Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
South Carolina

Community-Led Effort Reduces Bacteria in the Tyger River

Waterbodies Improved

Nonpoint sources of pollution, including agriculture and failing septic systems, contributed high levels of bacteria to the Tyger River. In 2002 the South Carolina Department of Health and Environmental Control (SCDHEC) added 20 sites (i.e., waterbody segments) of the Tyger River to the state's Clean Water Act (CWA) section 303(d) list of impaired waterbodies for violating the state's fecal coliform (FC) bacteria water quality standard. To address the problem, project partners implemented agricultural best management practices (BMPs), repaired or replaced failing septic systems, and educated homeowners and pet owners about FC nonpoint sources. As a result of these efforts, four sites now fully support the recreational designated use, which will be reflected in the state's 2012 Integrated Report. Seven other sites show significant progress toward achieving the FC bacteria water quality standards but remain listed as impaired pending further improvements.

Problem

The Tyger River watershed is in the Piedmont region of northwest South Carolina. It drains 820 square miles and encompasses portions of Greenville, Newberry, Spartanburg and Union counties (Figure 1). The Tyger River flows into Fairforest Creek and ultimately drains into the Lower Broad River near Shelton, South Carolina. The major land uses in the watershed are forest (70 percent), cropland (11 percent), pastureland (10 percent), urban area (6 percent), and a small mix of water and barren land uses (3 percent).

Fecal coliform data collected between 1996 and 2000 identified 20 Tyger River monitoring sites at which more than 10 percent of the samples contained greater than 400 colony forming units (cfu) per 100 milliliters (mL). Those sites were considered impaired, and therefore SCDHEC placed the sites on South Carolina's 2002 CWA section 303(d) list of impaired waters. SCDHEC developed a total maximum daily load (TMDL), which was approved by the U.S. Environmental Protection Agency (EPA) in September 2004. The major nonpoint sources of FC bacteria cited in the TMDL were agricultural activities, failing septic systems, urban runoff and wildlife. The TMDL specified that FC bacteria loads must be reduced by between 16 and 82 percent to enable the Tyger River to meet the state's FC bacteria water quality standards and support its recreational designated use.

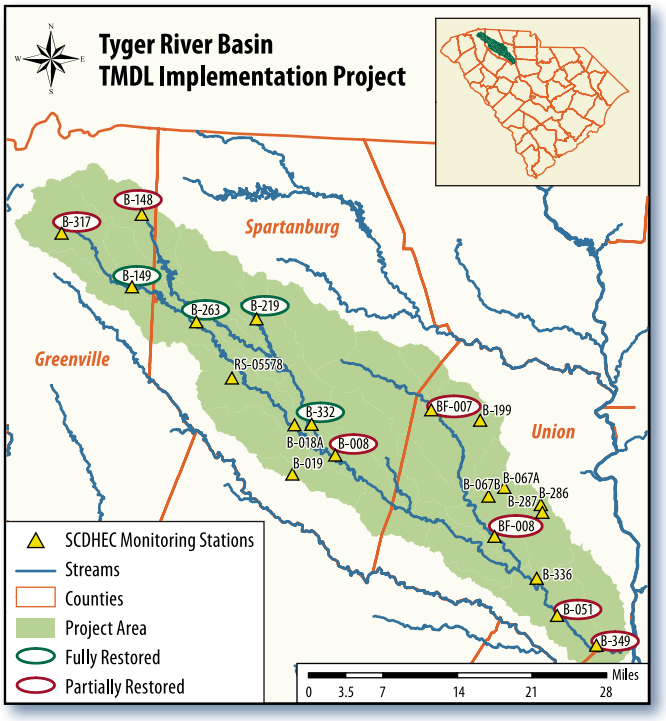

Figure 1. The Tyger River project area is in northwest South Carolina. The 20 monitoring sites listed as impaired in 2002 are shown; as of 2012, four have been restored and seven have shown progress towards meeting FC bacteria water quality standards.

Project Highlights

In 2006 project partners developed and began to implement a watershed-based plan to reduce nonpoint sources of FC bacteria. The Clemson University Cooperative Extension and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) coordinated with local agricultural producers to implement the following BMPs: 19 alternative water source units for livestock and 15,193 feet of pipeline to direct water from wells to alternative watering sources for livestock; 27,385 feet of fencing to exclude livestock from the waterbodies; 14,994 square feet of heavy-use protection areas (creating a stable, non-eroding surface in areas frequently and intensively used by people, animals or vehicles); livestock streambank crossings; and 27,385 feet of streambank and shoreline protection (Figure 2).

Figure 2. Project partners installed alternative water sources for cattle. A gravel base area prevents erosion around the tank.

Clemson University Extension used CWA section 319 funds to repair or replace 114 rural septic systems and install five water well units. During fall 2009, the Duke Energy Foundation provided $4,000 to assist homeowners otherwise unable to afford the required matching funds. Clemson University led education programs with homeowner associations to educate local residents about the water quality benefits of proper septic system maintenance and repair, as well as the proper disposal of pet waste.

In addition to the nonpoint source reduction efforts in the Tyger River watershed, permitted wastewater dischargers also worked to eliminate potential sources of fecal coliform. Due to the ongoing, complementary section 319-funded work in the watershed to address FC bacteria, the Union Wastewater Treatment Plant received a higher priority ranking for an EPA State Revolving Fund loan to consolidate treatment plants and eliminate an older wastewater treatment facility.

Results

Post-project water quality monitoring indicates that four Tyger River sites (sites B-219, B-149, B-263 and B-332) fully support the recreational designated use as of 2012. (That is, the FC bacteria water quality standard of 400 cfu/100 mL is exceeded in less than 10 percent of the samples collected). As a result, SCDHEC listed the four Tyger River sites (waterbodies) as fully restored in the state's 2012 Integrated Report. Seven additional Tyger River sites now partially support the recreational designated use. (That is, the FC bacteria water quality standard of 400 cfu/100 mL is exceeded in 10 to 25 percent of the samples, instead of 25 percent or more). The average of the highest peaks of FC bacteria for all 20 stations decreased from 8,800 cfu/100mL (pre-project) to below 2,300 cfu/100mL (post-project), indicating that "worst-case" conditions improved substantially over the watershed as a whole. These seven sites will remain listed on the state's 2012 Integrated Report as impaired in Category 4a (with a TMDL in place) until data show that they fully support the designated use. In addition to reducing FC bacteria, the restoration efforts led to the following load reductions in the Tyger River: 11,231 pounds of nitrogen per year, 3,009 pounds of phosphorus per year, and 6,751 tons of sediment per year.

Partners and Funding

The project used $494,041 in EPA CWA section 319 grant funds and $381,472 in state match provided primarily by Clemson University and homeowners to help install pollution control practices. Matching funds also included $4,000 from the Duke Energy Foundation. Participating partners included land owners, county government offices, NRCS, local soil and water conservation districts, and the Cattlemen's Associations from Spartanburg, Greenville and Union counties.

The Tyger River project has also been a successful case study in community involvement. In addition to engaging landowners in the Tyger River watershed, a similar, concurrent section 319-funded project in the adjacent Enoree River watershed engaged many of the same key players, thereby facilitating greater outreach across multiple counties and further increasing awareness of water quality issues.

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

EPA 841-F-12-001S
August 2012

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