Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Tennessee

Implementing Best Management Practices and Restoring Streambanks Improve Water Quality in Goose Creek

Waterbody Improved

Land development contributed to increased siltation in Tennessee's Goose Creek and degraded water quality. As a result, the Tennessee Department of Environment and Conservation (TDEC) added the creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 2004. Best management practices (BMPs) implemented in the watershed improved water quality, and Goose Creek was removed from Tennessee's CWA section 303(d) list of impaired waters in 2010.

Problem

Goose Creek is a 15.4-mile stream that flows from its headwaters to Town Creek through the town of Mountain City in Johnson County (Figure 1). The creek is in ecoregions 66f (Limestone Valleys and Coves) and 66e (Southern Sedimentary Ridges of the Blue Ridge Mountains).Water uses in the watershed include irrigation, livestock watering and wildlife, recreation, and fish and aquatic life. The stretch of Goose Creek from Crooked Branch to Corn Creek is considered an Exceptional Tennessee Water due to the presence of the state endangered skunk cabbage and the state threatened crested shield-fern.

Land development and bank erosion caused alteration in streamside or littoral vegetation. In 2003, TDEC conducted several Semi-Quantitative Single Habitat assessment (SQSH) tests at River Mile 1.3 near Brown Place Road and at mile 0.3 (behind the visitor's center of Ralph Stout Park). SQSH is used as a measure of compliance with water quality standards for the beneficial use of fish and aquatic life. During initial testing at this time, Goose Creek received a habitat score of 101 at river mile 1.3 and a score of 114 at river mile 0.3. Both scores are considered *impaired* in these ecoregions. The creek also showed *Escherichia coli* levels that exceeded the state's standard of 126 colony forming units per 100 milliliters (cfu/100 mL) and riparian loss, indicating that the waterbody failed to support its designated uses. As a result, TDEC placed all 15.4 miles of Goose Creek (TN06010103034-0310) on the state's CWA section 303(d) list of impaired waters in 2004 due to increased siltation.

Figure 1. Goose Creek is one of several tributaries that combine to form Town Creek in Johnson County, Tennessee.

Project Highlights

Habitat restoration within the Goose Creek watershed is ongoing with the assistance of the Tennessee Agricultural Resources Conservation Fund (ARCF) cost-share program and U.S. Environmental Protection Agency CWA section 319 funds. Since 2003, these two sources have funded the implementation of BMPs in the watershed. ARCF funding supported the installation or construction of 7,896 feet of fence, 810 feet of access road, erosion protection on five heavy-use areas,

Figure 2. Stakeholders installed educational signs along Goose Creek.

Figure 3. Good habitat and chemical test scores indicate that Goose Creek has been restored.

4,837 feet of pipeline, seven watering facilities, 150 feet of subsurface drain, three pumping plants, 194 feet of stock trails and walkways, and one water well. CWA section 319 funding supported the creation of 3,536 feet of riparian forest buffer, and 1,700 feet of streambank protection.

In Mountain City's Ralph Stout Park, CWA section 319 funds were used to install multiple rock vanes along Goose Creek to control bed elevation and divert sheer stress. Native tree, shrub, and herb species were also planted along the streambank to establish a riparian buffer. In Mountain City, the Ralph Stout Park is used extensively for walking and biking. The educational kiosks/signs installed along Goose Creek were designed to educate the public on the processes and benefits of stream restoration as well as enhance community involvement (Figure 2). Improving water quality has restored both plant and animal native habitats (Figure 3).

Results

BMPs installed on the tributaries to Goose Creek have helped reduce the level of siltation entering the waterbody, and enhanced the recovery from riparian loss. In 2006 TDEC conducted a SQSH assessment at mile 0.1 near the mouth of Goose Creek, which showed marked improvement. The creek earned a habitat score of 143, considered *good* for the region (where a score of 200 would be optimal). Water quality assessment now indicates that Goose Creek fully supports its designated uses. Accordingly, the waterbody was removed from Tennessee's CWA section 303(d) list of impaired waters in 2010.

Partners and Funding

Many federal and state agencies, local organizations, and individual landowners worked together to improve water quality in the Goose Creek watershed. Funding sources included CWA section 319 grants totaling $51,971, which were allocated for improvements made along Goose Creek and its tributaries. Stakeholders used $36,009 from the ARCF, which included support provided through the Johnson County Soil Conservation District ($27,069), the Carter County Soil Conservation District ($2,678), and the Sullivan County Soil Conservation District ($6,262 for creek-side signage in Ralph Stout Park). Other key partners included the town of Mountain City, Ralph Stout Park, the Appalachian Resource Conservation and Development Council, Johnson County Soil Conservation District, Carter County Soil Conservation District, Brushy Fork Environmental Consulting, TDEC, Johnson City Environmental Field Office, and local landowners. U.S. Department of Agriculture Farm Bill funds also supported installation of practices from 2005 to 2011.

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