

Chapter 1

New River Subbasin 05-07-01

Including the: South Fork New River, East and Middle Fork South Fork New River, Naked Creek, Peak Creek, and Cranberry Creek

1.1 Subbasin Overview

Subbasin 05-07-01 at a Glance

Land and Water Area

Total area:	341 mi ²
Land area:	338 mi ²
Water area:	3 mi ²

Population (County)

2000 Est. Pop.:	39,937 people
Pop. Density:	117 persons/mi ²

Land Cover (percent)

Forest/Wetland:	74%
Water:	<1%
Urban:	<1%
Cultivated Crop:	<1%
Pasture/ Managed Herbaceous:	24%

Counties

Alleghany, Ashe and Watauga

Municipalities

Boone, Blowing Rock and Jefferson

Aquatic Life

Monitored Streams Statistics

Total Streams:	137.0 mi
Total Supporting:	123.3 mi
Total Impaired:	6.5 mi
Total Not Rated:	7.2 mi

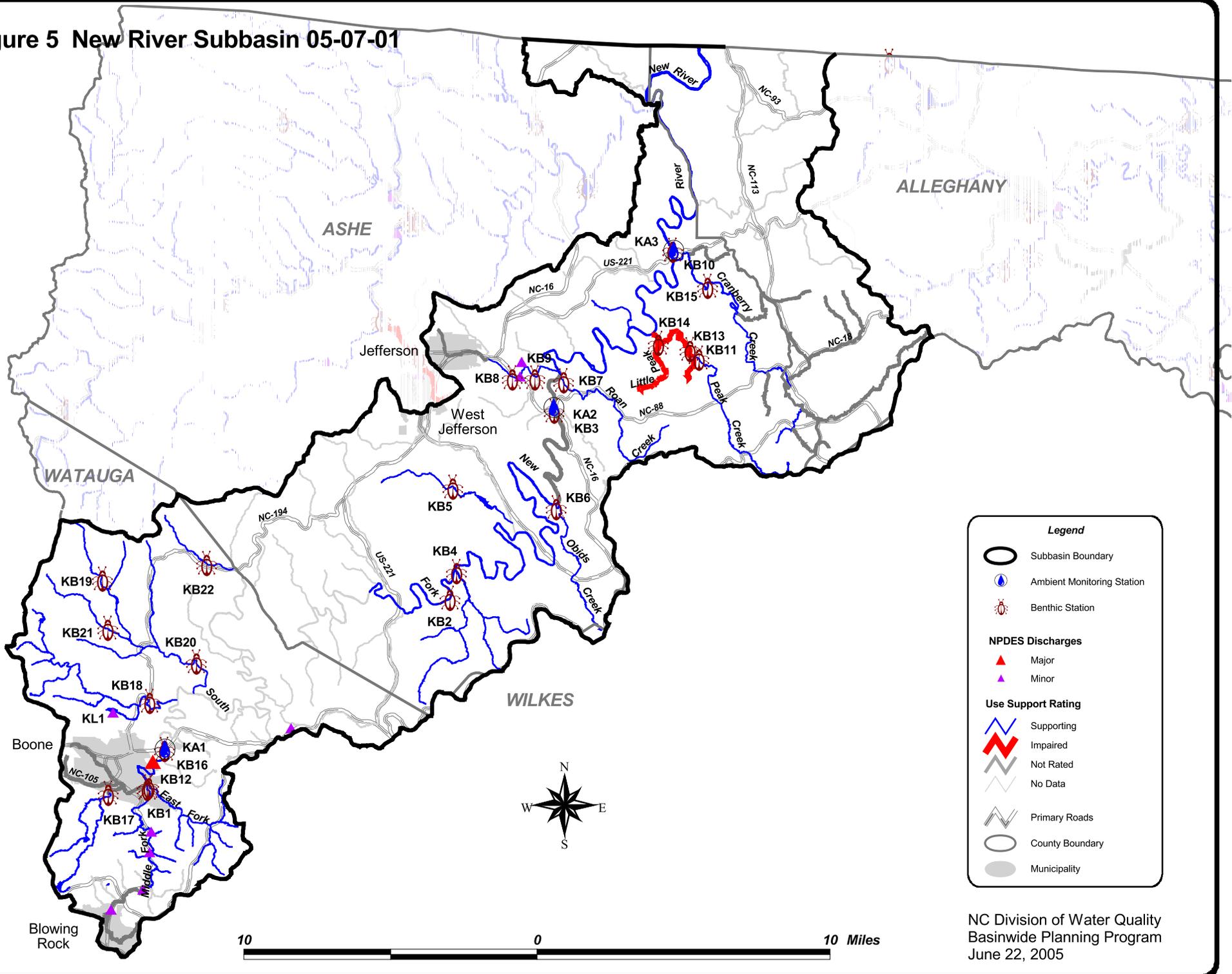
Streams in this subbasin are characterized by moderate to high gradients, extensive boulder and rubble substrates, and well-defined riffle and pool sequences. The larger waterbodies (i.e., South Fork New River and Cranberry Creek), however, generally have lower gradients and slightly less boulder and rubble substrates. The South Fork New River is the largest watershed in this subbasin. The river flows north-northeast through fairly mountainous terrain before joining with the North Fork New River to form the New River in northern Ashe County.

Land use is primarily forested with little in the way of large-scale development. Urban areas include the Towns of Blowing Rock, Boone, and Jefferson where population has increased by 12.3, 4.0 and 9.4 percent, respectively, over the last ten years (1990 to 2000). Refer to Appendix I for more information about population growth and trends. Outside these urban areas, the land is dotted with rural residential communities, pasturelands and Christmas tree farms. Agricultural activities have historically consisted of cattle grazing, but within the last 15 years, Christmas tree farming has increased. Refer to Appendix III for more information regarding changes in land use.

There are ten individual NPDES wastewater discharge permits in this subbasin with a total permitted flow of 6.01 MGD. The largest of these is the Boone Wastewater Treatment Plant (WWTP) with a total permitted discharge of 4.82 MGD. Three of the ten

facilities are required to perform whole effluent toxicity (WET) testing and include the WWTPs of Boone, Blowing Rock and Jefferson. One Notice of Violation (NOV) was issued in the subbasin. It is associated with a sodium hydroxide (NaOH) spill at the Blowing Rock Water Treatment Plant (WTP). For more information related to this NOV, refer to Section 1.4.1. Refer to Appendix VI for the listing of NPDES permit holders.

Figure 5 New River Subbasin 05-07-01



Legend

- Subbasin Boundary
- Ambient Monitoring Station
- Benthic Station
- NPDES Discharges**
 - Major
 - Minor
- Use Support Rating**
 - Supporting
 - Impaired
 - Not Rated
 - No Data
 - Primary Roads
 - County Boundary
 - Municipality

Table 4 Use Support New River Subbasin: 05-07-01

AU#	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment			
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors
Cranberry Creek (Mulberry Creek)										
10-1-37	B Tr +	18.9 FW Miles	S					ND		
	From source to South Fork New River				KB15	E	2003			
East Fork South Fork New River										
10-1-3-(8)	WS-IV CA	0.5 FW Miles	S					ND	Habitat Degradation	Road Construction
	From .8 mile downstream of Watauga Co SR 1524 to S Fk New River				KB12	G	2003		Habitat Degradation	Impervious Surface
Howard Creek										
10-1-9-(6)	C Tr HQW	3.6 FW Miles	S					ND		
	From the Appalachian State University Raw Water Supply Intake Dam to South Fork New River				KB18	G	2003			
Little Peak Creek										
10-1-35-4	B Tr +	2.8 FW Miles	I					ND	Toxic Impacts	Mine Drainage
	From source to Peak Creek				KB14	P	2003		Habitat Degradation	Mine Drainage
Meat Camp Creek										
10-1-10	C Tr +	10.4 FW Miles	S					ND	Habitat Degradation	Unknown
	From source to South Fork New River				KB19	G	2003			
					KB20	G	2003			
Middle Fork South Fork New River										
10-1-2-(15)	WS-IV CA	0.5 FW Miles	S					ND	Habitat Degradation	WWTP NPDES
	From 0.4 mile downstr of US Hwy 221 & 321 to South Fk New River				KB1	GF	2003		Habitat Degradation	Road Construction
									Habitat Degradation	Impervious Surface
Naked Creek										
10-1-32a2	C +	1.0 FW Miles	S					ND		
	From Ezra Fork to 0.4 miles above Jefferson WWTP				KB8	GF	2003			
10-1-32b	C +	2.5 FW Miles	S					ND	Habitat Degradation	WWTP NPDES
	From 0.4 miles above Jefferson WWTP to South Fork New River				KB9	GF	2003		Habitat Degradation	Pasture
									Habitat Degradation	Impervious Surface

Table 4 Use Support New River Subbasin: 05-07-01

AU#	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Stressors	Sources
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result		
New River (North Carolina Portion)												
10a	C ORW	4.6	FW Miles	S	KA5	NCE		S	KA5	NCE		
	From confluence of North and South to first point of crossing state line											
Norris Branch (below normal reservoir)												
10-1-9-7-(1)	WS-II Tr H	0.0	FW Miles	S	KL1	NCE		ND				
	From source to the Appalach St U Raw Water Holding Res Dam											
Norris Fork												
10-1-10-2	C Tr +	4.3	FW Miles	S				ND				
	From source to Meat Camp Creek				KB21	E	2003					
Obids Creek												
10-1-27-(2)	WS-IV Tr +	2.8	FW Miles	S				ND				
	From a point 0.9 mile downstream of NC Hwy 163 to South Fork New River				KB6	G	2003					
Ore Knob Branch												
10-1-35-3	B Tr +	0.9	FW Miles	I				ND			Toxic Impacts	Mine Drainage
	From source to Peak Creek				KB13	P	2003				Habitat Degradation	Mine Drainage
Peak Creek												
10-1-35-(2)a	B Tr +	2.1	FW Miles	S				ND				
	From Water Supply Dam at Appalachian Sulphides, Inc to Ore Knob Branch				KB11	G	2003					
10-1-35-(2)b	B Tr +	2.9	FW Miles	I				ND			Toxic Impacts	Mine Drainage
	From Ore Knob Branch to South Fork New River				KB13	P	2003				Habitat Degradation	Mine Drainage
Pine Orchard Creek												
10-1-15-1	C Tr +	3.5	FW Miles	S				ND				
	From source to Elk Creek				KB22	E	2003					
Pine Swamp Creek (Pine Swamp)												
10-1-24	C +	5.5	FW Miles	S				ND			Habitat Degradation	Pasture
	From source to South Fork New River				KB4	G	2003				Habitat Degradation	Agriculture

Table 4 Use Support New River Subbasin: 05-07-01

AU#	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment			
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors
Roan Creek										
10-1-31-(2)	WS-IV Tr C	0.4 FW Miles	S					ND		
	From 0.5 mile upstream of mouth to South Fork New River			KB7	E	2003				
South Beaver Creek(Lake Ashe)										
10-1-25-2a	C Tr +	5.1 FW Miles	S					ND		
	From source to Lake Ashe			KB5	G	2003				

Table 4 Use Support New River Subbasin: 05-07-01

AU#	Classification	Length/Area	Aquatic Life Assessment					Recreation Assessment				
			AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	Stressors	Sources
South Fork New River												
10-1-(20.5)	WS-V HQ	21.8 FW Miles	S							ND		
	From a point 0.4 mile upstream of Couches Creek to a point 2.8 mile upstream of Obids Creek				KB2	E	2003					
10-1-(26)a	WS-IV HQ	2.8 FW Miles	S							ND		
	From a point 2.8 miles upstream of Obids Creek to Obids Creek				KB3	E	2003					
					KB2	E	2003					
10-1-(26)b	WS-IV HQ	6.6 FW Miles	NR	KA2	CE	Low pH	12.2	S	KA2	NCE	Low pH	Unknown
	From Obids Creek to a point 0.6 miles upstream of Roan Creek				KB3	E	2003					
10-1-(3.5)a	C +	0.3 FW Miles	S	KA1	NCE			NR*	KA1	NCE	Fecal Coliform Bacteria	Impervious Surface
	From Winkler Creek to 0.1 miles downstream of Hunting Lane										Fecal Coliform Bacteria	Agriculture
											Habitat Degradation	Impervious Surface
10-1-(3.5)b	C +	5.1 FW Miles	S	KA1	NCE			NR*	KA1	NCE	Fecal Coliform Bacteria	
	From 0.1 mile downstream Hunting Lane to US Hwy.221/421				KB16	GF	2003					
10-1-(30)a	WS-IV HQ	0.6 FW Miles	NR	KA2	CE	Low pH	12.2	S	KA2	NCE	Low pH	Unknown
	From a point 0.6 miles upstream of Roan Creek to Roan Creek				KB3	E	2003					
10-1-(30)b	WS-IV HQ	0.1 FW Miles	S	KA3	NCE			S	KA3	NCE		
	From Roan Creek to a point 0.1 mile upstream of Naked Creek				KB10	E	2003					
10-1-(31.5)	C HQW	4.8 FW Miles	S	KA3	NCE			S	KA3	NCE		
	From 0.1 mile upstream of Naked Creek to Dog Creek				KB10	E	2003					
10-1-(33.5)	B ORW	22.5 FW Miles	S	KA3	NCE			S	KA3	NCE		
	From Dog Creek to New River				KB10	E	2003					
Winkler Creek												
10-1-4-(3.5)a	C Tr +	0.2 FW Miles	S							ND		
	From Boone Water Supply Intake to Winkler Creek Road (SR #1549)				KB17	E	2003					

Table 4 Use Support New River Subbasin: 05-07-01

AU#	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment			
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors
Use Categories:		Monitoring data type:		Results:		Use Support Ratings 2005:				
AL - Aquatic Life	KF - Fish Community Survey			E - Excellent		S - Supporting				
REC - Recreation	KB - Benthic Community Survey			G - Good		I - Impaired				
	KA - Ambient Monitoring Site			GF - Good-Fair		NR - Not Rated				
	KL - Lake Monitoring			F - Fair		NR*- Not Rated for Recreation (screening criteria exceeded)				
				P - Poor		ND - No Data Collected to make assessment				
	Miles/Acres			NI - Not Impaired		Results				
	FW - Fresh Water					CE - Criteria Exceeded > 10% and more than 10 samples				
						NCE - No Criteria Exceeded				

Aquatic Life Rating Summary

S	m	123.3	FW Miles
NR	m	7.2	FW Miles
I	m	6.5	FW Miles
S	e	88.4	FW Miles
NR	e	40.6	FW Miles
ND		194.7	FW Miles

Recreation Rating Summary

S	m	39.2	FW Miles
NR*	m	5.4	FW Miles
ND		416.2	FW Miles

Fish Consumption Rating Summary

NR	e	460.8	FW Miles
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A map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 5. Table 4 contains a summary of assessment unit numbers (AU#) and lengths, streams monitored, monitoring data types, locations and results, along with use support ratings for waters in the subbasin. Refer to Appendix IX for a complete listing of monitored waters and more information about use support methodology.

There were 22 benthic macroinvertebrate community samples collected during this assessment period. Data were also collected from three ambient monitoring stations and one lake. Refer to the *2004 New River Basinwide Assessment Report* at <http://www.esb.enr.state.nc.us/Basinwide/New%20River%20Basin%20Aug%202004.pdf> and Appendix IV for more information on monitoring.

Waters in the following sections and in Table 4 are identified by an assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, list 303(d) Impaired waters and identify waters throughout the basin plan. The AU# 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 AU# and the DWQ index segment are the same.

1.2 Use Support Assessment Summary

All surface waters in the state are assigned a classification appropriate to the best-intended use of that water. Waters are regularly assessed by DWQ to determine how well they are meeting their best-intended use. For aquatic life, an Excellent, Good, Good-Fair, Fair or Poor bioclassification is assigned to a stream based on the biological data collected by DWQ. For more information about bioclassification and use support assessment, refer to Appendices IV and IX, respectively. Appendix X provides definitions of the terms used throughout this basin plan.

In subbasin 05-07-01, use support was assigned for the aquatic life, recreation, fish consumption and water supply categories. No fish consumption advisories or advice have been issued for this subbasin, and all waters are Not Rated on an evaluated basis in the fish consumption category. In the water supply category, all waters are Supporting on an evaluated basis based on reports from Department of Environmental Health (DEH) regional water treatment plant consultants.

There were 137.0 stream miles (29.7 percent) monitored during this assessment period in the aquatic life category. Approximately 6.5 stream miles (1.4 percent) are Impaired. One lake (Appalachian State University Lake) was monitored as part of the Lakes Assessment Program. No criteria were exceeded, and it is considered Supporting for its designated use. Refer to Table 5 for a summary of use support for waters in subbasin 05-07-01.

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

Table 5 Summary of Use Support Ratings by Category in Subbasin 05-07-01

Use Support Rating	Aquatic Life	Fish Consumption	Recreation	Water Supply
Monitored Waters				
Supporting	123.3 mi	0.0	39.2 mi	0.0
Impaired	6.5 mi	0.0	0.0	0.0
Not Rated	7.2 mi	0.0	5.4 mi	0.0
Total	137.0 mi	0.0	44.6 mi	0.0
Unmonitored Waters (Evaluated)				
Supporting	88.5 mi	0.0	0.0	145.9 mi
Impaired	0.0 mi	0.0	0.0	0.0
Not Rated	40.6 mi	460.8 mi	0.0	0.0
No Data	194.7 mi	0.0	416.2 mi	0.0
Total	323.8 mi	460.8 mi	416.2 mi	145.9 mi
Totals				
All Waters*	460.8 mi	460.8 mi	460.8 mi	145.9 mi

* Total Monitored + Total Unmonitored = Total All Waters.

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 AU#. Information regarding 303(d) listing and reporting methodology is presented in Appendix VII.

1.3.1 Naked Creek [AU# 10-1-32b]

2000 Recommendations

Naked Creek, from the Jefferson WWTP to the South Fork New River (2.0 miles), was identified as Not Supporting due to habitat degradation and excess nutrients associated with nonpoint (i.e., agriculture, road and residential construction, urban runoff) and point (Jefferson WWTP) sources of pollution. DWQ had approved a design upgrade for the Jefferson WWTP and recommended the development of an erosion control ordinance to reduce the effects of sediment loss associated with new development activities.

Current Status

Naked Creek, from the Jefferson WWTP to the South Fork New River (2.0 miles), is currently Supporting due to a Good-Fair bioclassification at site KB9. Located in an area dominated by urban development and bisecting a large golf course, this site has historically received Poor (1998) and/or Fair (1993) bioclassifications. The improvement is likely associated with nearly \$1.9 million worth of upgrades to the Jefferson WWTP. Funding was provided by the NC Construction Grants & Loans Section of DENR, Clean Water Bonds (NC Rural Economic

Development Center), and the Economic Development Administration (NC Department of Commerce) and included the construction of a new clarifier, chlorine contact basin, a 70,000-gallon aerated sludge holding tank, and a third aeration basin. A new sodium metabisulfite ($\text{Na}_2\text{S}_2\text{O}_5$) storage and feed system, tertiary filters, and an emergency generator were also installed. Increased rainfall amounts during 2003 may also have contributed to the current use support rating by diluting the effects of effluent from the WWTP. Samples collected upstream of the WWTP at site KB8 also indicate a Good-Fair bioclassification.

Conductivity levels measured at sites KB8 and KB9 were the highest of any other sample sites collected in the subbasin. Conductivity is a measure of the water's ability to carry an electrical current and is equivalent to the amount of total dissolved salts in a system. Levels too high or too low may limit survival, growth and reproduction. In Naked Creek, the high conductivity levels are likely associated with upstream land use, which includes residential properties and pasturelands. The levels may also be associated with on-going construction activities at the Jefferson WWTP. Streambank erosion was moderate at both locations, and riparian zones were absent.

2005 Recommendations

Based on the current bioclassification, DWQ recommends that Naked Creek be removed from the 303(d) list of impaired waters for 2006. DWQ will continue to monitor water quality in Naked Creek and work with local agencies to develop an erosion control ordinance to reduce sediment loss associated with any new development activities. In addition, public education is needed to show the importance of good riparian buffer zones and the use of best management practices (BMPs) to reduce habitat degradation. It is also recommended that local agencies work with landowners and developers to install appropriate BMPs during and after development and/or construction activities to reduce the amount of stormwater runoff from the site.

Water Quality Initiatives

During this assessment period, several agricultural BMPs were installed in the Naked Creek watershed and include: 20 water tanks; four stream crossings; ten springs; one well; and the installation of 4,824 feet of fence for livestock exclusion. Funds totaling \$53,224 were provided by the NC Agricultural Cost Share Program (NCACSP) and were administered by the New River Soil and Water Conservation District (SWCD). For more information on the NCACSP, see Chapter 8.

1.3.2 Peak Creek [AU# 10-1-35-(2)b]

2000 Recommendations

Peak Creek, from Ore Knob Branch to the South Fork New River (2.9 miles), was identified as Not Supporting due to low pH and toxic levels of dissolved copper, iron and zinc. The creek had a very sparse benthic community and was devoid of fish. Peak Creek receives runoff from Ore Knob Mine, an abandoned copper and lead mine that began production in the 1850s and operated periodically until closure in the 1960s. Remediation efforts have shown little in the way of long-term water quality improvements. DWQ will participate in a multiagency partnership to address restoration/reclamation of the entire Ore Knob area.

Current Status

Peak Creek, from the water supply dam constructed by Appalachian Sulphides Company, Inc. to Ore Knob Branch (2.1 miles), is Supporting due to a Good bioclassification at site KB11. This segment is located upstream of the confluence with Ore Knob Branch and is not impacted by the abandoned mining facility. This site has historically received Good (1990, 1993 and 1998) and/or Excellent (1991 and 1996) bioclassifications. There was no evidence of streambank erosion in this segment, and the riparian zone was mostly intact.

Peak Creek, from Ore Knob Branch to the South Fork New River (2.9 miles), continues to be Impaired due to a Poor bioclassification at site KB13. This site is located just downstream of the confluence of Ore Knob Branch and continually receives acid mine drainage from the abandoned mining facility. Conductivity levels were high at the time of sampling and nearly all of the instream surfaces were red due to the precipitation of iron oxides. No streambank erosion was observed in the sampling reach and the riparian zone was wide and intact. The substrate, however, was completely embedded. The Poor bioclassification may also be a result of drought conditions during 2001 and 2002.

2005 Recommendations

Peak Creek [AU# 10-1-35-(2)b] will remain on the state's 303(d) list of Impaired waters. DWQ will continue to monitor Peak Creek and participate in the multiagency partnership dedicated to improving the waters in the Ore Knob area.

Water Quality Initiatives

Under Section 206 of the Water Resources Development Act of 1996 (PL 104-303), the US Army Corps of Engineers (USACE) published the *Ore Knob Aquatic Restoration Project: Draft Detailed Project Report and Environmental Assessment* (March 2003). The project was sponsored by DWQ and the USACE Huntington District. The goal of the project was defined as "to return aquatic macrobiota and fish to Peak Creek and Little Peak Creek." Quantitatively, the project could restore up to 14.3 acres of aquatic habitat (6.9 stream miles). The target areas include: 5.6 acres (2.9 miles) of Peak Creek; 2.0 acres (2.5 miles) of Little Peak Creek; and 5.0 acres (0.5 miles) of the South Fork New River. In addition, approximately 1.7 acres (1.0 miles) of Ore Knob Branch would also be improved. Restoration in these areas would allow for aquatic ecosystem and water quality improvements. Restoration would also protect the Outstanding Resources Waters (ORW) of the South Fork New River and the trout waters of Peak and Little Peak Creeks, designations set forth by DWQ.

Two distinct problem areas were identified and include the former processing area and the tailings (waste) area, which includes mine portals and shafts. Three alternatives were considered as feasible restoration projects. The chosen alternative (described below) would result in the restoration of 2.0 to 14.3 acres of aquatic habitat and cost between \$133,700 and \$1,393,200. A maximum of \$2.0 million was given for project study, design and construction, and operation and maintenance costs.

In order to meet the goals and objectives of the Ore Knob project, restoration of the former processing area and reclamation of the tailings area are necessary. This involves three distinct treatments: (1) diversion of surface water runoff away from and around tailings; (2) isolation of the tailings; and (3) passive treatment of acid discharge through the use of wetlands. Implementation of the project is expected to restore 6.9 miles of aquatic habitat and 24 acres or

more of terrestrial (wetland and upland) habitat. The project is expected to remain functional for at least 25 years, with the first 20 years requiring minimal maintenance. The non-federal sponsor of the project (i.e., state or local government agency) would be responsible for the maintenance once the project is established. No significant environmental impacts were identified, and total cost of the project is \$1,393,200.

Due to federal budget constraints, funding for the Ore Knob Aquatic Restoration Project has not been provided. DWQ will continue to work with the USACE and interact with the multiagency partnership to pursue additional restoration options in the Ore Knob area.

Water Quality Initiatives

During this assessment period, several agricultural BMPs were installed along Peak Creek. Funds totaling \$8,369 were provided by the NCACSP and were administered by the New River SWCD. For more information on the NCASCP, see Chapter 8.

1.3.3 Little Peak Creek [AU# 10-1-35-4]

2000 Recommendations

Little Peak Creek, from source to Peak Creek (2.4 miles), was identified as Not Supporting due to low pH and toxic levels of dissolved copper, iron and zinc. Like Peak Creek, Little Peak Creek had a very sparse benthic community and was devoid of fish. Little Peak Creek also receives runoff from the abandoned Ore Knob Mine. Remediation efforts have shown little in the way of long-term water quality improvements. DWQ will participate in a multiagency partnership to address restoration/reclamation of the entire Ore Knob area.

Current Status

Little Peak Creek, from source to Peak Creek (2.4 miles), continues to be Impaired due to a Poor bioclassification at site KB14. Despite the Poor bioclassification, the substrate was not embedded; riffle and pool habitats were well developed; and riparian zones were wide and mostly intact with very little bank erosion. Since 1991, the creek has received a Poor bioclassification and continues to be adversely affected by acid mine drainage from the former processing area of the abandoned mining facility.

2005 Recommendations

Little Peak Creek will remain on the state's 303(d) list of Impaired waters. DWQ will continue to monitor Little Peak Creek and participate in the multiagency partnership dedicated to improving the waters in the Ore Knob area.

Water Quality Initiatives

Little Peak Creek is located near the abandoned Ore Knob Mine facility and was included in the USACE *Ore Knob Aquatic Restoration Project*. Refer to Section 1.3.2 for more information regarding this project.

1.3.4 Ore Knob Branch [AU# 10-1-35-3]

2000 Recommendations

Ore Knob Branch, from source to Peak Creek (0.9 miles), was identified as Not Supporting on an evaluated basis due to low pH and toxic levels of dissolved copper, iron and zinc. Ore Knob

Branch receives runoff from the abandoned Ore Knob Mine. Remediation efforts have shown little in the way of long-term water quality improvements. DWQ will participate in a multiagency partnership to address restoration/reclamation of the entire Ore Knob area.

Current Status

Ore Knob Branch, from source to Peak Creek (0.9 miles), continues to be Impaired due to a Poor bioclassification at site KB13. Site KB13 was collected near the confluence of Ore Knob Branch and Peak Creek and has historically received Poor and/or Fair bioclassifications since 1990. Ore Knob Branch is the main catchment stream for runoff from the tailings area of the abandoned mining facility.

2005 Recommendations

Ore Knob Branch will remain on the state's 303(d) list of Impaired waters. DWQ will participate in the multiagency partnership dedicated to improving the waters in the Ore Knob area.

Water Quality Initiatives

Ore Knob Branch drains the abandoned Ore Knob Mine facility and was included in the USACE *Ore Knob Aquatic Restoration Project*. Refer to Section 1.3.2 for more information regarding this project.

1.4 Status and Recommendations for Waters with Noted Impacts

Based on DWQ's most recent use support methodologies, 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 in locating 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. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Refer to Section 1.1 for more information about AU#. Nonpoint source program agency contacts are listed in Appendix VIII.

1.4.1 Middle Fork South Fork New River [AU# 10-1-2-(6), 10-1-2-(14) and 10-1-2-(15)]

Current Status

Middle Fork South Fork New River (Middle Fork), from Brown Branch to the South Fork New River (5.4 miles), is currently Supporting due to a Good-Fair bioclassification at site KB1. The sample site is located directly downstream of the Boone Golf Course, and ultimately receives discharge from four NPDES facilities including: the Blowing Rock WWTP (0.80 MGD), the Roaring River Chalets WWTP (0.005 MGD), Tweetsie Railroad (0.70 MGD), and Summit Woods WWTP (0.008 MGD). Upstream, Middle Fork, from source to Brown Branch (5.7 miles), is Not Rated.

The bioclassification in the Middle Fork has been steadily decreasing from Excellent (1993) to Good (1998) to the most recent Good-Fair (2003). The probable reason for decline is due to the overwhelming dominance of nonpoint source runoff (NPS) in the area. During the time of sampling, several major projects were underway including: road widening activities, bridge replacements, and the installation of water mains. Banks were stable in the sampling reach, but riparian zones were nonexistent.

2005 Recommendations

DWQ will continue to monitor the Middle Fork and document changes to water quality. It is recommended that local agencies work to install best management practices (BMPs) and implement a sediment and erosion control plan. In addition, DWQ will assist agency personnel in locating sources of water quality protection funding for BMPs and community education related to nonpoint source runoff, stormwater runoff and the importance of riparian zones.

Special Studies

A combination of weather and equipment failure caused 3,000 gallons of 25-percent sodium hydroxide (NaOH) to be released from the Blowing Rock Water Treatment Plant (WTP) into the Middle Fork South Fork New River (Middle Fork). The sodium hydroxide, also referred to as caustic soda, is used to adjust the pH of water during the drinking water treatment process. High winds and a power surge on October 14, 2003, caused a malfunction of pumps and backflow devices. Consequently, the basement of the WTP was flooded with an estimated 150,000 gallons of finished drinking water. The floodwater caused an “out-of-service” 4,500-gallon fiberglass tank to float, which then broke the connection valve of the partially filled 4,500-gallon tank of 25-percent sodium hydroxide. Not realizing that the spill had occurred, the floodwater was pumped out of the basement to a stormwater inlet that flowed through the property’s stormwater system and directly into the Middle Fork.

Once the WTP staff was aware of the sodium hydroxide release, DWQ, the Watauga County Emergency Management Agency, the Town of Boone and the U.S. Environmental Protection Agency (EPA) were notified. DWQ issued a Notice of Violation (NOV) for exceeding the water quality standard for pH. The NC Wildlife Resources Commission (WRC) estimated that 14,000 to 15,000 fish were killed in the Middle Fork and in the upper part of the South Fork New River. Students at the Appalachian State University (ASU) also reported dead salamanders in the waters near the campus in Boone (no numbers provided).

Benthic macroinvertebrate sampling was conducted by DWQ three weeks after the incident to assess impacts to the benthic community. Samples were collected on November 4, 2003. DWQ sampled a total of five sites: two in the Middle Fork South Fork New River (Middle Fork); two in the East Fork South Fork New River (East Fork); and one in the South Fork New River. Three of the sites were basinwide sites (KB1, KB12 and KB16) (NCDENR-DWQ, November 2003).

In the Middle Fork, the basinwide sampling site showed a slight increase to a Good bioclassification (KB1) from a Good-Fair in August 2003. The second site was added when no deleterious affects were noted at the basinwide site at KB1. This sample was collected approximately one mile downstream of the WTP. The bioclassification here was rated Good-Fair, which matched a sample collected in the same general vicinity in 1999.

Samples collected in the East Fork were to be used as a reference for samples collected in the Middle Fork. No deleterious impacts were expected; however, the basinwide site (KB12) went from a Good bioclassification in August 2003 to a Poor bioclassification in November 2003. This site is located 100 yards from the Middle Fork site (KB1), across the parking lot of a privately owned building, just before the confluence of the South Fork New River. A second site was added approximately one mile upstream at the next bridge crossing to determine the extent of the degraded area. This sample location was given a Fair bioclassification; however, since there were no prior samples collected in this area, DWQ cannot determine the cause of the low bioclassification. The East Fork drains more residential and agricultural land than the Middle Fork, and it is unclear as to why this reference stream deteriorated when the Middle Fork did not.

The sample collected at the basinwide site on the South Fork New River (KB16) decreased from a Good-Fair bioclassification in August 2003 to a Fair bioclassification in November 2003. This section of the river receives discharge from the Boone WWTP and has fluctuated between a Fair and Good-Fair bioclassification since 1984. The most recent decrease is most likely associated with impacts in the East Fork rather than the Middle Fork.

Since the WTP incident, several upgrades have been completed or are planned for the facility. These include:

- Installation of an alarm system near the basement floor which will sound if there is 1" of water on the floor.
- Repair of a broken fluoride line.
- Installation of a sump pump in the waste sump to keep water away from the waste sump.
- Removal of the empty "out-of-service" caustic soda tank.
- Rewiring of the valve actuators on finished water pumps to close if the power is interrupted.

Because the data were collected outside the data window for this basinwide water quality plan and since such incidents are associated with short-term rather than long-term impacts, the information collected in November 2003 will not be used to determine use support during this basin cycle. DWQ will, however, continue to monitor the Middle Fork, East Fork and South Fork New Rivers and use the November 2003 and any subsequent monitoring data to determine use support for the 2010 basinwide water quality plan.

Water Quality Initiatives

The Middle Fork Greenway Association (MFGA) in conjunction with the Department of Geography and Planning at Appalachian State University (ASU) conducted a Greenway Trail Feasibility Study along the Middle Fork South Fork New River (MFGA, May 2001). The proposed greenway would extend over 5.0 miles along the Middle Fork between the towns of Blowing Rock and Boone. Working with landowners, the MFGA hopes to purchase or obtain access to 20-foot easements alongside an already existing 30-foot vegetative buffer as part of the required surface water quality standards set forth by DWQ for water supply areas (Chapter 4). Through the string of 20-foot easements, MFGA will construct a 10-foot wide pedestrian/bike trail, which would be wheelchair accessible and available to all ages and fitness levels. The project would also enhance and stabilize the existing riparian buffer with new tree and shrub plantings where landowners allow.

Using grant money totaling \$57,000 from the NC Clean Water Management Trust Fund (CWMTF), MFGA paid for surveys, environmental site assessments, and legal fees to secure easements from several willing landowners along the proposed route. The grant money is also being used to educate and inform landowners of the importance of watershed protection and potential streambank restoration projects. MFGA is also promoting streambank stabilization projects by suggesting to landowners that they stabilize the streambank by planting trees and shrubs as memorials to family members.

In an area where the landscape is slowly being transformed by development and the potential for expanded water and sewer lines along the river exists, MFGA hopes to provide more protection to the Middle Fork through the construction of the greenway trail. In addition, MFGA hopes to preserve the natural beauty of the river, preserve community history, and increase citizen appreciation and awareness of the watershed.

1.4.2 East Fork South Fork New River [AU# 10-1-3-(7) and 10-1-3-(8)]

Current Status

East Fork South Fork New River, from source to South Fork New River (3.4 miles), is Supporting due to a Good bioclassification at site KB12. The sampling site is located approximately 100 yards from the Middle Fork, but the upstream reaches drain residential and pasture areas while the Middle Fork's catchment drains more suburban areas of Boone (Section 1.4.1). As with the Middle Fork, several projects were underway during the time of sampling and included: road widening, bridge replacement, and the installation of water mains. Substrate was not embedded near the sampling area, but one entire streambank consisted of manicured lawns with no riparian area.

Like the Middle Fork, the East Fork has experienced a similar sampling history with an Excellent bioclassification in 1993 and a Good bioclassification in 1998. Unlike the Middle Fork, however, the East Fork maintained the Good bioclassification in 2003. This, in large part, is due to less suburban and more residential/pasture oriented land use.

2005 Recommendations

DWQ will continue to monitor the East Fork and document changes to water quality. It is recommended that local agencies work to install BMPs and implement a sediment and erosion control plan. In addition, DWQ will assist agency personnel in locating sources of water quality protection funding for BMPs and community education related to NPS, stormwater runoff and the importance of riparian zones.

Special Studies

The East Fork was included in the special study conducted by DWQ in November 2003. The study was the result of a release of sodium hydroxide from the Blowing Rock WTP into the Middle Fork South Fork New River. Refer to Section 1.4.1 above for more information.

1.4.3 South Fork New River [AU# 10-1-(3.5) a and b]

2000 Recommendations

Impacts from the Boone WWTP discharge were noted along the South Fork New River. To reduce the amount of runoff that this section of the river receives, the Town of Boone was

drafting a Stormwater Management Plan as a follow-up to recent Floodplain Management activities. In addition, stream restoration and bank stabilization projects were planned.

Current Status

South Fork New River, from 0.10 miles downstream of Hunting Lane to US Highway 221/421 (5.4 miles), is Supporting in the aquatic life category due to a Good-Fair bioclassification at site KB16. This section of the river receives runoff from suburban areas of Boone, and the sampling site is located downstream of the Boone WWTP. Observations made at the time of sampling showed highly embedded substrate, moderately eroding streambanks, and partially intact riparian zones. The benthic community has been steadily increasing at this site. This improvement is most likely associated with recent upgrades to the Boone WWTP. Since 1998, ambient water chemistry data has shown a sharp reduction in the amount of ammonia (NH₃) and total nitrogen (N) being released into the river.

Over 20 percent of the samples collected at ambient station KA1 exceeded 400 colonies of fecal coliform bacteria/100 milliliters (ml) of water. Therefore, this section of the South Fork New River is Not Rated for recreational use due to elevated fecal coliform bacteria. Current methodology requires additional bacteriological sampling for streams with a geometric mean greater than 200 colonies/100 ml or when concentrations exceed 400 colonies/100 ml in more than 20 percent of the samples. These additional assessments are prioritized such that, as monitoring resources become available, the highest priority is given to those streams where the likelihood of full-body contact recreation is greatest. This section of the South Fork New River is not classified for primary recreation (Class B) and was not prioritized for additional sampling during this basinwide cycle. Potential sources of elevated bacteria levels include failing septic systems, broken or leaking sewer lines, and nonpoint source runoff from pasturelands. Refer to Appendix IX for more information related to recreational use support methodology and fecal coliform bacteria.

2005 Recommendations

DWQ will continue to monitor water quality in the South Fork New River and work with local agencies to identify possible sources of fecal coliform bacteria. In addition, the Town of Boone should continue its efforts to improve their WWTP and develop stormwater management practices. Public education is also needed to show the importance of good riparian zones and the use of BMPs to reduce habitat degradation.

Special Studies

This segment of the South Fork New River was included in the special study conducted by DWQ in November 2003. The study was the result of a sodium hydroxide release from the Blowing Rock WTP into the Middle Fork South Fork New River. Refer to Section 1.4.1 above for more information.

1.4.4 South Fork New River [AU# 10-1-(26)b and 10-1-(30)a]

Current Status

South Fork New River, from Obids Creek to Roan Creek (7.2 miles), is Not Rated due to low pH readings at site KA2. Several factors may be playing a role and may include upstream road construction activities, residential development, illicit discharges and/or excess algal growth and decay. Historic trends in ambient chemistry data have shown little significant change in water

quality between years at this ambient station. DWQ believes that the low pH readings obtained during this assessment period was a short-term condition and is not likely to impact the benthic or fish communities in the South Fork New River. In fact, benthic macroinvertebrate samples collected at site KB3 received an Excellent bioclassification during the assessment period.

2005 Recommendations

DWQ will continue to monitor water quality in the South Fork New River and work with local agencies to identify possible sources of the low pH.

Water Quality Initiatives

This section of the South Fork New River is part of a 31-mile study area for the *Riparian Corridor Conservation Design* published by the National Committee for the New River (NCNR). The report was prepared for the Conservation Trust for North Carolina (CTNC) and the NC Clean Water Management Trust Fund (CWMTF). The study area extends from the mouth of Pine Swamp Creek to the New River State Park and includes both private and publicly owned lands. The primary goal of the conservation design is to preserve high priority tracts of land. High priority tracts are those identified by NCNR where preservation could be beneficial to water quality. NCNR evaluated riparian length, riparian width, composition of riparian vegetation, other water sources (i.e., perennial and intermittent streams, bogs, fens), natural heritage elements, wetland communities, and proximity to other high priority areas using high-resolution infrared imagery, tax parcel identification numbers, field surveys, and GIS software. Information gathered by NCNR was also used to identify water quality concerns for the entire watershed. These include new development on ridge tops and along streambanks, maintenance and construction activities along primary and secondary roads, and nonpoint source runoff from pastures and Christmas tree farms.

Through outreach and education, NCNR will work with landowners to explain the significance of their property in those areas identified as high priority tracts and the importance of riparian buffers. NCNR will also explain options for preserving the land and work with them to find the best option. Working with landowners and developers, NCNR hopes to reduce the density of development along the streambanks, retain riparian areas, and ensure careful construction practices. By preserving the intact riparian corridors, minimizing sediment and erosion during development, and excluding livestock from the river and its tributaries, NCNR hopes to maintain, and even improve, the water quality of the South Fork New River (NCNR, December 2001).

NCNR has been restoring riparian buffers in the New River basin since 1998 through the River Builder Program. The program works to educate landowners about the importance of riparian buffers and encourages them not to mow down to the stream. The program is primarily funded by the CWMTF and helps landowners reestablish riparian vegetation through the planting of livestakes on devegetated and eroding streambanks. Livestakes are cut stem segments from native vegetation, which root and grow quickly. The roots then act as a placeholder, keeping the soil in place. Shrubs and hardwood trees are planted at the top of the streambank. The program assists landowners with planting and is appropriate where streambanks have been damaged by the removal of vegetation.

For severely eroding banks, rootwads and whole tree revetments may be needed. Rootwads consist of the base of a large tree and much of its root system. The root wad is then inserted into

the streambank. Whole tree revetments involve the use of large trees (typically hemlocks) that are cabled sideways into the streambank. Both of these natural structures help to deflect the water's energy away from the streambank, reducing erosion and providing habitat for aquatic and terrestrial communities. As part of the program, the landowners are required to sign an agreement to not disturb the plantings for fifteen years. For more information about the River Builder Program or the Riparian Corridor Conservation Design, visit www.ncnr.org.

1.4.5 Winkler Creek [AU# 10-1-4-(3.5)a and b]

Current Status

Winkler Creek, from the Boone Water Supply Intake to Winkler Creek Road (SR #1549) (0.2 miles), is Supporting due to an Excellent bioclassification at site KB17. Land use in the headwaters is primarily undisturbed with single-family residential homes scattered throughout the watershed. Substrate was a good mix of bolder, rubble and gravel with well-developed riffles and pools. Within the sampling reach, streambank erosion was minimal, and the riparian area was generally intact.

Winkler Creek, from Winkler Creek Road (SR #1549) to South Fork New River (1.7 miles), is Not Rated. Samples were not collected in this section, which runs through commercial and residential areas in the Town of Boone.

2005 Recommendations

DWQ will continue to monitor Winkler Creek and document any changes in water quality. DWQ will assist agency personnel in locating sources of water quality protection funding for community education related to nonpoint source runoff (i.e., stormwater and residential runoff) and the importance of riparian zones.

Water Quality Initiatives

NCNR surveyed 344 parcels of land along Winkler Creek for a Riparian Corridor Conservation Design. By evaluating riparian length and width, vegetative amount and types, wetlands, bank stability, livestock access, and properties containing both streambanks, NCNR determined the preservation and restoration potential of streambanks along the creek. Each streambank or property was ranked and totaled for high, medium or low prioritization. This allowed for a quick reference in identifying land for preservation or restoration efforts.

Sixteen high priority restoration tracts and eighteen high priority preservation tracts were identified in the watershed. NCNR will work with interested landowners who wish to voluntarily preserve or restore their riparian property (NCNR, 2005a). For more information about NCNR, refer to Chapter 12.

1.4.6 Howard Creek [AU# 10-1-9]

Current Status

Howard Creek, from the raw water supply intake dam for Appalachian State University (ASU) to the South Fork New River (3.6 miles), is currently Supporting due to a Good bioclassification at site KB18. Land is largely undeveloped with very few residential homes dotting the landscape. Substrate was a mix of boulders, rubble and gravel, and there were well-developed riffle and pool habitats. Streambank erosion was moderate, and the riparian zone was wide with frequent

breaks. This site has been sampled three times (1988, 1993 and 1998) and has historically received an Excellent bioclassification. The 2003 sample was just one species short of receiving an Excellent bioclassification, and there were no deleterious changes in water quality noted at this site.

2005 Recommendations

DWQ will continue to monitor Howard Creek and document any changes in water quality. DWQ will assist agency personnel in locating sources of water quality protection funding for community education related to nonpoint source runoff and the importance of riparian zones.

Water Quality Initiatives

NCNR surveyed 389 parcels of land along Howard Creek for a Riparian Corridor Conservation Design. By evaluating riparian length and width, vegetative amount and types, wetlands, bank stability, livestock access, and properties containing both streambanks, NCNR determined the preservation and restoration potential of streambanks along the creek. Each streambank or property was ranked and totaled for high, medium or low prioritization. This allowed for a quick reference in identifying land for preservation or restoration efforts.

Fifteen high priority restoration tracts and 99 high priority preservation tracts were identified in the watershed. NCNR will work with interested landowners who wish to voluntarily preserve or restore their riparian property (NCNR, 2005b). For more information about NCNR, refer to Chapter 12.

1.4.7 Meat Camp Creek [AU# 10-1-10]

Current Status

Meat Camp Creek, from source to South Fork New River (10.4 miles), is Supporting due to a Good bioclassification at sites KB19 and KB20. Despite its relatively small drainage area, the upstream site (KB19) contained a good mix of boulder, rubble and gravel substrate and well-developed riffle and pool habitat areas. No erosion was noted, but State Route #1340 parallels the stream along one site. Downstream (KB20), land use is very sparse rural residential areas with scattered pasturelands. Substrate consisted of a thorough mix of boulder, rubble, and gravel and well-developed riffle and pool habitat areas. No erosion was noted, but the riparian zone was not intact.

2005 Recommendations

DWQ will continue to monitor Meat Camp Creek and document any changes in water quality. DWQ will assist agency personnel in locating sources of water quality protection funding for community education related to nonpoint source runoff and the importance of riparian zones.

Water Quality Initiatives

Several agricultural BMPs have been installed along Meat Camp Creek during this basinwide cycle and include the construction of an agrichemical handling facility, the installation of 12 watering tanks or troughs, riparian buffer plantings on 1.5 acres, and fencing 10,980 feet of stream from livestock access. Ten springs, one well, two stream crossings, and one area was protected for heavy use. Funding was provided by the NCACSP for a total cost of \$46,011. Refer to Chapter 8 for more information about the NCACSP or contact the Watauga County Soil and Water Conservation District (SWCD) for more information.

1.4.8 Roan Creek [AU# 10-1-31-(1) and 10-1-31-(2)]

Current Status

Roan Creek, from the source to South Fork New River (7.5 miles), is Supporting due to an Excellent bioclassification at site KB7. Land use in this area includes a mix of residential, pasture and Fraser Fir Christmas tree farms. Conductivity was relatively low (38 $\mu\text{mhos/cm}$), but was much higher in an unnamed tributary (58 $\mu\text{mhos/cm}$) entering Roan Creek. This higher level in the unnamed tributary is likely associated with recent construction activities for a residential subdivision. Streambank erosion was not observed, but the riparian zones were narrow with several breaks.

2005 Recommendations

DWQ will continue to monitor water quality in Roan Creek and work with local agencies to provide public education related to the importance of good riparian zones and the use of BMPs to reduce habitat degradation and runoff often associated with construction activities.

Water Quality Initiatives

During this assessment period, several agricultural BMPs were installed along Roan Creek. Funds totaling \$4,604 were provided by the NCACSP and were administered by the New River SWCD. For more information on the NCASCP, see Chapter 8.

1.4.9 Cranberry Creek (Mulberry Creek) [AU# 10-1-37]

Current Status

Cranberry Creek, from source to South Fork New River (18.9 miles), is Supporting due to an Excellent bioclassification at site KB15. Cranberry Creek and the surrounding watershed contain a mix of agriculture and scattered residential land use. Agricultural land is dominated by pasture and Fraser Fir Christmas tree farms. Bank erosion at the sampling site was moderate; the substrate was not embedded; and the riparian zones were mostly intact.

The New River Soil and Water Conservation District (SWCD) has reported that channelization and sedimentation is becoming a problem in the Cranberry Creek watershed. Such impacts are likely associated with construction and/or development activities in the upper reaches of the watershed. Water quality impacts may also be due to agricultural activity in the area, including nonpoint source runoff from pasturelands, Christmas tree farms and row crops.

2005 Recommendations

DWQ will continue to monitor Cranberry Creek and document changes to water quality. It is recommended that local agencies work to install appropriate BMPs and implement a sediment and erosion control plan related to construction and/or development activities. In addition, DWQ will assist agency personnel in locating sources of water quality protection funding for BMPs and community education related to nonpoint source and stormwater runoff and the importance of riparian zones.

1.4.10 Pine Swamp Creek [AU# 10-1-24]

Current Status

Pine Swamp Creek, from source to the South Fork New River (5.5 miles), is Supporting due to a Good bioclassification at site KB4. Cattle pasture and Fraser Fir Christmas tree farms dominate upstream land use. Observations at the time of sampling showed mildly embedded substrate, poor riparian zones, and severe streambank erosion.

2005 Recommendations

DWQ will continue to monitor Pine Swamp Creek and document any changes in water quality. It is recommended that local agencies work to install appropriate BMPs and implement conservation plans on land in agriculture production. In addition, DWQ will assist agency personnel in locating sources of water quality protection funding for BMPs and community education related to agricultural nonpoint source runoff and the importance of riparian zones.

Water Quality Initiatives

During this assessment period, several agricultural BMPs were installed along Pine Swamp Creek. Funds totaling \$15,068 were provided by the NCACSP and were administered by the New River SWCD. For more information on the NCACSP, see Chapter 8.

1.5 Additional Water Quality Issues within Subbasin 05-07-01

The previous sections discussed water quality concerns for specific stream segments. The following section discusses issues that may threaten water quality in the subbasin that are not specific to particular streams, lakes or reservoirs. The issues discussed may be related to waters near certain land use activities or within proximity to different pollution sources.

This section also discusses ideas, rules and practices in place to preserve and maintain the pristine waters of the New River basin. In subbasins 05-07-01 and 05-07-02 (Chapter 2), this is particularly important since many of the waters are designated as high quality or outstanding resource waters (HQW and ORW, respectively). Special management strategies, or rules, are in place to better manage the cumulative impact of pollutant discharges, and several landowners have voluntarily participated in land conservation, stabilization and/or restoration projects.

1.5.1 Christmas Tree Production and Best Management Practices

Christmas tree production in western North Carolina is an important industry generating nearly \$100 million in yearly wholesale income. An estimated 2,000 Christmas tree growers are growing over 30,000 acres of Christmas trees. Most of the tree plantations in western North Carolina are above 3,000 feet in elevation and are often located on steep, highly erodible slopes (NCSU Cooperative Extension Service, April 2005).

To address sediment, pesticide and nutrient runoff, the NC Agriculture Cost Share Program (NCACSP) adopted a new best management practice (BMP) in March 2003. Under the Christmas Tree Conservation Cover BMP, grass, legumes or other approved plantings should be planted and maintained on fields with no previously established groundcover to reduce soil

erosion and improve water quality. Other improvements include reduced off-site sedimentation and pollution from dissolved and sediment-attached substances.

From 1998 to 2003, 76 acres of Christmas Tree Conservation Cover were installed in the New River basin. NCACSP funding totaled \$7,320 with landowners and/or Christmas tree plantation operators contributing an additional \$2,440. For more information on the NCACSP, see Chapter 8. For more information related to Christmas tree production and BMPs, visit <http://www.ces.ncsu.edu/fletcher/programs/xmas/>.

1.5.2 Land Clearing Activities

In 2003, 18 acres of land were cleared near Mountain Valley Road in Alleghany County. This area is located in the subwatershed of Piney Fork (AU# 10-1-37-3), a tributary to Cranberry Creek (Section 1.4.9). The land was logged and stumped, and the owner was scheduled to replant the land with white pine trees. DWQ staff in the Winston-Salem regional office has recorded a turbidity violation and sediment was reported leaving the site. Multiple agency representatives including DWQ, the Division of Land Resources (DLR), the Division of Forest Resources (DFR), and the Natural Resource Conservation Service (NRCS) met on the tract in 2003 to discuss land use and which agency was responsible for regulatory oversight. Due to some ambiguity regarding intent of land use, DFR was assigned regulatory oversight. In September 2004, the local forestry staff documented that the site was in “permanent compliance” with Forestry Practice Guidelines (FPGs). For more information related to forestry in the New River basin, refer to Chapter 9.

1.5.3 Management Strategies for Water Quality Protection

Municipalities and smaller outlying communities are being pressured to expand and this involves construction and/or development in areas of pristine waters along the South Fork New River. High Quality Water (HQW) and Outstanding Resource Water (ORW) are supplemental classifications to the primary freshwater classification(s) placed on a waterbody. Management strategies are associated with the supplemental HQW and ORW classifications and are intended to protect the current use of the waterbody. Below is a brief summary of these strategies and the administrative code under which the strategies are found. More detailed information can be found in the document entitled *Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina* (NCDENR-DWQ, August 2004a). This document is available on-line at <http://h2o.enr.state.nc.us/admin/rules/>. Definitions of the primary and supplemental classifications can be found in Chapter 4.

HQW is intended to protect waters with water quality higher than the state’s water quality standards. In the New River basin, waters classified as Water Supply I and II (WS-I and WS-II), ORW, and waters designated by the NC Wildlife Resources Commission (WRC) as native (wild) trout waters are subject to HQW rules. Streams that petitioned for WS-I or WS-II or are considered Excellent based on biological and physical/chemical parameters may qualify for the HQW supplemental designation.

New discharges and expansions of existing discharges may, in general, be permitted in waters classified as HQW provided that the effluent limits are met for dissolved oxygen (DO), ammonia/nitrogen levels (NH₃-N), and the biochemical oxygen demand (BOD₅). More stringent

limitations may be necessary to ensure that the cumulative effects from more than one discharge of oxygen-consuming wastes will not cause the dissolved oxygen concentration in the receiving water to drop more than 0.5 milligrams per liter (mg/l) below background levels. Discharges from single-family residential structures into surface waters are prohibited. When a discharge from an existing single-family home fails, a septic tank, dual or recirculation sand filters, disinfection, and step aeration should be installed (Administrative Code 15A NCAC 2B .0224)

In addition to the above, development activities which require an Erosion and Sedimentation Control Plan under the NC Sedimentation Control Commission or an approved local erosion and sedimentation control program are required to follow stormwater management rules as specified in Administrative Code 15A NCAC 2H .1000 (NCDENR-DWQ, December 1995). Under these rules, stormwater management strategies must be implemented if development activities are within one mile of and draining to waters designated as HQW. The low-density option requires a 30-foot wide vegetative buffer between development activities and the stream. This option can be used when the built upon area is less than 12 percent of the total land area or the proposed development is for a single-family residential home on one acre or greater. Vegetated areas may be used to transport stormwater in the low-density option, but it must not lead to a discrete stormwater collection system (i.e., constructed). The high-density option is for all land disturbing activities on greater than one acre. For high-density projects, structural stormwater controls must be constructed (i.e., wet detention ponds, stormwater infiltration systems, innovative systems) and must be designed to control runoff from all surfaces affected by one inch or more of rainfall. More stringent stormwater management measures may be required on a case-by-case basis where it is determined additional measures are needed to protect and maintain existing and anticipated uses of the water (Administrative Code 15A NCAC 2H .1006).

ORWs are unique and special surface waters that have some outstanding resource value (i.e., outstanding fish habitat and fisheries, unusually high levels of water-based recreation, special ecological or scientific significance). No new discharge or expansions on existing discharges are permitted. Rules related to the development activities are similar to those for HQW, and stormwater controls for all new development activities requiring an Erosion and Sedimentation Control Plan under the NC Sedimentation Control Commission or an approved local erosion and sedimentation control program are required to follow stormwater management rules as specified in Administrative Code 15A NCAC 2H .1000 (NCDENR-DWQ, December 1995). In addition, site-specific stormwater management strategies may be developed to protect the resource values of these waters.

In 1976, a portion of the New River basin, including the lower South Fork New River and the North Carolina portion of the New River itself, were designated as a National Scenic River and a state Natural and Scenic River. Totalling 26.5 miles, both the lower South Fork New River and the New River are classified as ORW by DWQ. Designated with a "+" symbol in the stream classifications schedule, special management strategies are applied to several waters along the North and South Fork New Rivers in order to protect downstream waters designated as ORW. Stormwater controls are required on land within one mile of and draining to the designated ORW areas. Discharge limitations also apply to the "+" designated waters. These limitations were developed using most of the HQW management strategies as a framework and include the following:

- New or expanding NPDES discharges will be permitted as long as the water quality standards are maintained in the ORW waters and provided that the total combined discharges do not exceed 50% of the total instream flow in the ORWs.
- Effluent limits for oxygen-consuming wastes must remain below the limits of 5.0 mg/l for BOD and 2.0 mg/l for NH₃-N.
- Discharge of total suspended solids (TSS) is limited to 10.0 mg/l for trout waters and 20.0 mg/l for all other waters.
- All permitted facilities must be equipped with emergency equipment including stand-by power, dual-train design for all treatment components, or equivalent failsafe treatment designs.
- For those dischargers where nutrient enrichment is expected, effluent limits will be set for phosphorus or nitrogen or both [Administrative Code 15A NCAC 2B .0225(e)(4)].

These special management strategies apply to almost all of the streams in subbasin 05-07-01 and 05-07-02. They also apply to a few streams in subbasin 05-07-03 including Elk Creek and Rock Creek.

Many of the streams in this subbasin are also classified as trout (Tr) waters, and therefore, are protected for natural trout propagation and maintenance of stocked trout. There are no watershed development restrictions associated with the trout classification; however, the NC Division of Land Resources (DLR), under the NC Sedimentation and Pollution Control Act (SPCA), has requirements to protect trout streams from land-disturbing activities. Under General Statutes 113A-57(1), “waters that have been classified as trout waters by the Environmental Management Commission (EMC) shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the twenty-five percent of the buffer zone nearest the land-disturbing activity, whichever is greater.” The Sedimentation Control Commission, however, can approve land-disturbing activities along trout waters when the duration of the disturbance is temporary and the extent of the disturbance is minimal. This rule also applies to unnamed tributaries flowing to the affected trout water stream. Further clarification on classifications of unnamed tributaries can be found under Administration Code 15A NCAC 02B .0301(i)(1). For more information regarding land-disturbing activities along designated trout streams, see the DLR website at <http://www.dlr.enr.state.nc.us/>.