek storm drains; three stakeholder meetings; and preliminary identification of locations for stream restoration projects (Land-of-Sky Regional Council of Governments, 2001).

Because of the water quality impairment noted above, Ross Creek has been identified by NCEEP as one of 28 local watersheds in the basin with the greatest need and opportunity for stream and wetland restoration efforts. This watershed will be given higher priority than nontargeted watersheds for implementation of NCEEP restoration projects.

2.3.7 Cane Creek [AU#6-57-(9)a]

Current Status
Cane Creek, from Ashworth Creek to Cushion Branch (9.6 miles), is currently Impaired because of a Fair bioclassification at site B-6. This site declined significantly from the last sampling in 1997. Cane Creek is located in an area undergoing significant urban development and land use changes, particularly around the Town of Fletcher. DWQ will work with others to continue monitoring this stream to determine the stressors in this watershed.

Cane Creek, from Cushion Branch to the French Broad River (2.4 miles), is Supporting due to a Good bioclassification at site F-3. However, the recent widening of US 25 and the construction of a new bridge across the stream seems to have contributed large amounts of sediment to the stream.

2005 Recommendations
DWQ will work with the Town of Fletcher as it begins to develop its Phase II stormwater program and assist local agencies in identifying sources of water quality protection funding. In addition, a local sedimentation and erosion control plan should be developed. The expanding urban communities may also benefit from urban BMPs, watershed signs, newsletters and brochures geared toward water quality awareness.

Water Quality Initiatives
RiverLink is evaluating the existing and historic environmental conditions in the Cane Creek watershed. This evaluation will focus on ecological, hydrological and water quality changes in Cane Creek and provide a baseline in order to address ecosystem restoration and maintenance. RiverLink will develop a model to identify and prioritize protection and restoration projects. For more information, contact RiverLink or visit to www.riverlink.org.

Because of the water quality impairment noted above, Cane Creek has been identified by NCEEP as one of 28 local watersheds in the basin with the greatest need and opportunity for stream and wetland restoration efforts. This watershed will be given higher priority than nontargeted watersheds for implementation of NCEEP restoration projects.

2.3.8 Gash Creek [AU #6-47]

2000 Recommendations
Gash Creek was listed as Impaired due to nonurban development resulting in habitat degradation. Additional information needs to be obtained for this creek in order to develop appropriate management strategies for restoration. Golf and construction activities seem to be the primary concern within this watershed and should be the focus of a nonpoint source inventory.

Current Status and 2005 Recommendations
Gash Creek, from source to the French Broad River (3.7 miles), is currently Not Rated because of a Not Rated bioclassification at site SB-6. This stream could not be rated due to the small stream size at the time of sampling. Gash Creek drains agricultural and residential land, as well as a golf course. Water quality problems at this site include habitat degradation and organic enrichment. The Etowah Sewer Company has moved its discharge to the French Broad River since Gash Creek was last sampled in 1996. Unfortunately, the stream has not improved since

the removal of this discharge. The decline in water quality in 2002 may be attributed to a combination of poor habitat, low flows due to drought conditions during the time of sampling, upstream land practices, and an urbanizing landscape. Gash Creek remains on the 303(d) list of Impaired waters. It is recommended that local entities work with landowners to improve riparian buffers and habitat of Gash Creek.

2.3.9 Mill Pond Creek [AU #6-51]

2000 Recommendations

Mill Pond Creek was listed as Impaired due to nonpoint source pollution. Possible sources of contamination include a closed landfill (Henderson County Stony Mountain Road Landfill), a NC Department of Transportation (NCDOT) storage site, and/or upstream dischargers. The Volunteer Water Information Network (VWIN) consistently notes high levels of conductivity in Mill Pond Creek. DWQ will investigate and monitor this creek in order to develop appropriate management strategies.

Current Status and 2005 Recommendations

Mill Pond Creek, from source to the French Broad River (3.1 miles), is currently Not Rated because of a Not Rated bioclassification at site SB-7. This stream could not be rated due to its small size during the time of sampling. This small stream is located downstream from the Henderson County landfill and two wastewater dischargers. Residential development and on-going dam construction may also be impacting the creek. DWQ observations and monitoring indicate that this creek suffers from poor habitat conditions and high conductivity. The biological community was sparse indicating a toxic impact. DWQ will continue to monitor this stream and work with local agencies to identify and address the source of conductivity and toxicants. DWQ will also assist local personnel in locating sources of water quality protection funding for this watershed. It is recommended that local agencies work to improve the riparian zone and complete stream restoration activities to improve habitat.

2.3.10 South Hominy Creek [AU# 6-76-5]

2000 Recommendations

South Hominy Creek was listed as Impaired due to nonpoint source runoff associated with urban stormwater runoff, non-urban development activities, and agricultural runoff. The water quality in South Hominy Creek declined significantly from the first basinwide sampling period going from a Good-Fair to a Poor bioclassification. DWQ will work with various local and county agencies to conduct further monitoring and assist in locating sources of water quality protection funding.

Current Status and 2005 Recommendations

South Hominy Creek, from source to Hominy Creek (12.4 miles), is currently Supporting because of a Good-Fair bioclassification at site SB-54 and a Good bioclassification at site F-5. South Hominy Creek is located in the Hominy watershed. Overall, the creek contains good aquatic habitats; however, there is evidence of streambank erosion, nutrient loading, livestock access, and partially embedded substrate. Many of these issues are being addressed at the local level by the BCSWCD.

Due to the current bioclassification and continuing local initiatives, DWQ recommends that South Hominy Creek be removed from the 2006 303(d) list of Impaired waters. In addition, DWQ will continue to monitor this watershed and be involved in the NCEEP project described below.

Water Quality Initiatives

In 2003, NCEEP began a local watershed planning project in the South Hominy Creek watershed. Its goals were to assess the function of watershed resources, determine mechanisms to improve stream and wetland integrity, and identify areas needing restoration, enhancement or preservation. NCEEP identified 13 sites where opportunities exist to improve watershed functions and water quality. The local watershed plan reviewed historical land use data and concluded that impacts to the watershed are most likely associated with adjacent land use, clearing of riparian buffers, and excess sediment due to bank erosion, land development, and/or unpaved road runoff. Four general types of projects were identified and include: preservation of watershed-riparian function; restoration of riparian corridors; enhancement of riparian corridors; and BMP installation and landowner education. The plan also recommends that additional data be collected to better characterize and prioritize management strategies (NCDENR-NCEEP, February 2004a). For more information, refer to the technical findings report available on-line at www.nceep.net/services/lwps/south_hominy_creek/southhominycreek.htm. The final local watershed plan should be available in the summer of 2005.

2.4 Status and Recommendations for Waters with Noted Impacts

The surface waters discussed in this section are not Impaired. However, notable water quality problems and concerns were documented for these waters during this assessment. Attention and resources should be focused on these waters to prevent additional degradation and facilitate water quality improvements. DWQ will notify local agencies of these water quality concerns and work with them to conduct further assessments and to locate sources of water quality protection funding. Additionally, education on local water quality issues and voluntary actions are useful tools to prevent water quality problems and to promote restoration efforts. Nonpoint source program agency contacts are listed in Appendix VIII.

2.4.1 Reems Creek [AU# 6-87-(10)]

Current Status and 2005 Recommendations

Reems Creek, from the bridge at US Highway 23 to the French Broad River (4.5 miles), is currently Supporting because of a Good-Fair bioclassification at site B-13 and a Good bioclassification at site F-8. Upstream, from source to the bridge at US Highway 23 (10.2 miles), Reems Creek received an Excellent bioclassification at site SB-51.

While the stream supports aquatic life, it contains elevated fecal coliform bacteria levels. In 2002, DWQ received a request to reclassify Reems Creek to Class B waters for primary recreational use. DWQ staff conducted the necessary sampling for this request in 2003 and found that the state standard for fecal coliform bacteria was exceeded. In this plan, the data window used to make use support assessments is 1997 to 2002. In the next basinwide plan, this stream will likely be Impaired for primary recreation due to fecal coliform bacteria. It is recommended that local entities study the watershed to identify sources of fecal coliform bacteria

and implement measures to reduce the bacteria levels. DWQ will assist in locating sources of water quality protection funding to address the issue of fecal coliform bacteria.

2.4.2 Gill Branch [AU# 6-76-12]

Current Status and 2005 Recommendations

DWQ did not have water quality data available during the plan's data window of 1997 to 2002; therefore, Gill Branch is currently rated No Data. Gill Branch is a tributary of Reems Creek; and in 2002, DWQ received a request to reclassify Gill Branch to Class B waters for primary recreational purposes. Recent sampling by DWQ (2003) indicates that Gill Branch has elevated levels of fecal coliform bacteria. The sampling found that the state standard for fecal coliform bacteria was exceeded. In the next basinwide plan, this stream will likely be Impaired for primary recreation due to fecal coliform bacteria. It is recommended that local entities study the watershed to identify sources of fecal coliform bacteria and implement measures to reduce this problem. DWQ will assist in locating sources of water quality protection funding to address fecal coliform bacteria.

2.4.3 Bent Creek [AU #6-67-(7)]

Current Status and 2005 Recommendations

Bent Creek, from the Powhatan Dam to the French Broad River (3.0 miles), is Supporting due to a Good-Fair bioclassification at site SB-28. This monitoring site is located below the Powhatan dam and a campground sewage disposal facility (Powhatan Recreational Area). The bioclassification may have been affected by low flow due to drought conditions during the time of sampling. This segment of the stream showed signs of habitat degradation compared to upstream sites, which received an Excellent bioclassification at sites SB-26 and SB-27. Bent Creek also exhibited signs of nutrient enrichment (NCDENR-DWQ, January 2002).

Since the dam and the campground sewage disposal facility are in close proximity to each other, DWQ could not separate out these impacts on water quality. Currently, there are no minimum flow requirements along the dam, and the campground is constructing a new sewage collection system. DWQ will work with the Powhatan Recreational Area to ensure that the sewage disposal facility is operating according to its permit.

2.4.4 North Fork Swannanoa River [AU #6-78-11-(13)]

Current Status and 2005 Recommendations

The North Fork Swannanoa River, from the Asheville Water Supply Dam to the Swannanoa River (5.3 miles), is Supporting due to a Good-Fair bioclassification at SB-40. Drought related conditions experienced throughout the basin from 1998 to 2002 may have impacted the benthic community along the North Fork creating habitat and water quality stress. Currently, there are no minimum flow requirements for the water supply dam. This also may have contributed to the Good-Fair bioclassification observed at this site. DWQ will continue to monitor water quality throughout the Swannanoa watershed and rely on local initiatives to address potential sources of nonpoint source pollution.

2.4.5 Flat Creek [AU #6-78-6-(4)]

Current Status and 2005 Recommendations

Flat Creek, from Big Piney Branch to the Swannanoa River (3.0 miles), is Supporting due to a Good-Fair bioclassification at site SB-47. Flat Creek is located in a residential area and flows through the Town of Montreat. As with many other streams throughout the Swannanoa watershed, impacts to Flat Creek may be associated with habitat and water quality stress due to drought conditions during the time of sampling. DWQ will continue to monitor water quality throughout the Swannanoa watershed and rely on local initiatives to address potential impacts from nonpoint source pollution.

2.4.6 Flat Creek [AU #6-88]

Current Status and 2005 Recommendations

Flat Creek, from source to the French Broad River (11.1 miles), is Supporting due to a Good-Fair bioclassification at SB-52 and a Good bioclassification at F-9. This watershed is located adjacent to and north of the Reems Creek watershed and drains the extreme northwest corner of Buncombe County where rolling pastures and hills characterize the landscape. Although the Good bioclassification for site F-9 was also found to be Good in 1997, DWQ observed an increase in more tolerant fish species and a less diverse community. Five NPDES facilities are currently located in this watershed for a combined discharge of 0.13 MGD. DWQ will continue to monitor the fish community and aquatic habitat in this area. DWQ will also work to identify potential nonpoint source impacts.

2.4.7 Moore Creek [AU# 6-76-8]

Current Status and 2005 Recommendations

Moore Creek, from source to Hominy Creek (3.2 miles), is currently Not Rated due to a Not Rated bioclassification at site SB-37. This stream drains a residential area in Candler and suffers from habitat degradation including bank erosion and poor riparian buffers. It is recommended that local agencies work with landowners to improve the riparian zone adjacent to the stream. Stream restoration activities are also desirable along Moore Creek as the banks are eroding and unstable. Additional information and a more comprehensive watershed assessment are needed to determine the stressors contributing to the water quality conditions in Moore Creek.

2.4.8 Canie Creek [AU# 6-76-12]

Current Status and 2005 Recommendations

Canie Creek, from the source to Hominy Creek (2.3 miles), is currently Not Rated because of a Not Rated bioclassification at site SB-31. This creek drains a mixture of residential and commercial land and was found to have the lowest water quality in the Hominy Creek watershed. The creek suffers from severe bank erosion, and rip-rap was used to stabilize portions of the bank. Canie Creek also had high conductivity and a narrow riparian area. It is recommended that local agencies work with landowners to improve the riparian zone adjacent to the stream. Using bioengineering solutions, stream restoration activities are also recommended to prevent any further impacts associated with erosion.

2.5 Additional Water Quality Issues within Subbasin 04-03-02

This section identifies those surface waters given an Excellent bioclassification, and therefore, may be eligible for reclassification to a High Quality Water (HQW) or an Outstanding Resource Water (ORW). It should be noted that these are streams that were sampled by DWQ during this basinwide cycle. There may be other tributaries eligible for reclassification in addition to the ones listed below. For more information regarding water quality standards and classifications, refer to Chapter 8.

2.5.1 Surface Waters Identified for Potential Reclassification

Harper Creek (AU# 6-55-11-11)
Harper Creek, from source to Clear Creek (2.6 miles), is Supporting due to an Excellent bioclassification at site SB-11. The current DWQ classification is B Tr.

Laurel Fork (AU# 6-55-11-2)
Laurel Fork, from source to Clear Creek (2.3 miles), is Supporting due to an Excellent bioclassification at site SB-12. The current DWQ classification is C Tr.

Bent Creek [AU# 6-67-(1)]
Bent Creek, from source to the Powhatan Dam (3.5 miles), is Supporting due to an Excellent bioclassification at site SB-26 and SB-27. The current DWQ classification is B Tr.

Boyd Branch (AU# 6-67-6)
Boyd Branch, from source to Bent Creek (1.3 miles), is Supporting due to an Excellent bioclassification at site SB-30. The current DWQ classification is C.

Reems Creek [AU# 6-87-(1)]
Reems Creek, from source to US Highway 23 (10.2 miles), is Supporting due to an Excellent bioclassification at site SB-51. The current DWQ classification is C Tr.