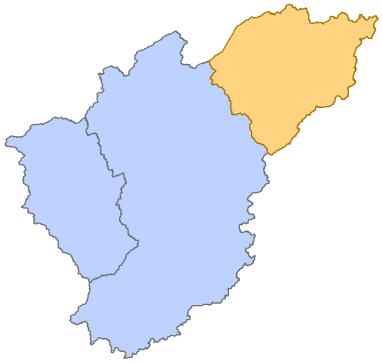
# Chapter 3
# Nolichucky River

*Part of Hydrologic Unit Code 06010108*



## Subbasin Overview

The Nolichucky River subbasin, which is the combination of the former DWQ subbasins 04-03-06 and 04-03-07, covers approximately 630 square miles. The Nolichucky River begins at the confluence of the North Toe River and Cane River about 10 miles before it enters Tennessee. The Nolichucky River continues to flow west until it meets the French Broad River at Douglas Lake near White Pine, Tennessee. Mount Mitchell, the tallest mountain in North Carolina, divides the headwaters of the South Toe River and Cane River watersheds. Mining and ornamental tree farming are common activities in the headwaters of the subbasin and are key economic contributors to the area.

The South Toe, North Toe, Cane, and Nolichucky Rivers make up a few remaining areas that still support populations of the Federally Endangered Appalachian Elktoe. This mussel species, once found throughout the mountains of western North Carolina requires clean, well-oxygenated waster that flows at a moderate to fast pace. They also require stable, relatively silt-free, gravelly or rocky stream bottoms (USFWS, 2008).

**WATERSHED AT A GLANCE**

**COUNTIES**
Avery, Buncombe, Madison, Mitchell, Yancey

**MUNICIPALITIES**
Bakersville, Burnsville, Newland, Spruce Pine, Sugar Mountain

**POPULATION**
1990: 36,321
or 58 per mi$^2$ 2000:
41,556 or 66 per mi$^2$

**2001 LAND COVER**
Developed: 5.6 %
Forest: 81.6 % Agriculture: 8.5 %
Other: 4.3 %

**EPA LEVEL IV ECOREGIONS**
Southern Crystaline Ridges and Mountains
Southern Metasedimentary Mountains
Southern Sedimentary Ridges
High Mountains

## Population and Land Cover

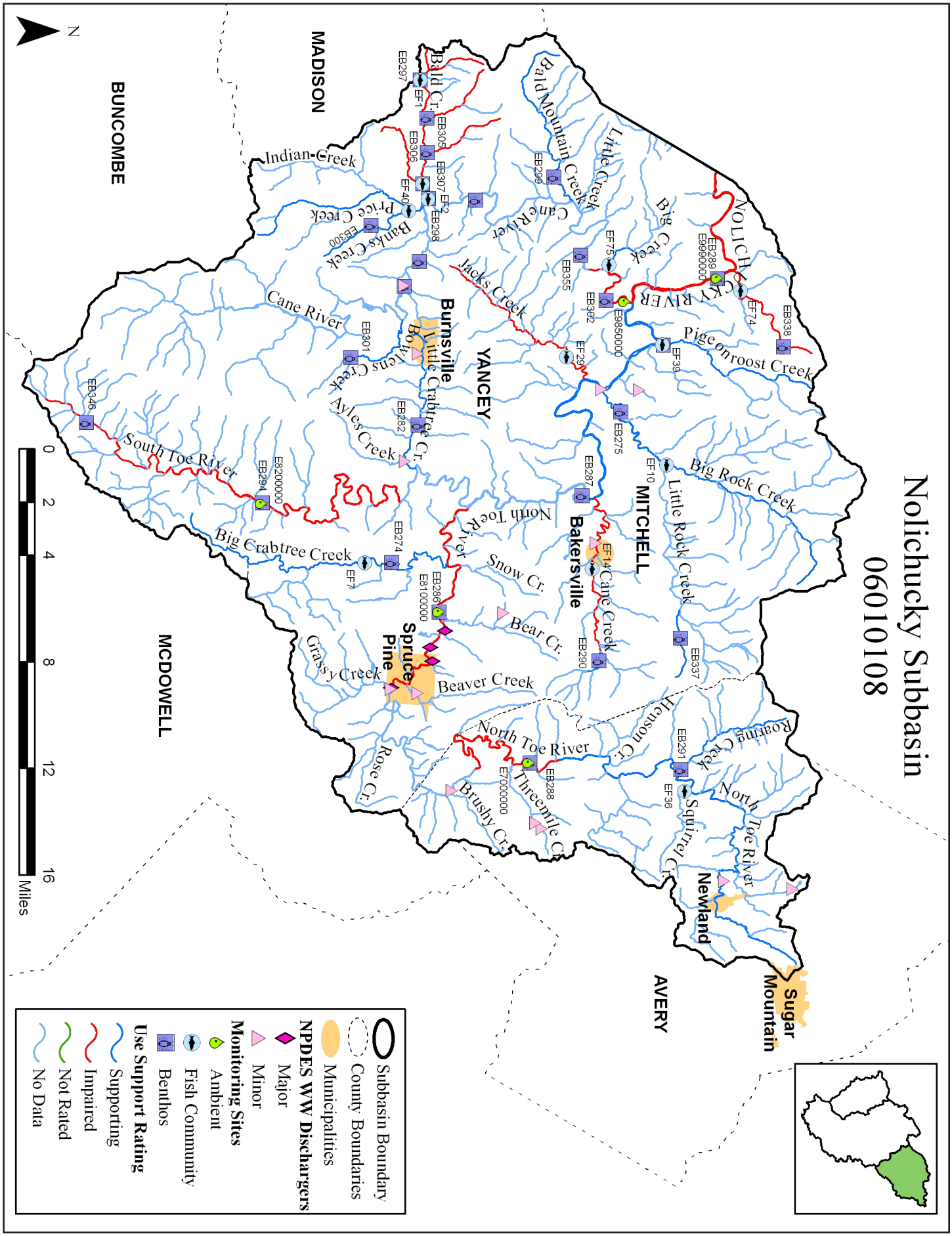
The Nolichucky River subbasin has the lowest overall population, and lowest population density in the French Broad River basin. It is also growing at a slower pace than the rest of the basin. This subbasin has the greatest percentage of land covered by forest and is the least agricultural. This is mostly likely the result of steep slopes and the lack of suitable locations for development and agriculture.

## Permits

**NPDES Wastewater Discharge**

There are 19 NPDES individual wastewater discharge permits in this subbasin with a total permitted flow of 17.21 million gallons per day (MGD). Six of those dischargers are permitted to discharge one MGD or more of treated wastewater. They are the Unimin Corporation Quartz (3.6 MGD); Feldspar Corporation Spruce Pine Facility (3.5 MGD); Unimin Corporation Schoolhouse Quartz (2.16 MGD); Spruce Pine WWTP (2 MGD); Unimin Corporation Red Hill Quartz Processing Plant (2 MGD); and K-T Feldspar Corporation Spruce Pine (1.73 MGD). Figure 3-1 shows the location of all individual NPDES wastewater permits in this subbasin. For a complete list of all individual NPDES wastewater permits see Appendix V.

**FIGURE 3-1: NOLICHUCKY RIVER SUBBASIN (06010108)**



**Stormwater**

The ***Stormwater Permitting Unit*** of the ***Wetlands and Stormwater Branch*** is responsible for the development, planning, and implementation of statewide stormwater control policies, strategies, and rules designed to protect the surface waters of North Carolina from impacts of stormwater pollutants and run-off volumes. The Unit handles permitting for industrial, municipal, and post-construction (for development projects) stormwater programs, as well as provides technical assistance to the regulated community, engineers, industry, citizens, and local governments.

**Animal Operations**

There are no registered animal operations in the Nolichucky River subbasin; however, there may be livestock in the watershed that is not reported or does not meet the minimum criteria requiring a permit.

## Ambient Water Quality

There were five sites sampled as part of DWQ's AMS. Of those five sites, four resulted in turbidity impairments; two in copper impairments; and one low pH impairment. Two sites exceeded the screening criteria for fecal coliform bacteria but require five samples in a 30 day period in order to make a determination as to whether those waterbodies should be impaired. One Random Ambient Monitoring System (RAMS) site sampled in 2007 and 2008 resulted in an impairment for low pH.

## Biological Health

Twenty-seven benthic macroinvertebrate samples were taken in the Nolichucky River subbasin from January 2004 - December 2008 at 23 different locations. Figure 3-2 shows the current site rating for all benthic macroinvertebrate sampling sites in which at least one sample was taken during the assessment period and figure 3-3 illustrates how those site ratings changed. Eight fish community samples were taken in the Nolichucky River subbasin from January 2004 through December 2008 at seven different locations.

Two fish kills were reported in the Nolichucky River watershed between January 2004 and December 2008.

**Figure 3-2: Current Benthos Site Rat-**

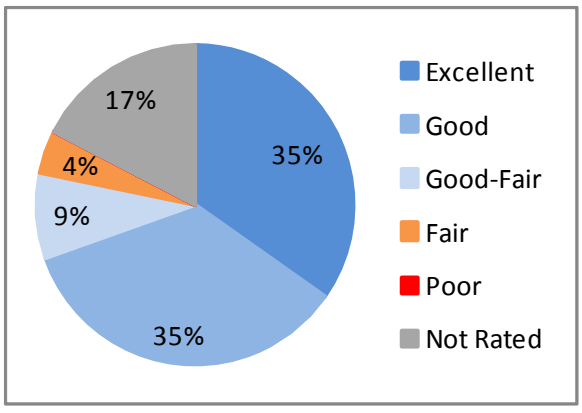
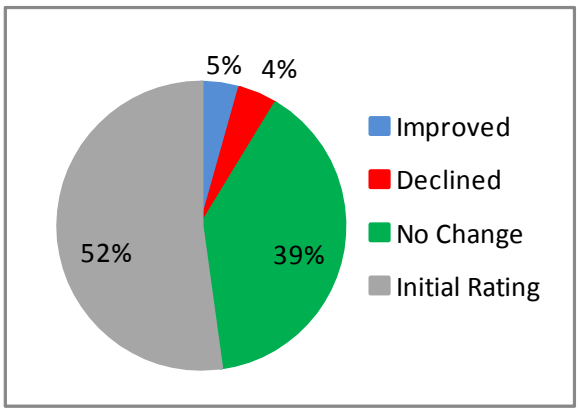



**Figure 3-3: Change in Benthos Ratings**




# Local Water Quality

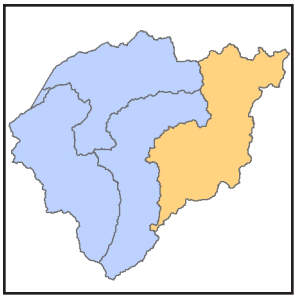
The North Carolina portion of the Nolichucky River subbasin has five 10-digit hydrologic units. Table 3-1 lists these watersheds with a summary of their sizes and the number of locations that were sampled between January 2004 and December 2008.

**Table 3-1: 10-Digit Hydrologic Unit or Watersheds in the Nolichucky River Subbasin**

| 10-Digit HUC | Name | Square Miles | Benthic Sites | Fish Com. Sites | Ambient Sites |
|---|---|---|---|---|---|
| 0601010801 | Headwaters North Toe River | 183.1 | 3 | 2 | 2 |
| 0601010802 | South Toe River - North Toe River | 147.2 | 3 | 1 | 1 |
| 0601010803 | Cane River | 157.8 | 12 | 1 | 1 |
| 0601010804* | South Indian Creek | 2.2 | 0 | 0 | 0 |
| 0601010806* | North Indian Creek - Nolichucky River | 139.3 | 5 | 3 | 2 |

*Denotes HUC is only partially in North Carolina and the area was only calculated for that portion.

## Headwaters North Toe River Watershed (0601010801)



This watershed contains the municipalities of Newland and Spruce Pine. There are eight minor and four major NPDES individual wastewater discharge permits in this watershed, with permitted flows totaling 14.19 MGD.

**Threemile Creek - North Toe River Subwatershed (060101080103)**
A private company contracted by EEP restored or preserved approximately 12,384 linear feet of Three Mile Creek and 13 tributaries of Three Mile Creek. Also, 2.3 acres of wetlands were enhanced and another 2.5 acres of wetlands were restored as part of this project. With the support and cooperation of the agricultural community for the watershed restoration effort, agricultural issues related to livestock grazing and ornamental tree farming have been addressed.

The Blue Ridge Resource Conservation and Development Council completed the removal of the Shane Vance Dam, also known as the Altapass Dam, on Rose Creek in the summer of 2010. Once the dam was removed, the natural hydrology was restored and woody vegetation was planted. This project improves habitat for the native brook trout by allowing for upstream migration. Once it becomes established, the vegetation planted along the restored stream bank will serve as a riparian buffer and should improve water quality.

North Toe River [AU # 7-2-(21.5)] is Impaired for turbidity and copper. Ambient monitoring site E7000000 exceeded the turbidity standard in 19.6 percent of the samples and exceeded the copper standard in 14.3 percent of the samples. DWQ is working with stakeholders to form the North Toe River Watershed Group to reduce turbidity in the watershed and restore the North Toe River.

Benthic macroinvertebrate samples were collected from Brushy Creek [AU # 7-2-29] in the summer of 2010 to assess the impacts that mining activities are having on small adjacent stream prior to planned management measure installations (BAU Memorandum 20100409).

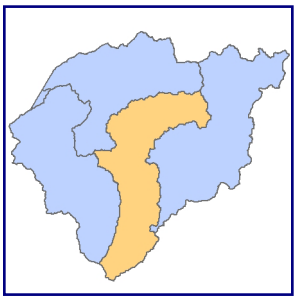
**Bear Creek - North Toe River Subwatershed (060101080106)**
A concrete dam was constructed on the North Toe River in 1949 just downstream of the Town of Spruce Pine to provide hydroelectric power. The dam was not in operation for several decades, and a portion of the dam had been breached to accommodate high water flow conditions. However, much of the dam structure remained in place and was impeding flow during normal low-flow conditions. The Blue Ridge Resource Conservation and Development Council partnered with the Mitchell County Soil and Water Conservation District and removed this dam in 2010. This project was partially funded by a United States Fish and Wildlife Service grant because the North Toe River provides habitat for the endangered Appalachian Elktoe.

North Toe River [AU # 7-2-(27.7)b] is Impaired for turbidity. AMS site E8100000 exceeded the turbidity standard in 36.5 percent of the samples. Mining operations in the subwatershed are a potential source of sediment

and DWQ is working with the mines, as well as, other stakeholders to reduce turbidity in the North Toe River. For more information on the ongoing effort to reduce turbidity in the river visit the ***Headwaters North Toe River Use Restoration Watershed website***.

Benthic macroinvertebrate samples were collected from Little Bear Creek [AU # 7-2-45] in the summer of 2010 to assess the impacts that mining activities are having on small adjacent streams prior to planned management measure installations (BAU Memorandum 20100409).

## South Toe River - North Toe River Watershed (0601010802)



The headwaters of the South Toe River drain the eastern slope of Mount Mitchell, the tallest mountain in the United States east of the Mississippi River. The Town of Bakersville and the eastern part of Burnsville are located in this watershed. There are two minor NPDES individual wastewater discharge permits in this watershed, with permitted flows totaling 0.21 MGD.

**Upper and Lower South Toe River Subwatersheds (060101080201 and 060101080203)**

South Toe River [AU # 7-2-52-(1)] is currently Impaired due to low pH at AMS site E8200000. Over 90 percent of the of the area draining to the sampling site is in conservation. Normally, pH in French Broad River Basin should be 6-9 s.u. The cause of low pH is not yet determined. The pH meter was replaced in April 2010 and samplers received additional training. It is still to early to determine if low pH values were result of sampling errors or some other cause. Acidic atmospheric deposition has been shown to be greatest in the southern Appalachian Mountains in areas with the highest elevations, thus atmospheric deposition could contribute to low pH. A TMDL is currently being developed by the TDEC for low pH in the Great Smoky Mountains National Park resulting mainly from acidic atmospheric deposition. This TMDL may reduce atmospheric deposition in North Carolina by reducing the amount of atmospheric pollution from Tennessee. It is uncertain whether the low pH in the South Toe River is the result of atmospheric acid deposition or some other source. Benthic macroinvertebrate sampling site EB294 at this same location rated Excellent in 2007.

**Cane Creek Subwatershed (060101080204)**

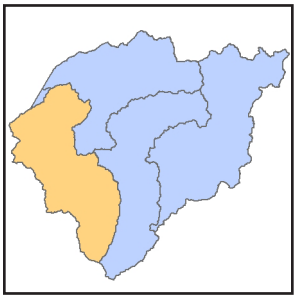
Cane Creek [AU # 7-2-59] is Impaired for biological integrity due to a Fair rating at fish community sampling site EF14. In May 2007, a fish kill of approximately 250 fish occurred in Whiteoak Creek [AU # 7-2-59-9], near Bakersville. After sampling, DWQ determined that a DO sag related to heavy rainfall likely caused this fish kill.

EEP currently has two projects in the Cane Creek watershed: the Dog Bite Creek Project and Elk Branch Project. The Dog Bite Creek Project consists of stream enhancement of 1,156 linear feet and stream restoration of 2,580 linear feet. The Elk Branch Project consists of the preservation of 950 linear feet and restoration of 2,458 linear feet of Elk Branch.

**Pigpen Creek - North Toe River Subwatershed (060101080205)**

EEP has initiated a project to restore 5,257 linear feet of Sink Hole Creek and three unnamed tributaries to Sink Hole Creek. Also included as part of the project is the preservation of 1,076 linear feet on an unnamed tributary to Sink Hole Creek.

## Cane River Watershed (0601010803)



The western half of Burnsville is the only municipal entity located in this watershed. There is one minor individual NPDES wastewater discharge permit in the watershed with a permitted flow of 0.8 MGD.

**Headwater Cane River Subwatershed (060101080301)**
A portion of upper Cane River has been impacted by historic instream gravel mining. This gravel mining has altered the natural substrate and stream channel. The current stream channel resembles that of a coastal plain braided stream. The Blue Ridge Resource Conservation and Development Council has selected this as a potential stream restoration project.

**Upper Cane River Subwatershed (060101080303)**
In the spring of 2008, DWQ found the Burnsville WWTP was upset by toxic waste that had not been reported. A survey of the Cane River below the plant resulted in the discovery of dead organisms in the river, including the Federally Endangered Appalachian Elktoe. The Town of Burnsville WWTP has undergone significant upgrades since this episode. DWQ continues to monitor the plant and the Cane River.

The Blue Ridge Resource Conservation and Development Council is in the planning stage of a project that would remove the Cane River Dam, which is located immediately upstream of the Burnsville WWTP discharge outfall. This project is of high priority because it will enable the migration of critical species.

**Middle Cane River Subwatershed (060101080305)**
Bald Creek [AU # 7-3-22], Possumtrot Creek [AU # 7-3-22-7], Lickskillet Branch [AU # 7-3-22-5], Elk Wallow Creek [AU # 7-3-22-4], and Fox Creek [AU # 7-3-22-1] are all currently Impaired due to high levels of fecal coliform bacteria found in samples taken in 2004. In January 2006, EEP completed the ***Bald Creek Local Watershed Plan***. The source of the fecal coliform bacteria is unknown, but may be from livestock, failing septic systems, and straight piping. These streams were also noted as suffering from channelization, as well as lack of buffers, pools, and riffles.

EEP is currently in the design phase of a project located on an unnamed tributary to Bald Creek. This project is planned to preserve 900 linear feet, enhance 150 linear feet, and restore 1,150 linear feet of an unnamed tributary to Bald Creek.

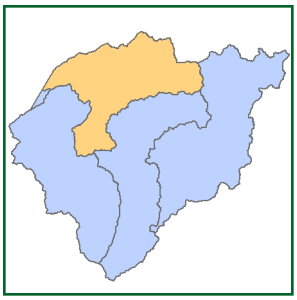
In April 2008, a fish kill of approximately 60 fish was reported on the Cane River at State Road 1381. The cause of the kill may have been related to problems at the Burnsville WWTP. The Burnsville WWTP had experienced slugs of low pH waste, among other problems. A noticeable chlorine, wastewater aroma was observed in the kill area. More recently, the Town of Burnsville's WWTP has received several upgrades which will give the facility better ability to sustain compliance. Improvements in the Town's pretreatment program have led to better categorization of the incoming waste stream and also reduced the potential of a 'slug' to impact the treatment plant. DWQ is working with local stakeholders to form a group to address issues in Cane River and entire upper Nolichucky watershed.

**Lower Cane River Subwatershed (060101080306)**
Cane River [AU # 7-3-(13.7)b] is currently Impaired for turbidity due to samples collected at ambient monitoring system site E9850000 and Not Rated for high water temperature because of inconclusive data.

## South Indian Creek Watershed (0601010804)

Only about two square miles of this watershed is located within North Carolina and all flow drains into Tennessee. The entire North Carolina portion of the watershed is located within the Pisgah National Forest.

## North Indian Creek - Nolichucky Watershed (0601010806)



Over one-quarter of the watershed is managed by the US Forest Service as part of the Pisgah National Forest. There are two minor individual NPDES wastewater discharge permits in this watershed, with permitted flows totaling 2.0 MGD.

**Jacks Creek Subwatershed (060101080601)**
Jacks Creek [AU # 7-2-63] is Impaired for biological integrity due to a Fair rating at fish community sampling site EF29 in 2002. When the sample was taken, it was noted that buffers were lacking in many areas along Jacks Creek and its tributaries. This site also rated Fair in 1997.

**Hollow Poplar Creek - Nolichucky River Subwatershed (060101080604)**
Hollow Poplar Creek [AU # 7-10] is impaired for low pH due to results from Random Ambient Monitoring System site E9993000. Higher elevations in the Appalachian Mountains, such as those found in the Hollow Poplar Creek watershed, have been shown to have higher rates of acidic atmospheric deposition. A TMDL is currently being developed by the TDEC for low pH in the Great Smoky Mountains National Park resulting mainly from acidic atmospheric deposition. This TMDL may reduce atmospheric deposition in North Carolina by reducing the amount of atmospheric pollution coming from Tennessee. It is uncertain whether the low pH in the Hollow Poplar Creek is the result of atmospheric deposition or some other source.

Nolichucky River [AU # 7] is Impaired for turbidity and copper. AMS site E9990000 exceeded the turbidity standard in 16.7 percent of the samples and exceeded the copper standard in 25.0 percent of the samples. No samples have been collected at this location since January 1, 2007.

## Recommendations

The Nolichucky River subbasin has multiple rivers that are Impaired for turbidity. DWQ staff in the ARO have partnered with the Wildlife Resource Commission, the Natural Heritage Program, the US Fish and Wildlife Service, the Toe River Valley Watch, as well as the Imerys and Unimin mining companies, along with a wide variety of additional local stakeholders to reduce sedimentation and restore the North Toe River. This group is in its formative stage and has high potential for cooperation between the public and private sectors to improve water resources, as well as economic and community well-being. It is recommended that the Division support the formation of this coalition and the implementation of management approaches developed by the group.

The removal of the Cane River Dam would allow for the upstream migration of critical species such as the Appalachian Elktoe and the Hellbender Salamander. Allowing these species to populate the pristine headwaters of the Cane River provides them with a protected habitat, so that once water quality has been restored in the lower portions of the river the species can then recolonize areas impacted by the Burnsville WWTP.

Agricultural BMPs and stream restoration are needed in both the Bald Creek watershed and Jacks Creek watershed in Yancey County. Agricultural BMPs could be put into place by the local soil and water conservation district. EEP has designated both of these watersheds as targeted local watersheds and are already planning stream restoration in the Bald Creek watershed.

Copper has become an emerging issue in this subbasin, but is not yet well understood. A better understanding of copper and its impacts on aquatic life are needed to better assess water quality for copper.

Further investigation into the cause of fish kills in White Oak Creek in Mitchell County is needed. There have been three fish kills in recent years with no definitive reason.

**FIGURE 3-4: HEADWATERS NORTH TOE RIVER WATERSHED WITH 2010 USE SUPPORT**

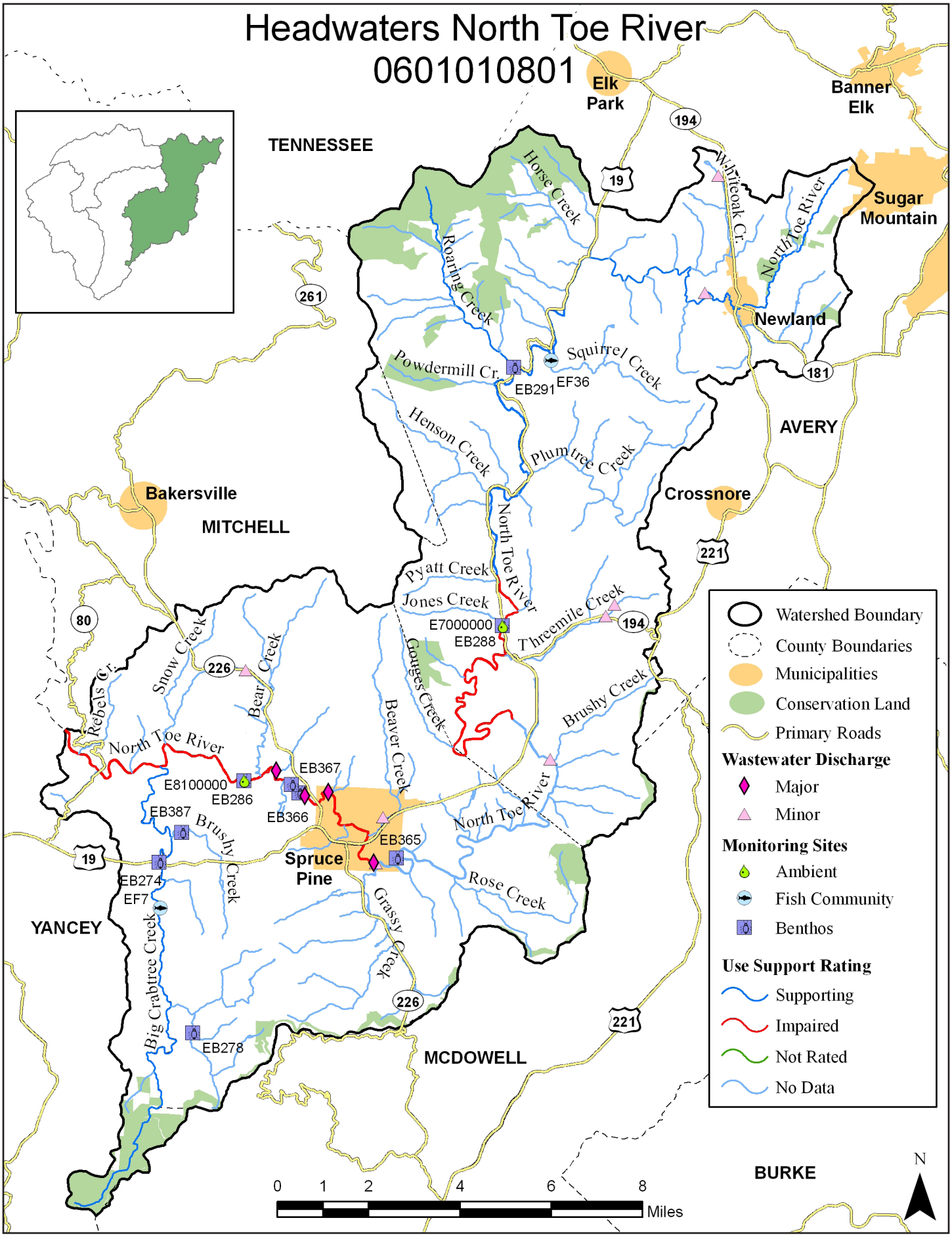


**FIGURE 3-5: SOUTH TOE RIVER WATERSHED WITH 2010 USE SUPPORT**

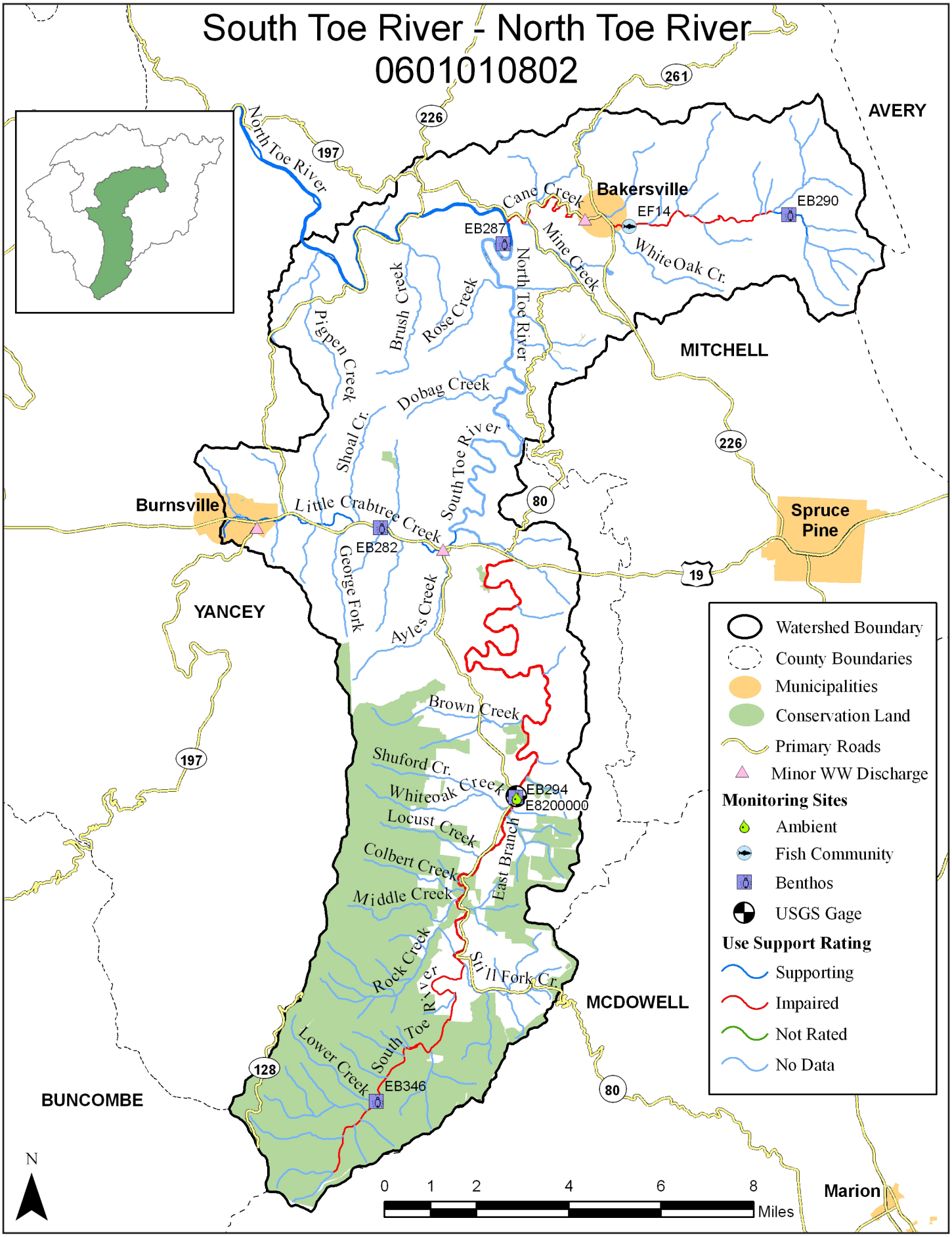


**FIGURE 3-6: CANE RIVER WATERSHED WITH 2010 USE SUPPORT**

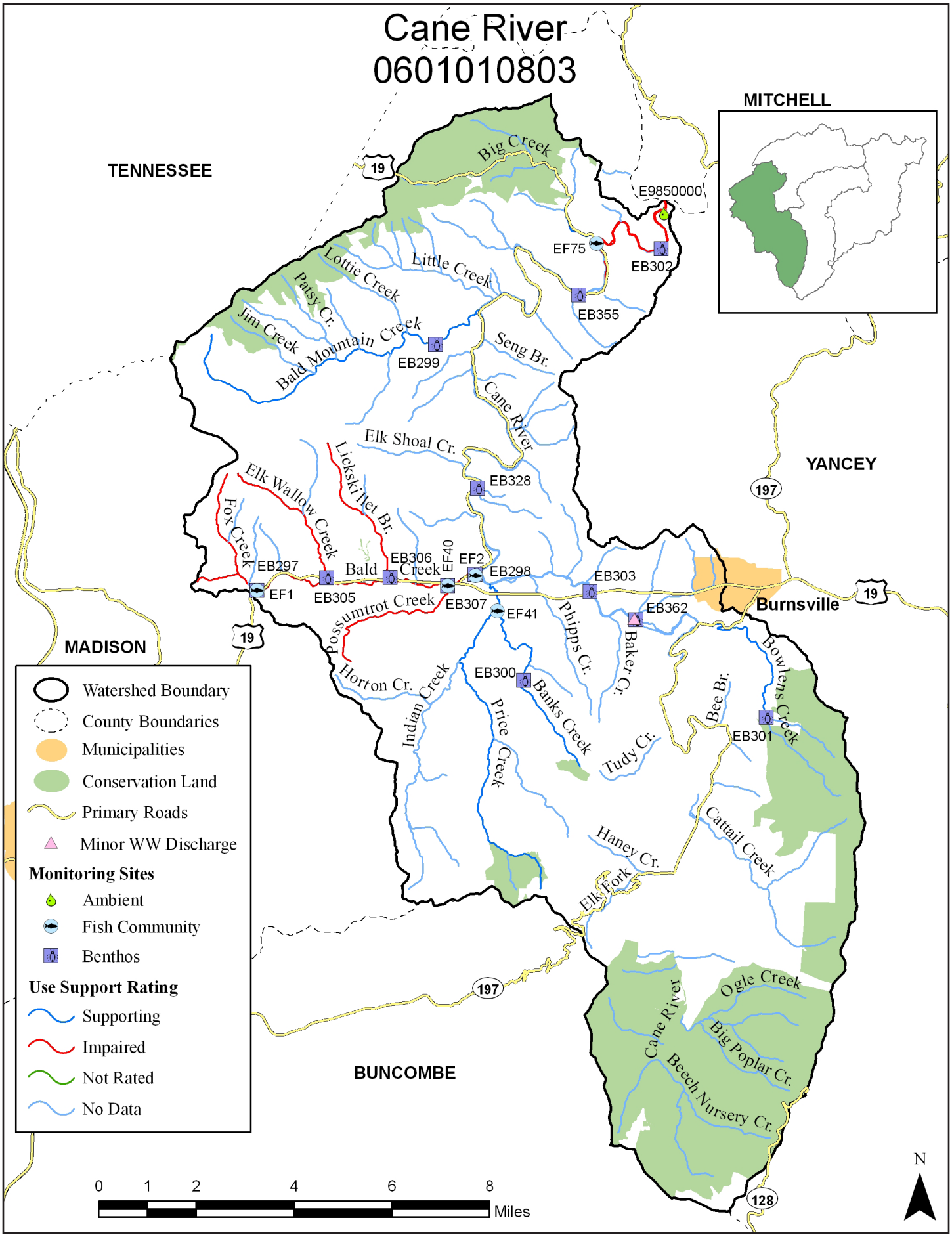


**FIGURE 3-7: NORTH INDIAN CREEK WATERSHED WITH 2010 USE SUPPORT**