# Section B - Chapter 6
# Catawba River Subbasin 03-08-35
**Clark Creek, Mauney Creek, South Fork Catawba River, Henry Fork and Jacob Fork**

## 6.1 Subbasin Overview

***Subbasin 03-08-35 at a Glance***

**Land and Water Area**

| | |
|---|---|
| Total area: | 559mi² |
| Land area: | 558mi² |
| Water area: | 1mi² |

**Population Statistics**

2000 Est. Pop.: 163,865 people
Pop. Density: 292 persons/mi²

**Land Cover (percent)**

| | |
|---|---|
| Forest/Wetland: | 57% |
| Surface Water: | 0% |
| Urban: | 3% |
| Agriculture: | 39% |

**Counties**

Burke, Catawba, Gaston and Lincoln

**Municipalities**

Brookford, Cherryville, Conover, Hickory, High Shoals, Hildebran, Lincolnton, Long View, Maiden, Newton, Spencer Mountain and Stanley

There are three ecoregions in this subbasin: the Eastern Blue Ridge Foothills (including the South Mountains), the Northern Inner Piedmont, and the Southern Outer Piedmont. The subbasin forms most of the watershed of the South Fork Catawba River. This river has its origin at the confluence of Henry and Jacob Forks. The other major tributaries in this subbasin include Clark and Indian Creeks.

Land use is primarily forested, but there is also a large percentage of the subbasin in pasture. A greater percentage of this subbasin is in pasture than in any other subbasin. However, pasture is rapidly being converted to residential land uses as the local population expands. Most communities in this region are expected to increase in population by more than 20 percent by 2020 (Table A-6 and A-7).

There are seven facilities in this subbasin which are required to monitor effluent toxicity. Five municipal and one industrial facilities had one or more failing tests since 1997: Cherryville (3), Delta Mills (1), Lincolnton (3), Maiden Creek (1), and Stanley WWTP (9).

The largest dischargers in this subbasin are those of Hickory, 15 MGD to Henry Fork; Lincolnton, 6 MGD to South Fork Catawba River; and Newton, 5.0 MGD to Clark Creek. Smaller dischargers include the Town of Cherryville's WWTP (2 MGD to Indian Creek), Delta Mills, Inc. (1 MGD to Clark Creek), and the Town of Stanly's WWTP (1 MGD to Mauney Creek).

There were 24 benthic macroinvertebrate community samples and six fish community samples (Figure B-6 and Table B-12) collected during this assessment period. Two sites remained the same; four sites had lower bioclassifications, and 16 sites were sampled for the first time during this assessment period. Data were also collected from six ambient monitoring stations as well. Benthic macroinvertebrate data showed that every site, except for Henry Fork declined in bioclassification. Henry Fork may have maintained its Good rating despite the drought and the City of Hickory's discharge because of its large drainage area. Benthic data suggest the wastewater treatments plants for the towns of Newton and Cherryville and Delta Mills may be having negative effects, likely exacerbated by the drought, on Clark and Indian Creeks. Both

# Figure B-6 Catawba River Subbasin 03-08-35

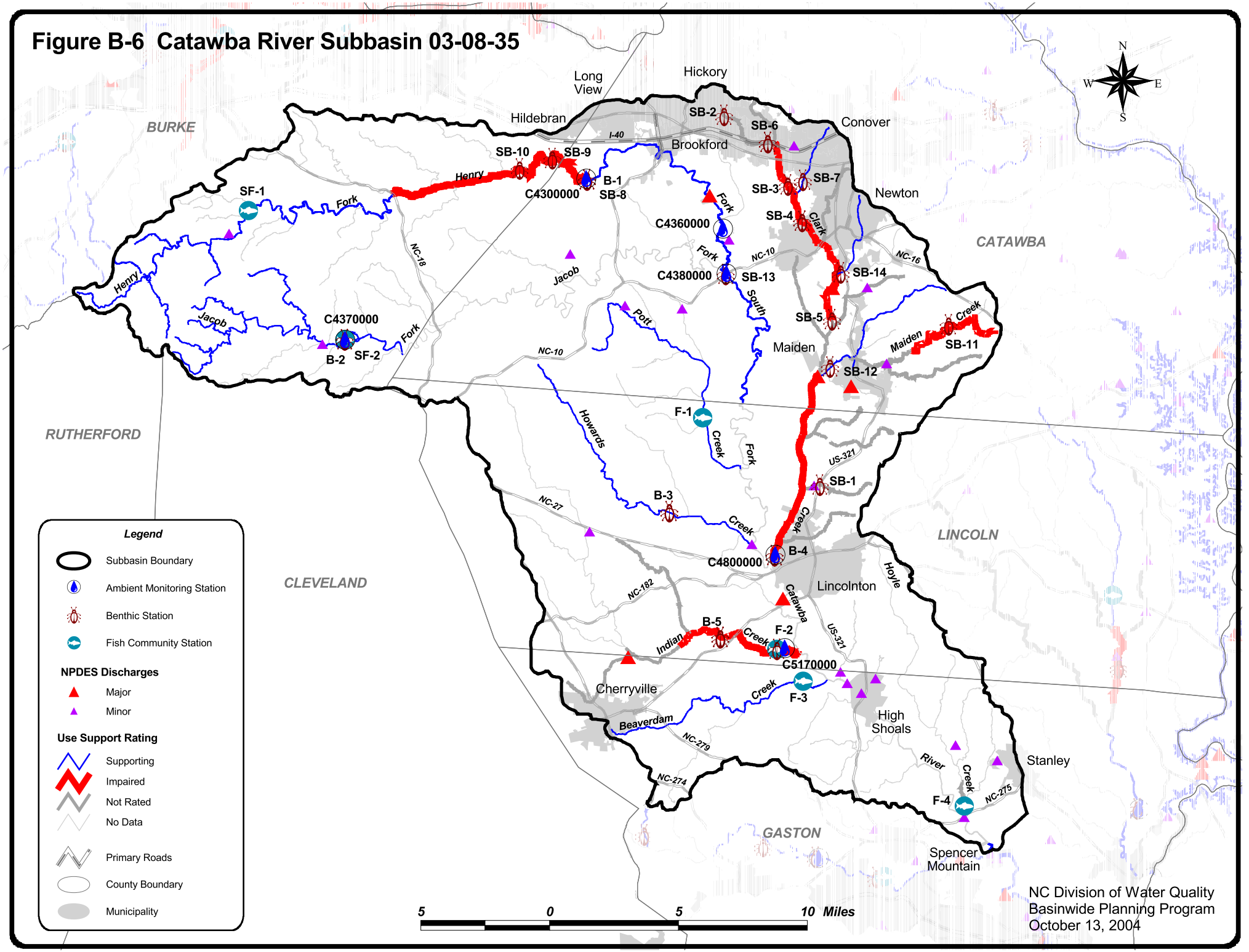

Table B-12 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 03-08-35

| Waterbody | Assessment Unit Number | DWQ Classification | Length/ Area | Category | Data Type with Map Number and Data Results | | | Use Support Rating | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Biological | Ambient | Other | 2004 | 1998 |
| Beaverdam Creek | 11-129-9-(0.7) | WS-IV | 8.3 mi. | AL | F-3 G--02 | | | S | - |
| Carpenter Creek (Horseshoe Lake) | 11-129-5-9 | C | 3.6 mi. | AL | SB-1 NR--01 | | | NR | FS |
| Clark Creek | 11-129-5-(9.5) | WS-IV | 1.8 mi. | AL | B-4 GF--97<br>B-4 F--02 | C4800000 nce | | I | PS |
| Clark Creek (Shooks Lake) | 11-129-5-(0.3)a | C | 3.3 mi. | AL | SB-2 NR--01<br>SB-6 NR--00<br>SB-6 NR--01 | | | NR | PS |
| Clark Creek (Shooks Lake) | 11-129-5-(0.3)b | C | 14.3 mi. | AL | SB-3 F--00<br>SB-4 GF--01<br>SB-4 F--02 | | | I | PS |
| Cline Creek | 11-129-5-2 | C | 3.1 mi. | AL | SB-7 NI--01 | | | S | - |
| Henry Fork | 11-129-1-(12.5)a | C | 10.3 mi. | AL | SB-9 F--01<br>SB-10 GF--01 | | | I | FS |
| Henry Fork | 11-129-1-(12.5)b | C | 4.8 mi. | AL | B-1 G--02 | C4300000 nce | | S | FS |
| Henry Fork | 11-129-1-(12.5)c | C | 8.6 mi. | AL | | C4360000 nce | | S | |
| Henry Fork | 11-129-1-(2) | C ORW | 19.5 mi. | AL | SF-1 G--98 | | | S | FS |
| Howards Creek | 11-129-4 | C | 13.8 mi. | AL | B-3 G--97<br>B-3 GF--02 | | | S | FS |
| Hoyle Creek | 11-129-15-(6) | WS-IV CA | 0.5 mi. | AL | F-4 GF--02 | | | S | - |
| Indian Creek | 11-129-8-(6.5) | WS-IV | 6.0 mi. | AL | B-5 G--97<br>B-5 F--02<br>B-5 F--03<br>F-2 F--02 | C5170000 nce | | I | ST |
| Jacob Fork | 11-129-2-(4) | WS-III ORW | 6.8 mi. | AL | | C4370000 nce | | S | FS |
| Maiden Creek | 11-129-5-7-2-(1) | WS-II | 4.9 mi. | AL | SB-11 F--02 | | | I | FS |
| Pinch Gut Creek | 11-129-5-7 | C | 7.2 mi. | AL | SB-12 G--01 | | | S | - |
| Pott Creek | 11-129-3-(0.7) | WS-IV | 3.2 mi. | AL | F-1 G--02 | | | S | - |
| South Fork Catawba River | 11-129-(0.5) | WS-V | 8.4 mi. | AL | | C4380000 nce | | S | FS |
| Town Creek | 11-129-5-4 | C | 3.8 mi. | AL | SB-14<br>GF--00 | | | S | - |

Table B-12 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 03-08-35

| Waterbody | Assessment Unit Number | DWQ Classification | Length/ Area | Category | Data Type with Map Number and Data Results | | | Use Support Rating | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Biological | Ambient | Other | 2004 | 1998 |
| Clark Creek | 11-129-5-(9.5) | WS-IV | 1.8 mi. | REC | | C4800000 ce | | NR | - |
| Henry Fork | 11-129-1-(12.5)b | C | 4.8 mi. | REC | | C4300000 nce | | S | - |
| Henry Fork | 11-129-1-(12.5)c | C | 8.6 mi. | REC | | C4360000 nce | | S | - |
| Indian Creek | 11-129-8-(5) | C | 2.6 mi. | REC | | C5170000 nce | | S | - |
| South Fork Catawba River | 11-129-(0.5) | WS-V | 8.4 mi. | REC | | C4380000 nce | | S | - |

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

**Use Categories**:
AL - Aquatic Life
REC - Recreation

**Monitoring data type:**
F - Fish Community Survey
B - Benthic Community Survey
SF - Special Fish Community Study
SB - Special Benthic Community Study
A - Ambient Monitoring Site
L - Lakes Assessment
FT - Fish Tissue Site

**Bioclassifcations:**
E - Excellent
G - Good
GF - Good-Fair
F - Fair
P - Poor

**Ambient Data**
nce - no criteria exceeded
ce - criteria exceeded

**Use Support Ratings 2004**:
S - Supporting, I - Impaired, NR - Not Rated

**Use Support Ratings 1998**:
FS - fully supporting, ST - supporting but threatened
PS - partially supporting, NS - not supporting

streams declined from Good-Fair in 1997 to Fair in 2002. Refer to *2003 Catawba River Basinwide Assessment Report* at http://www.esb.enr.state.nc.us/bar.html and Section A, Chapter 3 for more information on monitoring.

Waters in Parts 6.3 and 6.4 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 are summarized in Part 6.2 below. Recommendations, current status and future recommendations for waters that were Impaired in 1999 and newly Impaired waters are discussed in Part 6.3 below. Supporting waters with noted water quality impacts are discussed in Part 6.4 below. Refer to Appendix III for use support methods and more information on all monitored waters.

## 6.2 Use Support Assessment Summary

Use support ratings in subbasin 03-08-35 were assigned for aquatic life, fish consumption, recreation and water supply. All water supply waters are Supporting on an Evaluated basis based on reports from DEH regional water treatment plant consultants. Refer to Table B-13 for a summary of use support ratings by use support category for waters in the subbasin.

Table B-13 Summary of Use Support Ratings by Use Support Category in Subbasin 03-08-35

| Use Support Rating | Aquatic Life | Fish Consumption | Recreation | Water Supply |
|---|---|---|---|---|
| **Monitored Waters** | | | | |
| Supporting | 119.0 mi | 0 | 42.4 mi | 0 |
| Impaired | 37.2 mi | 0 | 0 | 0 |
| Not Rated | 15.0 mi | 0 | 1.8 mi | 0 |
| **Total** | **171.2 mi** | **0** | **44.2 mi** | **0** |
| **Unmonitored Waters** | | | | |
| Supporting | 36.2 mi | 0 | 0 | 297.2 mi |
| Impaired | 0 | 18.1 mi. | 0 | 0 |
| Not Rated | 42.6 mi | 520.9 mi. | 494.8 mi | 0 |
| No Data | 289.0 mi | 0 | 0 | 0 |
| **Total** | **367.8 mi** | **539.0 mi** | **494.8 mi** | **297.2 mi** |
| **Totals** | | | | |
| **All Waters** | **539.0 mi** | **539.0 mi** | **539.0 mi** | **297.2 mi** |

Note: All waters include monitored, evaluated and waters that were not assessed.

## 6.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were identified in the 1999 basin plan as Impaired or are newly Impaired based on recent data. The current status and recommendations for addressing these waters are presented below. These waters are identified by assessment unit number (AU#). Refer to the overview above for more information on AUs.

### 6.3.1 Clark Creek [AU# 11-129-5-(0.3)a, 11-129-5-(0.3)b, and 11-129-5-(9.5)]

Clark Creek drains a 91-square mile watershed, flowing from its headwaters in the City of Hickory southward through Newton and Maiden before joining the South Fork Catawba River in Lincolnton. Aquatic life is Impaired on the 16.7-mile segment of Clark Creek from Miller Branch to the South Fork Catawba River because of Fair bioclassifications at sites B-4, SB-4, SB-5 and SB-7. Additionally, 1.8 miles are Not Rated for recreation because of high fecal coliform readings at ambient site C4800000.

*1999 Recommendations*

*TMDL*: In 1999, DWQ recommended further study be conducted to determine the sources of copper, cadmium and silver. The 1999 basinwide plan noted that the TMDL process would be implemented to address fecal coliform, copper and turbidity problems in the Clark Creek watershed.

*CWMTF Grant*: DWQ conducted an intensive study of the upper Clark Creek watershed, funded by the Clean Water Management Trust Fund. This study was intended to reveal causes of biological impairment. Its results are discussed below.

*Color Reduction Strategy*: DWQ recommended that Clark Creek be included in the development of a Color Reduction Strategy for the South Fork Catawba River. Because the color issue extends beyond the boundaries of this subbasin, it is discussed further in Section A, Chapter 4, Part 4.4.

*Current Status and 2004 Recommendations*

Land use is a mixture of industrial, commercial and residential uses in the areas in and near municipalities, with widespread agricultural use in the more rural areas. Two towns, Newton and Maiden, operate major wastewater treatment plants with discharges into the creek. Additional discharges are made by multiple industrial permit holders including textile, furniture and food processors. In the early 20$^{th}$ century, almost the entire length of Clark Creek was channelized (dredged and straightened) to improve drainage of agricultural lands. Benthic macroinvertebrate communities are Impaired throughout the mainstem of Clark Creek. Aquatic habitat is generally poor. The streambed is comprised largely of unstable sand deposits, and bank erosion is widespread.

*Intensive Watershed Assessment Study*

Much progress has been made towards understanding the impacts to Clark Creek during the last assessment period. After extensive study in the Clark Creek watershed (funded by the CWMTF), DWQ published an assessment report for the upper Clark Creek watershed in

Catawba County. The study analyzed a broad range of data about the watershed to determine the most probable stressors and sources of impairment. The analysis noted the following three primary stressors:

- Widespread habitat degradation, manifested by extensive sedimentation and instability.
- Toxicity from nonpoint sources (industrial and commercial areas), together with scour (high velocity stormwater flows) and limited recolonization potential in the Clark Creek headwaters.
- Toxicity due to chlorine discharge from the Newton WWTP is a likely cause of impairment for at least one mile below the outfall.

DWQ's report recommends the following actions to address current sources of impairment and prevent future degradation. Actions one through six are all essential to the restoration of aquatic communities throughout Clark Creek. Action seven is essential to improvement in the lower portion of the study area below the Newton WWTP. The remaining actions should also be implemented, but will result in limited improvement unless the first seven are also accomplished.

1. Extensive stream channel restoration activities and stormwater retrofit BMPs should be implemented throughout the watershed. This will involve a substantial effort, likely to take several decades to fully implement.
2. These activities should be implemented deliberately and incrementally over time:
    - Work should be carried out first in tributary and headwater subwatersheds. Restoration of the mainstem of Clark Creek should be approached later when upstream sediment sources have been reduced and upstream hydrologic conditions have been mitigated to the extent practical.
    - Channel restoration and stormwater BMPs should be implemented in an integrated fashion so that both channel morphology and watershed hydrology problems are addressed using a coordinated approach in each subwatershed.
    - Local governments and other stakeholders should develop the cooperative organizational framework necessary to carry out the watershed planning, project design, implementation and monitoring activities that will be necessary to sustain the effort over time.
3. The five-square mile Cline Creek subwatershed should serve as the focus for initial planning and project activities.
4. Post-construction stormwater management should be required for all new development in the study area in order to prevent further channel erosion and continued habitat degradation.
5. Existing riparian buffers must be protected.
6. In order to prevent future water quality deterioration related to new construction activities, sediment and erosion control practices should be improved.
7. DWQ should ensure that chlorine concentrations in the Newton WWTP effluent are reduced to nontoxic levels and plans to add a chlorine limit when the permit is renewed in 2005.

8. The headcut in Clark Creek near the Martin Marietta quarry above I-40, of unknown origin, should be stabilized to prevent further erosion and sediment loading to the stream.
9. A watershed education program should be developed and implemented with the goal of targeting homeowners and managers of commercial and industrial facilities in order to reduce current stream damage and prevent future degradation.
10. Additional data should be obtained to more narrowly define the nature and source of toxicants impacting the headwater of Clark Creek.

*TMDLs*

DWQ made significant progress regarding TMDL development during the last basinwide planning cycle. In 2002, DWQ published a fecal coliform TMDL for Clark Creek.

*Fecal Coliform Bacteria TMDL*

The model outputs indicate that the sources of fecal coliform bacteria in the Clark Creek watershed include primarily urban development, animal grazing and septic systems. These sources accounted for about 53, 22 and 15 percent of the loading, respectively. In order for the water quality target to be met, the final allocation of the fecal coliform bacteria requires a nonpoint source load reduction of 77 percent/day for the various nonpoint sources of the fecal coliform bacteria.

The sewer system lines connecting the Newton Clark Creek WWTP and the sewage collection system in the watershed run along the mainstem of Clark Creek. The City of Newton should check the system to verify there are no leaks. Connection failures between the sewer pipelines or any leak from the pipe could result in fecal coliform contamination in the creek.

The model estimated that the point sources contributed about 5 percent of the total fecal coliform loading in the watershed. The wasteload allocation, based on DWQ permits, was estimated to be considerably lower than the actual discharged load. Therefore, reduction of fecal coliform loading from point sources is not necessary at this time.

*Copper TMDL*

DWQ placed a Draft Copper TMDL on public notice in December 2003 and received many comments. During the public comment period, questions were raised regarding the methodology used to determine copper concentrations in the stream. The method used by DWQ looked at the total level of copper in a sample. However, only a portion of the total copper in a sample is environmentally active, or capable of harming aquatic ecosystems. Therefore, a "Hardness Adjusted" analysis was performed to determine if the environmentally active copper exceeded state standards. The results of this analysis revealed that environmentally active copper does not exceed state standards in Clark Creek. For this reason, a copper TMDL will not be published and copper impairment on Clark Creek will be removed from the next revision of the 303(d) list.

*Planning Considerations*

As indicated by the conclusions of the watershed assessment and TMDL efforts, the most important factors leading to impairment in the Clark Creek watershed are broad in nature, originating from a wide variety of sources. Addressing these problems will require actions that are similarly broad in scope. Mitigating the potential impacts of future watershed development on watershed hydrology is also critical, or improvements resulting from efforts to control current

sources of impairment may be short lived. The work described above provides the basic information and framework necessary to develop a successful management strategy for the Clark Creek watershed. It is now up to local governments, along with local citizen and business input, to develop their own management techniques with assistance from DWQ. Please refer to Section A, Chapter 4, Part 4.8.

### 6.3.2 Maiden Creek [AU# 11-129-5-7-2-(1)]

*Current Status and 2004 Recommendations*
Maiden Creek begins its journey to Clark Creek just west of NC 16 in southern Catawba County. The stream is impounded just above its confluence with Allen Creek to Maiden Reservoir. The Town of Maiden uses Maiden Reservoir for its public drinking water supply. The 4.9-mile segment from its source to a point 0.7 mile upstream from backwaters of Maiden Reservoir is Impaired because of a Fair bioclassification at site SB-11.

This site at SR 1810 (Catawba County) was sampled at the request of the NC Division of Water Resources (DWR). DWR sought benthic data to determine minimum flow requirements for the Town of Maiden's water supply reservoir. The resulting Fair bioclassification indicates the stream is in a state of severe stress. DWQ suggests further study be conducted to determine stressors and sources of impairment in this relatively small watershed. Identification and effective management of those stressors may reduce operating costs and efficiency at the Town of Maiden water treatment plant. Being part of the larger Clark Creek watershed, DWQ recommends Maiden Creek be considered in any management plan developed for Clark Creek (Section B, Chapter 6, Part 6.3.1).

### 6.3.3 Indian Creek [AU# 11-129-8-(6.5)]

*Current Status and 2004 Recommendations*
The watershed of Indian Creek includes western Lincoln County and the extreme northwestern corner of Gaston County encompassing the north side of the Town of Cherryville. The fish sample site (F-2) is eight miles below the Town of Cherryville's WWTP (2 MGD) and a smaller WWTP associated with the West Lincoln High School (0.01 MGD). Aquatic life is Impaired in the 6.0-mile segment from a point 0.3 mile upstream of Lincoln County SR 1169 to South Fork Catawba River as indicated by Fair bioclassifications at sites F-2 and B-5.

The overall stream and riparian habitats are of moderately high quality, but fish sampling resulted in a Fair bioclassification in 1997 and 2002. Further study should be conducted to determine the stressors causing impairment. DWQ will continue to monitor this stream.

### 6.3.4 Mauney Creek [AU# 11-129-15-5]

*Current Status and 2004 Recommendations*
About 4.3 miles of Mauney Creek was listed Impaired due to both nonpoint and point sources (Stanley WWTP) of pollution.

In the 1999 basin plan, DWQ pledged to continue working with the Stanley WWTP facility to assure permit limits are met and noted that additional resources will be necessary to conduct a

watershed survey to determine the potential actions needed to address nonpoint sources of pollution in this creek. This remains true.

The Stanley WWTP conducts whole effluent toxicity tests on the discharge and has been in compliance with permit limits recently. Recent compliance is due to improvements made at the facility, including dechlorination and implementation of an industrial pretreatment program. In addition, some flow from Stanley WWTP has been diverted to Mount Holly. This cooperation reduces the number of sewer overflows for the Stanley system.

DWQ will resample this stream in the next assessment cycle.

### 6.3.5 Henry Fork [AU# 11-129-1-(12.5)a]

*Current Status and 2004 Recommendations*
Henry Fork drains central Burke County south of Morganton. It flows along the south side of Hickory before joining with Jacob Fork to form the South Fork Catawba River in Catawba County. Water quality in the upper segments of the river have been rated Good since 1989.

Two sites on Henry Fork (Burke County) were sampled as part of a study to examine the effects of a breached milldam. This breaching released large amounts of sediment into portions of the stream. Site SB-10, upstream of the breached milldam, had good riffle habitat with a mix of boulder, rubble, gravel, and sand and silt substrates. The sampling resulted in a Good-Fair bioclassification.

The stream below the dam (SB-9) was noticeably impacted by the sediment release as evidenced by the sand dominated substrate (~70 percent). The sand was several feet thick and was sufficient to eliminate all bank and most riffle habitats. The site was given a Fair bioclassification.

The impacts of sediment from the breached dam have Impaired aquatic life in the 10.3 mile segment from Laurel Creek to SR1124, but the effects may be temporary. The presence of good habitat directly above and below the impairment will aid in the recolonization of the segment, as sediment is washed downstream. DWQ will continue to monitor this segment.

The lower reach of Henry Fork [11-129-1-(12.5)c] appears on the *2002 Integrated 304(b) and 303(d) Report* because of turbidity levels. Data from this assessment period indicate that the turbidity standard was not exceeded. However, there were periods where turbidity was elevated above natural conditions. DWQ will continue to monitor this segment and again determine the conditions of Henry Fork the next assessment period.

## 6.4 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 have been documented for some waters based on this assessment. While these waters are not Impaired, attention and resources should be focused on these waters to prevent additional degradation or facilitate water quality improvement. Waters in the following

section are identified by assessment unit number (AU#). See overview for more information on AUs.

### 6.4.1 South Fork Catawba River [AU# 11-129-(0.5), 11-129-(3.5), 11-129-(3.7)a, 11-129-(3.7)b, 11-129-(9.5), 11-129-(10.5), 11-129-(14.5), 11-129-(15.5)]

The South Fork Catawba River is formed by the confluence of Jacob and Henry Forks in Catawba County. It flows southerly through Lincoln and Gaston counties before joining the mainstem Catawba River at Lake Wylie. The river is used extensively as both a drinking water supply and for the assimilation of municipal and industrial wastewater. Because the South Fork Catawba River flows through two subbasins, further discussion of issues and watersheds related to the South Fork Catawba River is presented in Section A, Chapter 4.

### 6.4.2 Howards Creek [AU# 11-129-4]

Howards Creek is only six meters wide and has predominately sand and silt substrates, poor riffles, and an intact riparian zone. In 1997, banks were considered stable, but there were many erosion areas detected in 2002. The stream was rated Good in 1992 and 1997, but declined to Good-Fair in 2002. The decline most likely resulted from the low flow due to drought and not declining water quality.

### 6.4.3 Hoyle Creek [AU# 11-129-15-(6)]

From 1997 to 2002, the bioclassification at site F-4 declined from Good to Good-Fair. The decline did not appear to be drought related. This stream is entrenched with easily eroded banks. There are three NPDES facilities with a combined discharge of 0.6 MGD above the site: Lincoln County's WWTP; the Town of Stanley's Lola Street WWTP; and a small, mobile home park's WWTP. Further investigation should be conducted on this stream to determine the cause of decline in the fish community.

### 6.4.4 Town Creek [AU# 11-129-5-4]

Town Creek drains a portion of the Town of Newton. This stream was sampled for the first time in 2000 and received a Good-Fair bioclassification. This borderline classification likely reflects impacts from urban stormwater runoff and residential nonpoint source pollution. Refer to Section A, Chapter 4, Parts 4.11 and 4.13 for information on urban runoff and habitat degradation.