Chapter 1
French Broad River Subbasin 04-03-01

Including the: West Fork, North Fork and Middle Forks of the French Broad River, Little River, French Broad River, Peter Weaver and Morgan Mill Creeks

1.1 Subbasin Overview

Subbasin 04-03-01 at a Glance

Land and Water Area

Total area:	215 mi²
Land area:	214 mi²
Water area:	1 mi²

Population

2000 Est. Pop.:	22,079 people
Pop. Density:	89 persons/mi²

Land Cover (percent)

Forest/Wetland:	89%
Water:	<1%
Urban:	2%
Cultivated Crop:	3%
Pasture/ Managed Herbaceous:	6%

Counties

Henderson and Transylvania

Municipalities

Brevard and Rosman

Originating in Transylvania County, the headwaters of the French Broad and Little Rivers are in this subbasin. The headwater tributaries are generally high gradient streams capable of supporting viable trout populations. Most of this subbasin is forested, and half of the land area is permanently protected as part of the Pisgah National Forest. By the year 2020, population within Henderson and Transylvania counties is expected to increase by 28.7 and 14.7 percent, respectively. Of particular concern is residential and urban development occurring in the surrounding areas of Brevard and Rosman. Since 1990, Brevard alone has experienced a 26.0 percent increase in population. Consequently, streams in these areas may be negatively impacted by sediment and streambank erosion commonly associated with development activities.

There are 15 individual NPDES wastewater discharge permits in this subbasin with a total permitted flow of 32.98 MGD. The largest are RFS Ecusta, Inc. (27.5 MGD), City of Brevard WWTP (2.5 MGD), and AGFA Corporation (2.4 MGD). Refer to Appendix VI for more information on NPDES permit holders. Issues related to compliance with NPDES permit conditions are discussed below in Section 1.3 for Impaired waters and in Section 1.4 for other waters. Information regarding population growth and trends can be found in Appendix I. There are no registered animal operations in this subbasin.

A map including the locations of NPDES discharges and water quality monitoring stations is presented in Figure 5. Table 4 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.

There were 24 benthic macroinvertebrate community samples and four fish community samples (Figure 5 and Table 4) collected during this assessment period. Data were also collected from three ambient monitoring stations. 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.

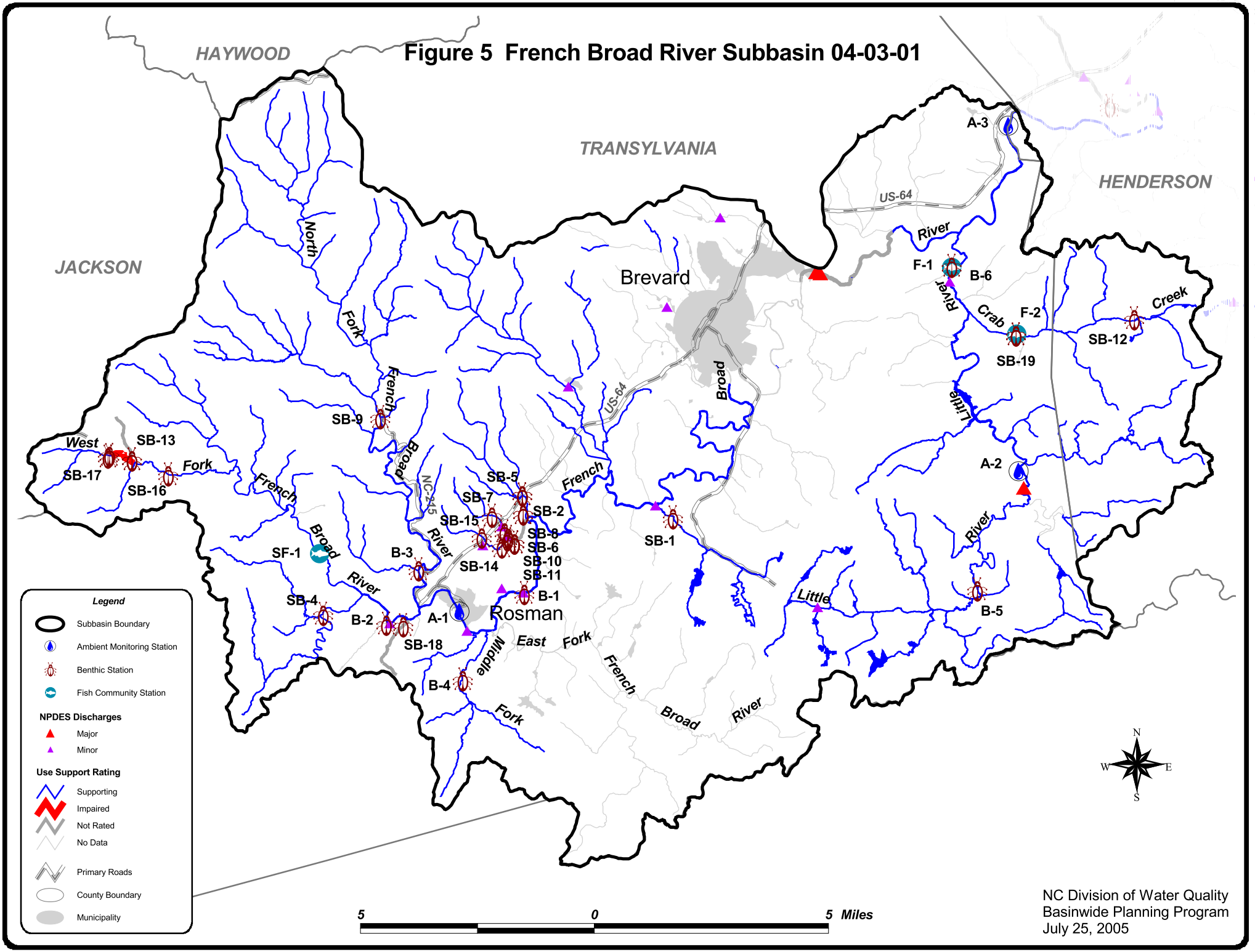
Figure 5 French Broad River Subbasin 04-03-01
HAYWOOD
TRANSYLVANIA
HENDERSON
JACKSON
Brevard
Rosman
US-64
NC-215
North Fork French Broad River
West Fork French Broad River
Middle Fork French Broad River
East Fork French Broad River
Little River
Crab Creek
Broad River
Little River
SB-9
SB-13
SB-17
SB-16
SB-5
SB-7
SB-15
SB-2
SB-8
SB-6
SB-10
SB-11
SB-14
SB-1
SB-4
SB-18
SB-12
SB-19
F-1
B-6
F-2
A-3
A-2
B-5
SF-1
B-3
B-2
A-1
B-1
B-4
Legend
Subbasin Boundary
Ambient Monitoring Station
Benthic Station
Fish Community Station
NPDES Discharges
Major
Minor
Use Support Rating
Supporting
Impaired
Not Rated
No Data
Primary Roads
County Boundary
Municipality
5 0 5 Miles
N
W
E
S
NC Division of Water Quality
Basinwide Planning Program
July 25, 2005

Table 4 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 040301

Assessment Unit #	Name	Length/Area		AL	REC	Benthic Community			Fish Community			Ambient Data	
6-(1)	FRENCH BROAD RIVER	19.7	Miles	S	S	B-1	E	2002				A-1	nce
6-(27)c	FRENCH BROAD RIVER	8.8	Miles	S	S							A-3	nce
6-10-1a	Morgan Mill Creek (Kaiser Lake)	1.7	Miles	S	ND	SB-7	NI	2000					
6-10-1b	Morgan Mill Creek (Kaiser Lake)	0.2	Miles	S	ND	SB-8	NI	2000					
6-10-1c	Morgan Mill Creek (Kaiser Lake)	0.1	Miles	NR	ND	SB-6	NR	2001					
6-10a	Peter Weaver Creek	2.3	Miles	S	ND	SB-14	NI	2000					
	Peter Weaver Creek	2.3	Miles	S	ND	SB-10	NI	2001					
	Peter Weaver Creek	2.3	Miles	S	ND	SB-15	NI	2001					
6-10b	Peter Weaver Creek	0.8	Miles	NR	ND	SB-11	NR	2001					
6-11	Cherryfield Creek	4.1	Miles	S	ND	SB-2	NI	2001					
6-11-3	Mason Creek	2.6	Miles	S	ND	SB-5	NI	2001					
6-2-(0.5)a	West Fork French Broad River	1.4	Miles	S	ND	SB-17	NI	2001					
6-2-(0.5)b	West Fork French Broad River	0.6	Miles	I	ND	SB-13	F	2001					
6-2-(0.5)c	West Fork French Broad River	5.0	Miles	S	ND	SB-16	G	2001					
6-2-(7.5)	West Fork French Broad River	4.8	Miles	S	ND	B-2	E	2002	SF-1	NR	1997		
6-20b	Carson Creek	2.8	Miles	S	ND	SB-1	E	2002					
6-2-10	Flat Creek	1.2	Miles	S	ND	SB-4	E	2002					
6-2-12	Woodruff Branch	1.5	Miles	NR	ND	SB-18	NR	1998					
6-3-(6.5)	North Fork French Broad River	10.1	Miles	S	ND	B-3	E	2002					
	North Fork French Broad River	10.1	Miles	S	ND	SB-9	G	2002					
6-38-(1)	Little River (Cascade Lake)	14.8	Miles	S	S	B-5	G	2002				A-2	nce
6-38-(20)	Little River	4.9	Miles	S	ND	B-6	GF	2002	F-1	GF	2002		
6-38-23	Crab Creek	5.4	Miles	S	ND	SB-12	NI	2000	F-2	G	2002		
	Crab Creek	5.4	Miles	S	ND	SB-19	G	2000	F-2	G	2002		
6-5	Middle Fork French Broad River	4.1	Miles	S	ND	B-4	E	2002					

Table 4 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 040301

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		

Waters in the following sections are identified by an 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 04-03-01 are summarized in Section 1.2. Recommendations, current status and future recommendations for previously or newly Impaired waters are discussed in Section 1.3. Waters with noted water quality impacts are discussed in Section 1.4. Water quality issues related to the entire subbasin are discussed in Section 1.5. Refer to Appendix X for a complete list of monitored waters and for more information about use support ratings.

1.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 04-03-01 in the aquatic life, recreation, fish consumption 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 96.8 stream miles (23.1 percent) monitored during this assessment period in the aquatic life category. Approximately 0.6 stream miles (<1 percent) are Impaired. Refer to Table 5 for a summary of use support ratings for waters in subbasin 04-03-01.

1.3 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.

1.3.1 West Fork French Broad River [AU# 6-2-(0.5)b]

2000 Recommendations

The 1995 basinwide plan identified 0.5 miles of the West Fork French Broad River below the Whitewater Trout Farm as partially supporting. The plan recommended that a special study of trout farms be conducted to determine if current permit conditions are adequate to protect water quality. This site was not sampled during the 2000 basin cycle and remains on the 303(d) list of Impaired waters.

Table 5 Summary of Use Support Ratings by Category in Subbasin 04-03-01

Use Support Rating	Aquatic Life	Fish Consumption	Recreation	Water Supply
Monitored Waters				
Supporting	93.8 mi	0.0	43.2 mi	0.0
Impaired	0.6 mi	0.0	0.0	0.0
Not Rated	2.4 mi	0.0	0.0	0.0
Total	**96.8 mi 0.0 ac**	**0.0**	**43.2 mi 0.0 ac**	**0.0**
Unmonitored Waters				
Supporting	192.3 mi 82.7 ac	0.0	0.0	29.6 mi 97.6 ac
Impaired	0.0	0.0	0.0	0.0
Not Rated	4.1 mi	0.0	0.0	0.0
No Data	125.4 mi 97.6 ac	418.6 mi 180.3 ac	375.4 mi 180.3 ac	0.0
Total	**321.8 mi 180.3 ac**	**418.6 mi 180.3 ac**	**375.3 mi 180.3 ac**	**29.6 mi 97.6 ac**
Totals				
All Waters*	**418.6 mi 180.3 ac**	**418.6 mi 180.3 ac**	**418.6 mi 180.3 ac**	**29.6 mi 97.6 ac**

* Total Monitored + Total Unmonitored = Total All Waters.

Current Status

A 0.6-mile segment is currently Impaired due to a Fair bioclassification at site SB-13. In 2001, DWQ conducted a special study in the headwaters of the West Fork French Broad River. From this study, DWQ was able to determine that area trout farms are still having an impact on water quality despite the improvements in operations to reduce nutrient inputs by altering trout feed and capturing more solids. In addition to trout farm discharges, other factors including poor riparian habitats and livestock access to tributaries are also affecting water quality. The West Fork French Broad River has clear indicators of water quality problems, specifically nutrient enrichment evidenced by algae growth and an atypical fish community (NCDENR-DWQ, November 2003).

2005 Recommendations

DWQ will continue to work with Whitewater Trout Farm (also known as KB Farms) to reduce impacts to water quality through the NPDES general permit. It is recommended that local agencies work with landowners to install best management practices (BMPs) to improve the riparian zone and limit livestock access to streams.

1.3.2 Peter Weaver Creek [AU# 6-10a and b]

2000 Recommendations
Peter Weaver Creek, from Morgan Mill Creek to the French Broad River, was partially supporting for its use and was placed on the 303(d) list. More comprehensive benthic macroinvertebrate surveys were needed for DWQ to determine the extent of water quality problems and if the impacts were from a trout farm located on Morgan Mill Creek or other nonpoint sources. DWQ proposed to implement a water quality monitoring program in the watershed to identify which pollutants were causing the problems. Depending on the results of the intensive sampling, existing individual NPDES permit holders may be required to conduct upstream/downstream monitoring, and general NPDES permit holders may be required to obtain individual NPDES permits.

Current Status
Peter Weaver Creek, from source to Morgan Mill Creek (2.3 miles), is currently Supporting due to Not Impaired bioclassifications at sites SB-10, SB-14 and SB-15. Based on sampling criteria, the lower segment of the creek, from Morgan Mill Creek to the French Broad River (0.8 miles), is Not Rated at site SB-11. Observations made at the time of sampling, however, indicate that the biological community has degraded and may be responding to habitat and water quality problems associated with trout farm discharges and nonpoint runoff from residential areas, including a recreational vehicle park. Drought conditions may also be impacting this sampling site.

Samples at sites SB-10, SB-11, SB-14 and SB-15 were collected as part of a Watershed Assessment and Restoration Program (WARP) study on Peter Weaver and Morgan Mill (see Section 1.3.3) Creeks (NCDENR-DWQ, June 2002). This intensive survey collected the following data: benthic macroinvertebrate; stream habitat assessment; morphology and riparian zone condition; stream chemistry; and characterization of watershed land use conditions and pollution sources. The study determined that impacts in Peter Weaver Creek are due to: organic loading from a trout farm located on Morgan Mill Creek; prevention of downstream movement of aquatic invertebrates at the water intake dam of the trout farm; and habitat degradation manifested by sedimentation and substrate instability.

2005 Recommendations and Water Quality Initiatives
As part of the WARP study on Peter Weaver and Morgan Mill Creeks, management strategies were developed to restore the Impaired waters. The following are recommendations to improve water quality in both creeks:

- Local agencies should work with landowners to install BMPs focusing on livestock operations and exclusion.
- Stream restoration and streambank stabilization practices should be implemented with priority given to Peter Weaver and Morgan Mill Creeks.
- Sediment and erosion control practices should be improved. The NC Division of Land Resources (DLR) or Transylvania County should develop guidelines that better protect waters from the impacts of home and road development on steep slopes. Improved mechanisms for addressing the impacts of disturbances of less than one acre should also be developed. Staffing levels must be sufficient to support effective enforcement. Eroding bare areas along road banks and at home sites should be

stabilized with vegetation or regraded to an appropriate slope so that vegetation can be established.

- DWQ should continue monitoring to identify sources of high metal concentrations in area tributaries. Once identified, these sources should be eliminated, if possible.
- Transylvania County or the NC Division of Environmental Health (DEH) should survey residences for straight pipes and work with owners to eliminate them.
- A watershed education program should be developed and implemented with the goal of targeting homeowners in order to reduce current stream damage and prevent future degradation.

In addition to the above, DWQ in coordination with the NC Cooperative Extension Service (NCCES) has reexamined the waste management plan of the Morgan Mill Trout Farm. DWQ and NCCES made the following recommendations: reconstruct the intake structure; change the sediment flushing schedule and structure; modify the settling ponds; switch from an automatic feeding system to a manual feeding schedule with high yield food; and consider decreasing the size of the operation. DWQ and NCCES will continue to monitor the trout farm and assist in implementing the recommendations listed above.

1.3.3 Morgan Mill Creek [AU# 6-10-1a, b and c]

2000 Recommendations

Morgan Mill Creek, from the trout farm (US 64) to Peter Weaver Creek, was partially supporting for its use and was placed on the 303(d) list. Refer to Section 1.3.2 above for more information regarding Morgan Mill Creek.

Current Status

Morgan Mill Creek, from source to river mile 1.92, is currently Supporting due to Not Impaired bioclassifications at sites SB-7 and SB-8. Based on current sampling criteria, the lower segment of the creek, from river mile 1.92 to Peter Weaver Creek (0.1 mile), is currently Not Rated at site SB-6. Observations made at the time of sampling indicate that the biological community in this lower segment of Morgan Mill Creek has degraded in response to habitat and water quality problems. Drought conditions may also be impacting this sampling site.

The June 2002 WARP study for Peter Weaver Creek (see Section 1.3.2) also pertains to Morgan Mill Creek. Like Peter Weaver Creek, organic loading from Morgan Mill Trout Farm, prevention of downstream movement of aquatic invertebrates at the water intake dam, and habitat degradation, including sedimentation and substrate instability, are the limiting factors for the biological community.

2005 Recommendations and Water Quality Initiatives

DWQ will continue to monitor the water quality in Morgan Mill Creek. It is recommended that local agencies work with landowners to install the appropriat 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 management strategies, refer to Peter Weaver Creek (Section 1.3.2).

1.4 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.

1.4.1 Little River [AU# 6-38-(20)]

2000 Recommendations
Little River, from Cascade Lake Dam to the French Broad River (4.8 miles), was monitored by DWQ for benthic macroinvertebrates. Samples showed impacts to the aquatic habitats and water quality, both of which are likely associated with agricultural activities. BMPs are encouraged to reduce potential nonpoint pollution impacts.

Current Status
Little River, from Cascade Lake Dam to the French Broad River (4.9 miles), is currently Supporting due to Good-Fair bioclassifications at sites B-6 and F-1. This site consistently receives a Good-Fair, but usually has the fewest numbers of fish collected during sampling. The substrate of the stream has become more embedded since this site was last monitored in 1997, making sediment a concern for this stream. This watershed could also be impacted by agricultural activities that accelerate erosion and instream habitat degradation. Agricultural BMPs are encouraged to reduce future impacts.

Cascade Lake hydroelectric dam is located approximately 4 miles upstream of the sampling sites. In July 2002, the owner, Cascade Power Company, surrendered the license to operate the facility to the Federal Energy Regulatory Commission (FERC). The facility will no longer generate electricity, and the project will operate as a "run-of-river" with all flow going into the old bypass section. For more information, see Section 14.2.

2005 Recommendations
DWQ will continue to monitor Little River. DWQ will also work with local agencies to identify sediment sources and assist agency personnel to locate monies for water quality protection funding. It is recommended that local agencies work to install BMPs and implement a sediment and erosion control program. The NC Wildlife Resources Commission (WRC) has identified Little River as an area that supports listed and otherwise rare and sensitive aquatic species. Care should be taken to protect these species and their aquatic habitats.

Water Quality Initiatives
Since 1998, over $516,000 worth of BMPs have been installed throughout Transylvania County using money from the NC Agriculture Cost Share Program (NCACSP), the NRCS Environmental Quality Improvement Program (EQIP), the Clean Water Management Trust Fund (CWMTF), and Section 319. Using funds from CWMTF, the Transylvania County Soil and

Water Conservation District (SWCD) completed a watershed assessment for the Little River watershed. The project inventoried 4.9 miles of the Little River and determined and prioritized stream restoration and BMP opportunities. Streambank stabilization and livestock exclusion projects are currently in progress.

In addition to the efforts underway by Transylvania County SWCD, the Henderson County SWCD has installed 16,166 feet of fence, 13 watering tanks and 2 stream crossings along tributaries of the Little River. NCACSP provided funding in the amount of $40,903 for these projects.

Because of the potential water quality problems noted in Little River, it has been identified by the NC Ecosystem Enhancement Program (EEP) 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.

1.5 Additional Water Quality Issues within Subbasin 04-03-01

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.

1.5.1 Surface Waters Identified for Potential Reclassification

French Broad River [AU# 6-(1)]
The French Broad River, from source to Nicholson Creek (19.7 miles), is Supporting due to an Excellent bioclassification at site B-1. The current DWQ classification is B Tr.

Carson Creek (AU# 6-20b)
Carson Creek, from Carson Creek dam to the French Broad River (2.8 miles), is Supporting due to an Excellent bioclassification at site SB-1. The current DWQ classification is B Tr.

Flat Creek (AU# 6-2-10)
Flat Creek, from source to the West Fork French Broad River (1.2 miles), is Supporting due to an Excellent bioclassification at site SB-4. The current DWQ classification is C Tr.

Middle Fork French Broad River (AU# 6-5)
The Middle Fork French Broad River, from source to the French Broad River (4.1 miles), is Supporting due to an Excellent bioclassification at site B-4. The current DWQ classification is B Tr.