# Section 319
# NONPOINT SOURCE PROGRAM SUCCESS STORY
# North Carolina

## Aquatic Life Use Restored in Agricultural Watershed

**Waterbody Improved**

Agricultural runoff decimated macroinvertebrate life in a 1.9-mile segment of the Mills River in western North Carolina. Because the segment failed to meet aquatic life criteria, North Carolina placed it on the state's 303(d) list of impaired waters in 1998. Local and state water quality experts worked with the community to implement several best management practices, including moving pesticide mixing stations away from river banks and restoring vegetated buffers. Water quality improved enough to once again support macroinvertebrate life, and the state expects to remove the river segment from its 303(d) list in 2006.

### Problem

The Mills River supplies drinking water for more than 50,000 people in three western North Carolina counties. Areas upstream from the town of Hendersonville are home to many intensely managed agricultural activities, including the production of cattle and specialty crops such as tomatoes. Officials suspected that these operations contributed sediments and pesticides to a 1.9-mile river segment extending upstream from the town's water intake.

The state conducted benthos sampling in the river segment and used the EPT index to measure the presence of pollution-sensitive aquatic insects. The index assumes that a waterbody showing high EPT richness is less likely to be polluted than another waterbody with relatively low EPT richness in the same geographic region. In addition, the state measured biotic integrity (BI) in the river segment. A low BI value indicates better water quality than a high BI value.

As shown in the accompanying table, monitoring results from both indices revealed that the segment met state water quality standards for aquatic life support in 1997. In subsequent years, however, the North Carolina Division of Water Quality (NC DWQ) found much lower EPT and higher BI values, indicating a decline in water quality. In 1998, NC DWQ assigned a *Poor* rating to the river segment and placed it on the state's 303(d) list.

This chemical-handling facility replaced one that was directly adjacent to Mills River.

| Year | EPT | BI | State assessment rating |
|---|---|---|---|
| 1997 | 24 | 5.17 | Good-Fair |
| 1998 | 2 | 6.69 | Poor |
| 2001 | 6 | -- | Poor |
| 2002 | 28 | 5.54 | Good-Fair |

Mills River biomonitoring results using the EPT index and BI. Low EPT/high BI indicate poor water quality, while high EPT/low BI suggest good water quality.

### Project Highlights

State and local water quality experts teamed with landowners and other organizations to address suspected pollutant loading sources

Streambank and buffer restoration shortly after tree planting. Small trees are in the tall grass on the left.

to the river segment. Project partners obtained three conservation easements totaling 192 acres, designated and planted 7.8 acres of riparian buffers, and restored nearly 4,700 linear feet of streambanks. In addition, they moved two chemical mixing stations away from river tributaries.

To address the sources of sediment, project partners stabilized 10 miles of logging roads, installed 2,580 linear feet of cattle fencing, and created 400 feet of stock trails to reduce cattle traffic on steep slopes. Area cattle operations received two water tanks, further helping to keep cattle away from streams.

Public outreach also played a role in the restoration effort. Workshops educated local agriculture producers about the dangers of pesticides in the river. Local residents received general watershed education.

Finally, project partners established a stormwater monitoring program in 2001.

## Results

Restoration efforts resulted in dramatic water quality improvements, as confirmed by benthic monitoring. In 2002, NC DWQ macroinvertebrate sampling showed a much richer EPT index of 28 and a stronger BI of 5.54. Both indices placed the river segment in the *Good-Fair* assessment rating, placing the river segment in compliance with its aquatic life support designation. With such a positive result, North Carolina expects to remove this river segment from its 303(d) list in 2006. Macroinvertebrate monitoring will continue, with the next sampling event scheduled for the summer of 2007.

Gains will be lost, however, if work does not continue. The Mills River watershed is in western North Carolina's fastest growing area. Keeping pace with development impacts is essential if designated uses are to be sustained. The state's future plans include restoring a mile of vegetated buffer and constructing a chemical mixing building that will eliminate two additional streamside mixing stations.

## Partners and Funding

Numerous groups worked together successfully to restore this segment of the Mills River. The NC DWQ supported the work with a 319 grant of $448,000. The state's Clean Water Management Trust Fund provided $730,000, and the partners used a $50,000 EPA Source Water Protection grant to create land conversion inventories and hold meetings and workshops.

Many agencies and organizations contributed services and funds, including North Carolina's Divisions of Forest Resources and Soil and Water Conservation; N.C. Ecosystem Enhancement Program; N.C. Wildlife Resources Commission; N.C. State University Mountain Horticultural Crops Research Station; Henderson County; Henderson County Soil and Water Conservation District; Environmental Conservation Organization of Henderson County; U.S. Environmental Protection Agency, Forest Service, and Natural Resources Conservation Service; Carolina Mountain Land Conservancy; City of Asheville's Water Treatment Plant; City of Hendersonville; Cross Creek Foundation; Land of Sky Regional Council; Tennessee Valley Authority; Trout Unlimited (Land of Sky Chapter); North and South Mills River Community Development Center; Regional Water Authority of Asheville, Buncombe and Henderson Counties; University of North Carolina at Asheville's Environmental Quality Institute; and Mills River Partnership.

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-06-003D
June 2006

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