



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

North Carolina

Agricultural and Wastewater Treatment Best Management Practices Improve Water Quality in Richland Creek

Waterbody Improved

Nonpoint source pollution, primarily from livestock and septic straight pipes, led to increased levels of fecal coliform (FC) bacteria and sedimentation in North Carolina's Richland Creek and several of its tributaries. As a result, in 2002 the North Carolina Division of Water Quality (NC DWQ) added more than 15 miles of Richland Creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters for failing to support the aquatic life designated use, due to low biological integrity. Using approximately \$2.0 million in state and federal funding, watershed partners implemented agricultural best management practices (BMPs) and wastewater treatment repairs. Water quality improved as a result of those efforts, and a portion of Richland Creek now supports its aquatic life designated use. NC DWQ removed a 1.6-mile segment of Richland Creek from the state's list of impaired waters in 2010.

Problem

The 43,700-acre Richland Creek subwatershed (Figure 1) lies within the French Broad Basin in western North Carolina. Richland Creek flows northeast through a heavily developed portion of Haywood County, and it serves as the municipal water supply for the Town of Waynesville. The subwatershed provides significant economic value to the county and the town: Richland Creek flows into Lake Junaluska, a 200-acre reservoir that is a popular recreational destination, generating more than \$40 million each year for the local economy. Streams throughout the area also support trout populations, attracting thousands of visitors annually.

According to NC DWQ's French Broad Basin Plan, nonpoint source runoff from agricultural, residential and urban areas contributed sediment to Lake Junaluska, which then needed to be dredged periodically. In addition, erosion throughout the Richland Creek subwatershed damaged valuable agricultural land and the aesthetic, recreational and habitat quality of downstream waterbodies.

In 1999 the Haywood Waterways Association (HWA) contracted with the Tennessee Valley Authority to develop an Integrated Pollutant Source Identification (IPSI) model for the Pigeon River watershed (which includes Richland Creek). The IPSI analyzes infrared aerial photography using a geographic information system to estimate the amount of pollution entering

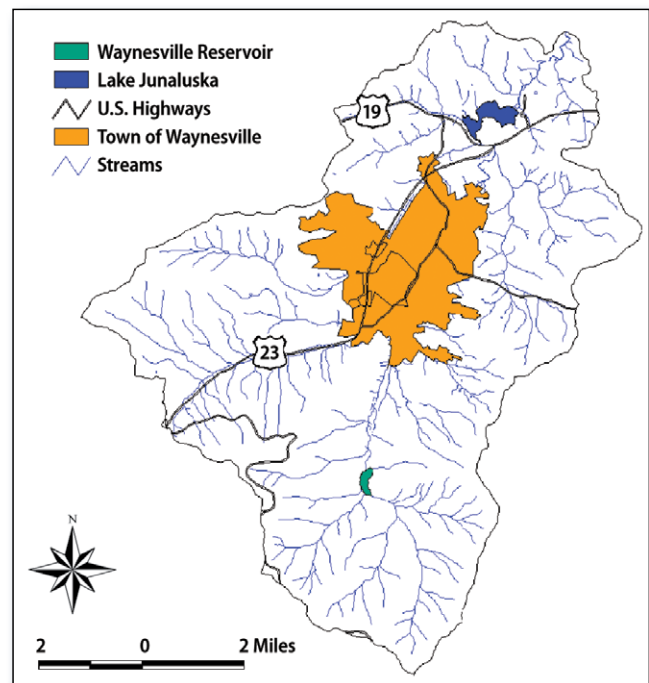


Figure 1. Richland Creek Subwatershed.

a stream. According to the 1999 IPSI, the primary sources of sediment in the Pigeon River watershed were erosion of streambanks (Figure 2), unpaved roads and poor-quality pastures, and animals accessing streams.



Figure 2. Before restoration, an eroded streambank in Haywood County contributed high levels of sediment downstream.

Biological monitoring data for Richland Creek, assessed according to the North Carolina Index of Biological Integrity (NCIBI), indicated poor biological health in the creek in 2002. The NCIBI measures the structure and health of the fish community; scores range from 12 (most degraded) to 60 (excellent). Richland Creek received a score of 32 (poor), which is considered impaired, during sampling conducted in 2002. Based on data showing biological impairment, that same year NC DWQ added more than 15 miles of Richland Creek, including a 1.6-mile segment from Lake Junaluska Dam to Jones Cove Branch, to the state's CWA section 303(d) list of impaired waters for failing to support the aquatic life designated use. The HWA used the IPSI modeling results to develop a Watershed Action Plan (WAP) for the Pigeon River in 2002. Because the WAP was in place, NC DWQ did not develop a separate total maximum daily load (TMDL) to address the biological impairment of Richland Creek.

Project Highlights

The HWA's March 2002 Pigeon River WAP identified causes and sources of impairments, as well as potential projects to restore water quality. The WAP identified the need to address sediment loading by reducing livestock's access to the stream. In 2005, the Southwestern North Carolina Resource Conservation & Development Council (NC RC&D), Haywood Soil and Water Conservation District (SWCD), and HWA obtained a CWA section 319 grant to begin implementing the action plan. Through that project, the Southwestern NC RC&D

implemented numerous BMPs in the Richland Creek subwatershed. Project partners received a second CWA section 319 grant in 2009 to create a Richland Creek-specific WAP and implement additional BMPs to restore biological integrity in impaired segments of the creek and its tributaries. BMPs implemented through 2011 include check dams (1300 feet), critical area plantings (5375 feet), diversions (250 feet), exclusion fencing (5055 feet), riparian herbaceous cover (1120 feet), stream channel stabilization (1120 feet), a grazing plan system, four heavy-use protection areas, a livestock stream crossing and four tanks/troughs.

Results

Water quality monitoring data collected after BMP implementation in the Richland Creek subwatershed indicates that biological integrity (as measured by the NCIBI score) has improved as a result of restoration efforts. The total number of fish collected in the 1.6-mile segment of Richland Creek (from Lake Junaluska to Jones Cove Branch) increased from 116 in 2002 to 224 in 2007. Monitoring conducted in 2007 also marked the first recording of darter species in the stream segment, along with increased numbers of Northern hogsucker and rock bass. The NCIBI score in the Richland Creek segment improved from 32 (poor) in 2002 to 40 (good-fair) in 2007. NC DWQ indicates that sediment loading reductions due to BMP implementation throughout the subwatershed have also contributed to the improved health of the biological community. Based on these data, the state removed the 1.6-mile segment of Richland Creek from the 2010 list of impaired waters because it now supports its aquatic life designated use.

Partners and Funding

To date, project partners have received a total of \$515,212 in CWA section 319 grant funds to implement restoration projects in Richland Creek subwatershed. More than \$1.4 million in matching funds were leveraged from the following organizations: HWA, Haywood SWCD, North Carolina Clean Water Management Trust Fund, Pigeon River Fund, Tennessee Valley Authority, North Carolina Department of Natural Resources (DENR) Wastewater Discharge Elimination Program, NC DENR Asheville Regional Office, Town of Waynesville, North Carolina State University, USDA Natural Resources Conservation Service, and North Carolina Wildlife Resource Commission.



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