



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# North Carolina

## Watershed Partnership Pays Off for Brasstown Creek

### Waterbody Improved

Eroding streambanks, runoff from agricultural lands, and livestock access caused widespread nonpoint source pollution problems in the Brasstown Creek watershed in the mid-1990s. By 1994 the creek had failed to meet aquatic life criteria and North Carolina had placed it on the state's 303(d) list due to sediment impairments. Public and private partners implemented several best management practices (BMPs)—restricting livestock access to the creek, providing livestock with alternative water sources, reconstructing stream channels, enhancing riparian buffers, and others—to reduce water quality impacts. Water quality improved enough to once again support a healthy macroinvertebrate community, and the state delisted Brasstown Creek in 2000.

### Problem

Brasstown Creek originates in Georgia and flows generally northwest into North Carolina. From the Georgia–North Carolina border, the creek meanders 8.5 miles before reaching the Hiwassee River. The watershed has an 83-square-mile drainage area and contains low-density residential development, pasture and hay lands, and a relatively large amount of forest cover.

The North Carolina Division of Water Quality (NC DWQ) monitored macroinvertebrates in that state's portion of Brasstown Creek using two biological indices. The EPT index is a measure of pollution-sensitive aquatic insects inhabiting a waterbody. A stream showing high EPT richness is less likely to be polluted than one with low richness in the same geographic region. In addition, NC DWQ evaluated Brasstown Creek's biotic integrity (BI), which measures the presence of pollution-tolerant species. High BI values characterize streams that have poor water quality and are dominated by pollution-tolerant species.

The accompanying table shows biomonitoring results from Brasstown Creek. In 1994 the creek had an EPT index of 18. This low value caused the state to place an 8.5-mile segment of Brasstown Creek on its 303(d) list for only partially supporting state aquatic life use criteria. NC DWQ cited sediment from nonpoint sources, including streambank erosion and



**Before:** Channel instability and bank erosion along this Brasstown Creek tributary were caused by historic channelization, lack of riparian vegetation, and cattle access.

agricultural and highway runoff, as the causes of impairment. This assessment was supported by a Tennessee Valley Authority (TVA) analysis of land use in the Brasstown Creek watershed.

### Project Highlights

In response to these problems, in 1995 the Hiwassee River Watershed Coalition (HRWC) formed a locally driven partnership to restore the watershed and implement numerous BMPs. The partners revegetated 160 acres of critically eroding bare areas (lands within 1,000 feet of streams); installed nearly 6.2 miles of



**After:** The rebuilt channel was designed with a more stable pattern, modeled after a similar, relatively undisturbed stream.

livestock exclusion fencing; reconstructed stream channels; and created, enhanced, or protected 48 acres of forested riparian buffer from 1999 through 2004. In addition, project partners installed stock trails, stream crossings, wells, and spring developments in heavy-use areas, thereby improving more than 2,000 acres of pastureland. These practices kept an estimated 650 tons of soil, 162 pounds of nitrogen, and 45 pounds of phosphorus out of Brasstown Creek annually.

## Results

NC DWQ sampled Brasstown Creek again in 1999 and found that although instream habitat and sedimentation problems remained, the benthic macroinvertebrate community showed a marked improvement. Evaluating EPT and BI indices, NC DWQ assigned Brasstown Creek a “Good” bioclassification, indicating that the creek met its aquatic life support designation

Year	EPT	BI	State bioclassification
1994	18	--	Fair
1999	44	4.6	Good
2004	53	4.8	Excellent

Brasstown Creek biomonitoring results. NC DWQ assessed EPT and BI to assign a bioclassification for the creek. A “Good” or “Excellent” bioclassification indicates that the creek meets its aquatic life support designation.

and allowing North Carolina to delist it in 2000. Subsequent monitoring in 2004 reaffirmed that the benthic community had recovered.

Other signs of water quality improvement in Brasstown Creek have been noted. A pollutant loading model developed by TVA, for example, showed a nearly 25 percent reduction in total suspended solids (TSS) for the North Carolina portion of the Brasstown Creek watershed between 1997 and 2004. Even greater TSS reductions—up to 83 percent—occurred in some subwatersheds where several BMPs were in close proximity.

Success is not yet complete for the entire watershed, however. Upstream portions remain listed as impaired or partially supporting their designated uses. The HRWC and its partners plan to implement similar restoration work in the Georgia portion of the watershed.

## Partners and Funding

The HRWC spearheaded the Brasstown Creek Watershed Restoration Project and was joined by government and non-government partners. These included NC DWQ; Clay County (North Carolina), Cherokee County (North Carolina), and Blue Ridge Mountain (Georgia) Soil and Water Conservation Districts; TVA; North Carolina Division of Soil and Water Conservation (Agriculture Cost Share Program); USDA Natural Resources Conservation Service; and 47 private landowners.

Nearly \$4 million has gone toward the Brasstown Creek watershed recovery effort. Agricultural BMPs were implemented with approximately \$450,000 in section 319 funds, \$400,000 from the North Carolina Agriculture Cost Share Program and the federal Environmental Quality Incentives Program, and \$127,500 in landowner cost share payments. The North Carolina Clean Water Management Trust Fund provided an additional \$2.5 million for stream and riparian buffer restoration. Finally, TVA contributed an approximately \$500,000 in-kind donation for technical support and watershed modeling.



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