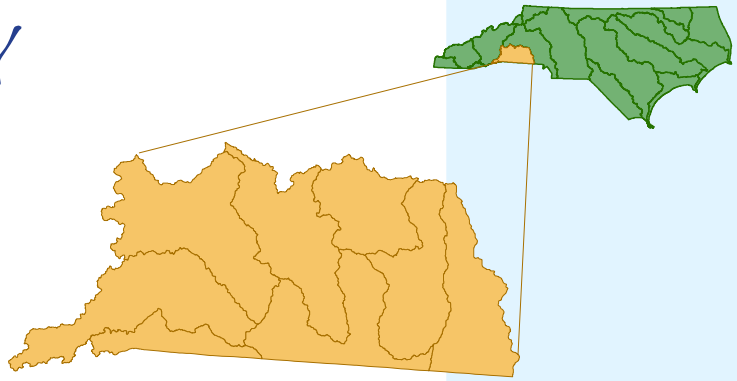
# Broad River Basin Summary

## HUC 03050105

## 2008



## River Basin Description

The Broad River basin encompasses 5,419 square miles within North and South Carolina. The North Carolina portion covers 1,513 square miles - nearly 28 percent of the entire watershed. The headwaters and major tributaries in the Broad River basin begin in the Blue Ridge Mountains of western North Carolina. The river continues to flow south-southeast through the foothills and southern piedmont into Cherokee County, South Carolina where it eventually joins the Congaree and Santee Rivers and then the Atlantic Ocean.

The geography of the Broad River basin itself contributes to its ecological significance. The basin drains a section of the Blue Ridge escarpment, but the area is primarily within the piedmont. This provides a wide range of habitat types. The Broad River basin is home to 15 rare aquatic and wetland-dwelling animal and plant species and includes a considerable portion of the South Mountains – a biologically rich area that is considered of national importance for its ecological assemblage. Five Natural Heritage Program (NHP) Priority Areas are found in the basin: the Rollins/South Mountains Natural Area, Hickory Nut Gorge, the Green River Gorge, the Pacolet River Gorge, and Pinnacle Mountain. Chimney Rock State Park and a portion of Crowders Mountain State Park are also located in the basin.

It also contains 1,508 miles of freshwater streams. The average drainage area is 0.98 square miles per stream mile, but the average is much smaller in the western portion of the basin where there is mountainous terrain. Areas with high drainage density (total length of streams divided by total drainage basin) are associated with high flood peaks, high sediment production, relatively low suitability for traditional agriculture, and high development costs for the construction of buildings and the installation of roads and bridges.

### Population & Land Cover Data

Population distribution and land cover patterns are highly variable in the Broad River basin. Land use varies from generally undisturbed areas in the headwater tributaries to relatively urban areas around the Towns of Spindale, Forest City, Rutherfordton, and the City of Shelby. As seen in this basin, converting land from an undisturbed forested area to an urban commercial/residential community can have significant impacts on local waterways.

### River Basin at a Glance

#### Counties

Buncombe, Cleveland, Gaston, Henderson, Lincoln, McDowell, Polk, Rutherford

#### Municipalities

Belwood, Boiling Springs, Bostic, Casar, Cherryville, Chimney Rock Village, Columbus, Earl, Ellensboro, Fallston, Forest City, Grover, Kings Mountain, Kingstown, Lake Lure, Lattimore, Lawndale, Mooresboro, Patterson Springs, Polkville, Ruth, Rutherfordton, Saluda, Shelby, Spindale, Tryon, Waco

#### Permitted Facilities

**NPDES WWTP**
- Major: ..... 14
- Minor: ..... 30

**NPDES Nondischarge**: ..... 7

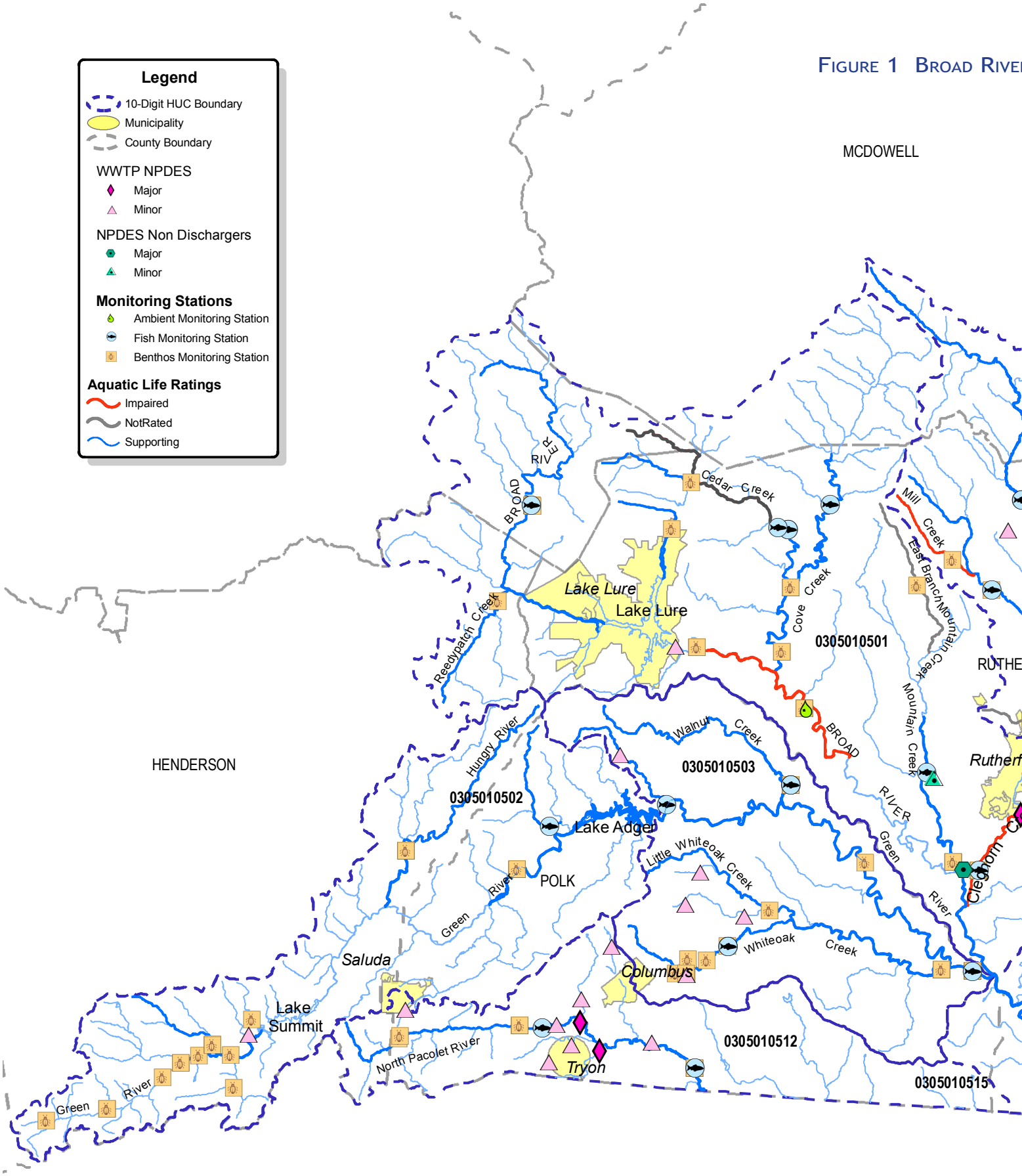
**NPDES Stormwater**
- General: ..... 90
- Individual: ..... 2

**Animal Operations**: ..... 20

#### Monitored Stream Miles (Aquatic Life)

Total Stream Miles ..... 1,500 mi
Monitored: ..... 570 mi
Total Supporting: ..... 463 mi
Total Impaired: ..... 85 mi
Total Not Rated: ..... 22 mi

## FIGURE 1 BROAD RIVER




North Carolina Department of Environment and Natural Resources,
Division of Water Quality, Planning Section,
Basinwide Planning Unit
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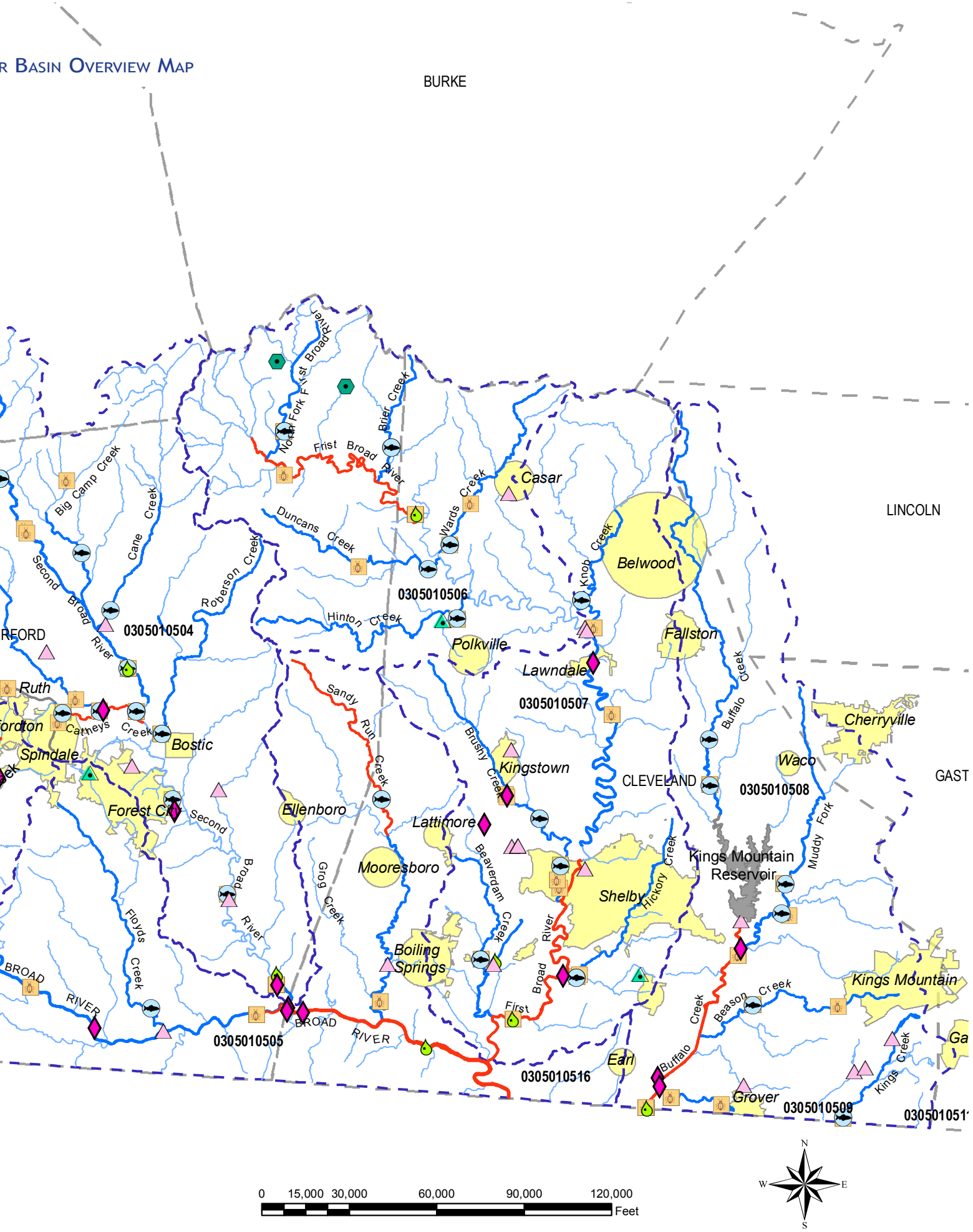
# R BASIN OVERVIEW MAP



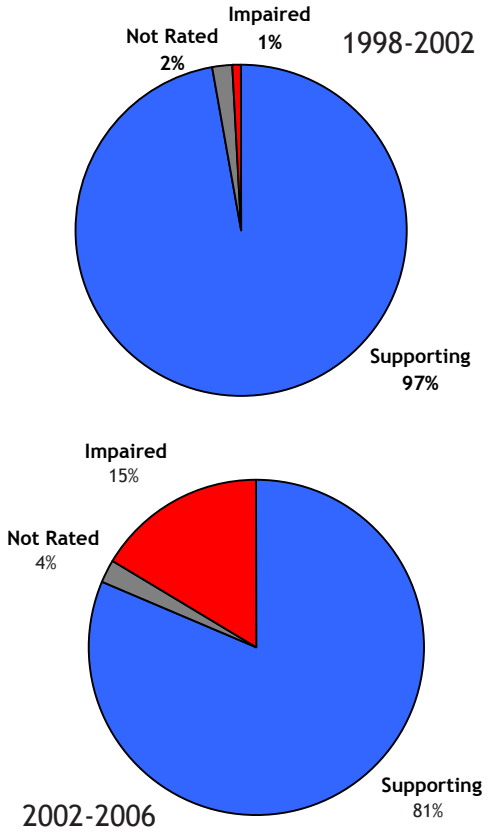
According to 2001 NRI Land Cover data, nearly 66 percent of the land in the basin is forested, and approximately 23 percent is agricultural. Nine percent is developed. All or portions of eight counties are located in the Broad River basin, and there are 27 municipalities. Much of the population can be found around the Towns of Spindale, Rutherfordton, Forest City, and the City of Shelby.

For more information, follow the link to the ***Population & Land Cover in the Broad River Basin*** chapter.

## Current Water Quality Status

Of the 1,508 stream miles in the Broad River Basin, 570 miles were monitored by DWQ. Impaired stream segments are shown in Figure 1 as red lines. Table 1 provides descriptions of impaired streams in the basin along with reason for impairment. Twelve stream segments within the Broad River basin were found to be impaired due to turbidity or biological integrity.

Figure 2
Aquatic Life Use Support Category (Monitored Streams)




### Ambient Sampling

During this assessment period, chemical and physical measurements were obtained by DWQ from eight ambient monitoring stations located throughout the basin. Two basinwide patterns of interest emerged: declining specific conductance and declining pH. Both of these parameters generally appear to have an inverse relationship with water flow when compared to flow data available from two USGS gaging stations. Between August 2003 and May 2004, however, pH deviated from this pattern and dropped significantly lower at five of the eight stations. No stressor has been identified to explain this observation.

Approximately 570 stream miles were assessed for aquatic life (37.8 percent). The number of impaired stream miles jumped from 4.7 miles in 2002 to 85 miles in 2006 (Figure 2). This increase is attributed to exceedences in water quality standards mostly due to nonpoint source pollution. Standards were exceeded for turbidity in several stream segments throughout the basin.

There are nearly 61 stream miles classified for primary recreation (Class B) in the Broad River basin. No waters are impaired in the recreation use support category; however, 29.5 miles are Not Rated. Fecal coliform bacteria in these segments exceeded 400 colonies/100 milliliter (mL) in greater than 20 percent of the samples collected.

There are nearly 480 stream miles currently classified for water supply in the Broad River basin. No waters are impaired in the water supply use support category.

No site-specific fish consumption advisories have been issued in the Broad River basin; however, there is a statewide advisory for several fresh water fish species. Site-specific and statewide advisories can be found on the ***NC Department of Health and Human Services (DHHS)*** web site.

### Biological Sampling

In the Broad River basin, a total of 80 benthic and fish sites were evaluated during the assessment period. Sixty of those sites were sampled during the basinwide monitoring cycle, and 20 additional sites were sampled as part of special studies throughout the entire river basin. Thirteen sites were sampled for the first time in 2005, thus increasing the sampling efforts by 25 percent.

#### Benthos

Thirty-two benthic sites were sampled in the Broad River Basin between January 2002 and December 2006. An additional 15 sites were sampled as part of a special study. Nine sites rated Excellent, a significant improvement from the five that were identified as Excellent

in 2000. Most of this improvement is represented in Good sites moving to Excellent, but one site on Hinton Creek improved dramatically from Good-Fair to Excellent. Other benthic sites remained static.

### Fish Community

Twenty-eight fish community basinwide sites were sampled. Thirteen of these sites were sampled for the first time during this monitoring cycle. An additional five sites were sampled as part of a special study. Three sites saw an increase in rating (i.e., Good-Fair to Good); eleven sites did not change; and one site in Sandy Run Creek decreased from Good to Fair. The dramatic decline may be the result of lingering impacts from drought conditions during the previous assessment period followed by extremely high flow events in the fall of 2004.

## Water Quality Stressors

In most cases, habitat is degraded by the cumulative effect of several stressors acting in concert. These stressors often originate in the upstream portions of the watershed and may include runoff from impervious surface, sedimentation, and erosion from construction, general agricultural practices, or other land disturbing activities. Naturally erodible soils in the Broad River basin make streams highly vulnerable to these stressors. Habitat degradation (as indicated by impaired biological integrity and high turbidity) was identified as a stressor for nearly 270 miles of streams in the Broad River basin. The distribution of turbidity violations and sample locations make it difficult to isolate a single source of erosion in the Broad River basin. However, it appears that violations are highest in urban transition and agricultural areas. Violations are lowest in the upper part of the basin where land use is predominantly forested. This trend demonstrates the importance of protection and conserving stream buffers and natural areas.

Fecal coliform bacteria and low pH are also stressors identified in the Broad River basin. Even though no waters in the basin were Impaired for fecal coliform bacteria, concentrations were above the 400 colonies/100 milliliter (mL) water quality guideline in more than 20% of samples at four of the eight ambient monitoring stations. The presence of fecal coliform bacteria in the aquatic environment indicates that the water has been contaminated from the fecal material of humans or other warm-blooded animals. Low pH was noted in two stream segments: First Broad River and Sugar Branch. Normal pH levels for streams in the Broad River basin should be between 6.5 and 7.2. Values below 6.5 may indicate the effects of acid rain or other acidic inputs. Values above 7.5 are often indicative of an industrial discharge.

## Recommendations

More specific recommendations for water quality stressors can be found in the 10-digit HUC watershed chapters.

### Water Quality Stressors:

- **Turbidity:** (See Statewide Recommendations).
- **Fecal Coliform Bacteria:** Fence livestock out of stream corridors. Educate the general public about properly disposing of pet waste. Provide public pet waste containers in local parks and along greenways.
- **Nutrients:** Educate the general public and farmers on the impacts of over fertilization. Adopt and implement a stormwater control ordinance to reduce nutrients through appropriate BMPs.

### Additional Studies and/or Monitoring:

- Red tent in the Second Broad River (See ***Chapter 3***).
- Loss of fish communities with multi age groups in Roberson and Brushy Creeks (See ***Chapter 3*** & ***Chapter 5***).
- Low pH problems in the First Broad River, Beaverdam Creek and Sugar Branch (See ***Chapter 4*** & ***Chapter 5***).
- Additional monitoring is needed to determine the main source of excess nutrients through out the basin.

- Watershed Management Plans are needed, where specified within watershed chapters, to address basinwide stressors and issues brought on by growth pressures.
- Impacts of growth on ORW and HQW designated waters (See ***map***).

### Coordinated Efforts:

- Support stormwater and sediment and erosion control ordinances where specified within the watershed chapters.
- Work with the Division of Land Resources and the Division of Soil & Water Conservation to improve education and implementation of BMPs and buffer requirements for Trout Waters (See ***Trout Waters map***).
- Continue support of restoration projects on impaired streams

### Lake Lure Dam:

Minimum flow and stage release requirements are needed for the dam at Lake Lure. Extreme periodic low and high flows are causing biological impairments in a portion of the Broad River directly below the dam. DWQ will work with the Division of Water Resources and other agencies to address this situation.

### Statewide Recommendations:

- Target turbidity impairments with the implementation of BMPs, support the establishment of local Sediment & Erosion Control Programs, and Stormwater Ordinances and determine what cases may be attributed to natural base sediment loads because of highly erodable soils vs. human caused erosion.
- An increased collaboration between all agencies involved in sediment control, riparian buffers and stormwater management programs will be the focus of a statewide effort to address turbidity concerns throughout the state. This may lead to the determination for the need of a statewide stormwater program.

## Local Initiatives

Local initiatives allow local people to make decisions that affect change in the community, protect natural resources, and combine professional and historical expertise to holistically understand the challenges and opportunities of tackling watershed protection. By working in coordination across jurisdictions and agency lines, more funding opportunities are available, and it is easier to generate necessary matching or leveraging funds. This could potentially allow local entities to do more work and be involved in more activities because their funding sources are diversified. The more localized the project, the better the chances for success. During this assessment period, $29,690,439 were spent by federal, state and local agencies on restoration and protection of the Broad River basin.

For more information, follow the link to the ***Local Initiatives in the Broad River Basin*** chapter.

Table 1 can be seen on the following page.

## Table 1: Impaired Waters in the Broad River Basin

| Assessment Unit | Stream Name | Potential Stressors | Potential Sources |
|---|---|---|---|
| 9-(22)b | Broad River | Habitat Degradation | Mine Drainage |
| 9-(25.5)b | Broad River | Turbidity | |
| 9-26b | Cleghorn Creek | Habitat Degradation; Nutrient Impacts | Stormwater Runoff; WWTP NPDES |
| 9-41-13-(6)b | Catheys Creek | Habitat Degradation | Impervious Surface; Stormwater Runoff |
| 9-41-13-3 | Mill Creek | Habitat Degradation | Impoundment |
| 9-41-13-7-(3)b | Hollands Creek | Habitat Degradation | Stormwater Runoff; Impervious Surface |
| 9-46a | Sandy Run (headwaters) | Habitat Degradation | General Agriculture/Pasture |
| 9-50-(1) | First Broad River | Low pH | -- |
| 9-50-(28) | First Broad River | Turbidity | -- |
| 9-53-(5) | Buffalo Creek | Turbidity | -- |