



# NONPOINT SOURCE SUCCESS STORY

## North Carolina

### Town Leads Efforts to Improve the Cullasaja River

#### Waterbody Improved

Sedimentation from historical logging, steep slopes and highly erodible soils caused biological impairments in the Cullasaja River. As a result, the North Carolina Department of Environment and Natural Resources (NCDENR) added portions of the Cullasaja River and Mill Creek (5.7 miles total) to the 2002 North Carolina Clean Water Act (CWA) section 303(d) list of impaired waters for failing to support their aquatic life designated uses. Watershed partners implemented numerous best management practices (BMPs) and developed a watershed action plan to achieve water quality improvements, leading to the 2012 removal of 3.7 miles of the previously impaired streams from the impaired waters list.

#### Problem

The Cullasaja River is in Macon County at the headwaters of the Little Tennessee River Basin in western North Carolina's Blue Ridge Mountains. This scenic river forms on the Highlands Plateau above the resort town of Highlands before plunging 2,000 feet through a dramatic gorge to join the Little Tennessee River in the town of Franklin (Figure 1). The 14.4-square-mile upper Cullasaja River watershed is bordered by the Tennessee Valley Divide on three sides, and consists of highly erodible soils, steep slopes and sandy substrate within streams. The steep slopes and erosive soils result in significant sediment loading and loss of topsoil throughout the watershed. Historical logging, damming of streams and expanding development within the watershed have further exacerbated the sediment pollution problem.

North Carolina's water quality standards state that waters must achieve a biological integrity score of at least *good-fair* to be considered supportive of aquatic life. The NCDENR's Division of Water Resources conducted water quality studies in 1999 and 2000 and found *fair* biological integrity, based on macroinvertebrate counts, in the main stem Cullasaja River above Mirror Lake (segment 2-21-(0.5), later subdivided into segments 2-21-(0.5)a (3.7 miles long) and 2-21-(0.5)b (0.7 miles long)), and in the 1.3-mile-long Mill Creek segment (2-21-3). As a result, NCDENR added these segments to the state's 2002 CWA section 303(d) list of impaired streams for failure to support aquatic life.

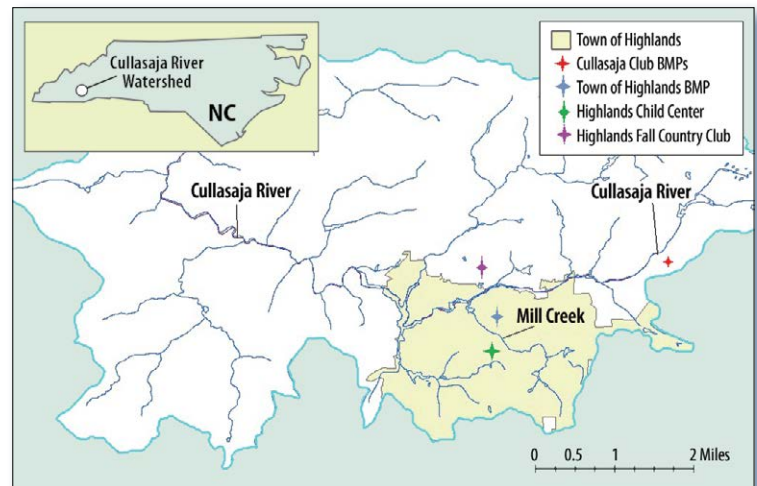


Figure 1. The Cullasaja River watershed is in western North Carolina. Partners installed practices at numerous locations.

#### Project Highlights

To support the restoration of these waterbodies, NCDENR completed the Little Tennessee River Basin Plan in 2002. The Cullasaja River Watershed Strategy and Action Plan was then created in 2004 as part of a Regional Geographic Initiative grant from the U.S. Environmental Protection Agency and the Cullasaja Watershed Association of Highlands, North Carolina.

As a part of the aforementioned plans, beginning in 2003 the town of Highlands funded numerous BMPs to improve conditions in both the



Figure 2. The town of Highlands installed permeable pavement at the Highlands Community Child Development Center.

Cullasaja River and Mill Creek. The town installed a 240,000-gallon underground stormwater management treatment and detention system in Town Park, which treats 14.6 acres of commercial area. The town also replaced three culverts in the Mill Creek drainage area and installed a 2,000-square-foot rain garden and 6,400 square feet of permeable pavement at the Highlands Community Child Development Center (Figure 2). In addition, the Cullasaja Club (a golf and family club community) funded and implemented numerous BMPs along the upper Cullasaja River, including maintaining 10 acres of no-mow, no-fertilizer areas along steep slopes; improving 3,500 feet of riparian buffer; and installing new irrigation systems in 2011 (Figure 3). In 2012 the Land Trust for The Little Tennessee River used CWA section 319 funds to develop an Upper Cullasaja Watershed Restoration Plan to help guide future implementation efforts.

## Results

After years of ratings of *poor* or *fair*, August 2010 sampling data demonstrated that the water quality in the larger Cullasaja River segment had improved to *good-fair* (Table 1). Based on these sampling results, NCDENR determined that segment 2-21-(0.5)a of the Cullasaja River now supports its aquatic life designated use and removed it from the impaired waters list in 2012, representing an improvement in 3.7 miles of the 5.7 miles of stream originally listed in 2002. The momentum of water quality improvement continues throughout the watershed. NCDENR hopes that past and future implementation efforts will translate into improvements in the second Cullasaja River segment and the Mill Creek segment in the near future.



Figure 3. The Cullasaja Club improved the health of the riparian buffer along the Cullasaja River.

## Partners and Funding

Many stakeholders have been active in the watershed restoration effort, including the U.S. Environmental Protection Agency, the NCDENR Division of Water Resources, Upper Cullasaja Watershed Association, Land Trust for the Little Tennessee River, the town of Highlands, the Highlands Community Child Development Center, Highlands Biological Foundation, the Coweta Long-Term Ecological Research Program, the Cullasaja Club, Watershed Science, and the Jackson–Macon Conservation Alliance. Funds supplied by the town of Highlands (including \$75,000 for the rain garden and permeable pavement project) and the Cullasaja Club supported the installation of BMPs. The 2012 Upper Cullasaja Watershed Restoration Plan project received over \$78,596 in funding to guide future watershed improvements in the Cullasaja River, adding to the thousands of dollars that past projects have invested in the watershed. Of the \$78,596 in funding, the CWA section 319 grant program contributed \$16,125 for the creation of a watershed plan.

**Table 1. Cullasaja River Biological Assessment Sampling Data (at U.S. route 64 sampling site)**

Sample Collection Date	Cullasaja River Rating
8/2010	Good-Fair <sup>1</sup>
7/2004	Fair
7/2001	Fair
6/1999	Fair
10/1996	Fair
10/1991	Poor

<sup>1</sup> Meets water quality standard for aquatic life support.



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## For additional information contact:

**Jason Meador**, Land Trust for Little Tennessee River  
828-524-2711 ext. 309 • [jmeador@litt.org](mailto:jmeador@litt.org)  
**Heather Jennings**, North Carolina Division of  
Water Resources  
919-807-6437 • [heather.b.jennings@ncdenr.gov](mailto:heather.b.jennings@ncdenr.gov)