



# NONPOINT SOURCE SUCCESS STORY

## South Carolina

### Septic System Repairs Improve Water Quality in Horse Creek

#### Waterbody Improved

Septic leachate from failing onsite septic systems resulted in high pathogen levels in Horse Creek. As a result, South Carolina added the creek to its 1998 Clean Water Act (CWA) section 303(d) list for fecal coliform (FC) bacteria impairment and failure to attain its primary recreation designated use. After the 1998 listing, watershed outreach and septic repairs were conducted which decreased bacteria loading to the creek. As a result, water quality improved, allowing South Carolina to remove Horse Creek from its impaired waters list for FC bacteria in 2008.

#### Problem

The 103,463-acre Horse Creek watershed is part of the Middle Savannah River watershed and is a tributary of the Savannah River downstream of Lake Thurmond. It is in Aiken and Edgefield counties and drains portions of the cities of Aiken and North Augusta (Figure 1). Primary land uses include forest (45 percent), agriculture (26 percent) and urban (19 percent). Growth is predominantly residential with development of numerous subdivisions and commercial centers.

The South Carolina Department of Health and Environmental Control (SCDHEC) monitored FC bacteria at several stations in the Horse Creek watershed. State criteria for FC impairment require that no more than 10 percent of the total samples during any 30-day period exceed 400 colony-forming units (CFU) per 100 milliliters. FC bacteria data collected from 1998–2002 were assessed to determine impairment of standards for recreational use due to FC bacteria. Approximately 13 percent of samples violated standards; as a result, SCDHEC placed Horse Creek (SV-072) on the CWA section 303(d) list of impaired waters in 1998. A total maximum daily load (TMDL) for FC bacteria was developed in 2005.

#### Project Highlights

Partners implemented a septic system repair effort in the Horse Creek watershed from April 2007 to October 2009. As a preliminary step, the city of North Augusta and Aiken County helped to assess and interpret the results of an aerial infrared thermographic survey conducted in the early spring of 2007 to identify temperature changes that could indicate leaking or failing septic systems. In the initial project phase, partners worked on 65 septic systems, pumping out systems

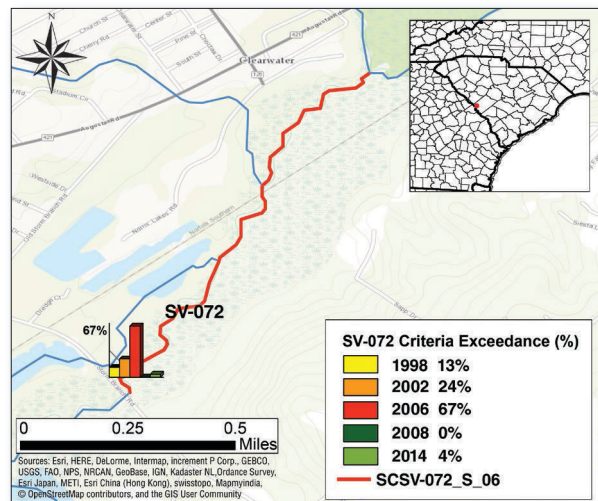


Figure 1. Horse Creek is in south-central South Carolina. Data show the percent exceedances of FC bacteria criteria at station SV-072 over time.

and replacing septic tanks, failed drain fields, and entire antiquated systems that no longer functioned (Figure 2). In the second project phase, additional funding allowed another 30 systems to be repaired, for a total of 95 systems.

Publicity for the septic system repair project included developing and distributing a brochure, sending letters directly to septic system contractors, and publishing articles in the *Aiken Standard* and the city of North Augusta's stormwater publication, *The Resource*.

Not all systems could be repaired. For example, the aerial infrared thermographic survey showed evidence of an illicit discharge at one residence (Figure 3). All sewage was being dumped from a pipe directly into Horse Creek, which then flowed into Langley Pond, a recreational swimming site. Upon talking to the home-



Figure 2. This Horse Creek watershed septic system had failed due to a cave-in.

owner, it was discovered that the septic system had never worked because of its location in a saturated floodplain. Five other houses had septic systems in the same floodplain area, which posed a similar failure risk. SCDHEC granted an extension to allow the project partners to find a solution. In August 2009 these homes were connected to the municipal sewer service.

Clients completed questionnaires both before and after repairs were made to assess their knowledge of environmental and health risks associated with septic system failures. Results showed that participating in the project led to an increase in clients' overall knowledge about how to care for septic systems.

Additionally, an EnviroScape Model was purchased with funds from a CWA section 319 grant and used to teach about watersheds and point source and nonpoint source pollution. The science coordinator in Aiken County taught the program in middle schools, while members of the Aiken County Master Gardener Association were trained to share the program with garden clubs and other civic organizations (approximately 500 adults participated in the programs).

## Results

Monitoring of the impaired segment continued during and after TMDL implementation. Results show monitoring site SV-072 met water quality standards and achieved full support for contact recreation in the 2008 CWA section 303(d) assessment (Figure 4). In total, implementation efforts reduced pollutant loadings of nitrogen by 1119.6 pounds, phosphorus by 439.2 pounds, and FC bacteria by 8.70E+11 CFU. Of note, in 2009 SCDHEC added monitoring site SV-072 to

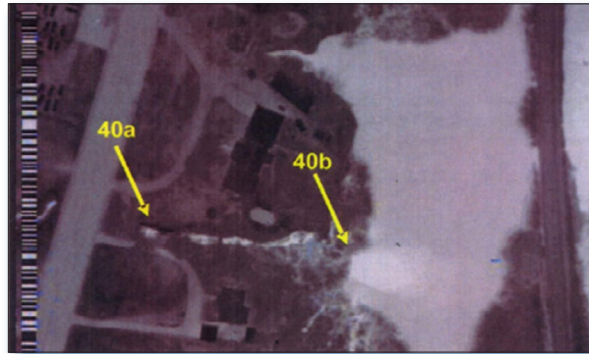


Figure 3. An aerial infrared thermogeographic survey picture shows an illicit discharge at point 40B.

a special study which allowed for weekly sampling for FC bacteria throughout the entire year. This increased sampling allowed for more temporal data collection which found the site to be meeting state standards.

## Partners and Funding

Multiple parties collaborated to restore Horse Creek, including SCDHEC, Clemson University, the Aiken Natural Resources Conservation Service (NRCS) offices, the city of North Augusta, Aiken County, the U.S. Environmental Protection Agency and local landowners. A CWA section 319 grant provided \$247,779 to support project oversight. Clemson University, the Aiken NRCS offices, the city of North Augusta, and Aiken County contributed in-kind services worth a combined \$64,288 to support TMDL implementation, project management, and participant recruitment. Lastly, landowners provided \$101,247 through cash and in-kind services for best management practice cost-share.

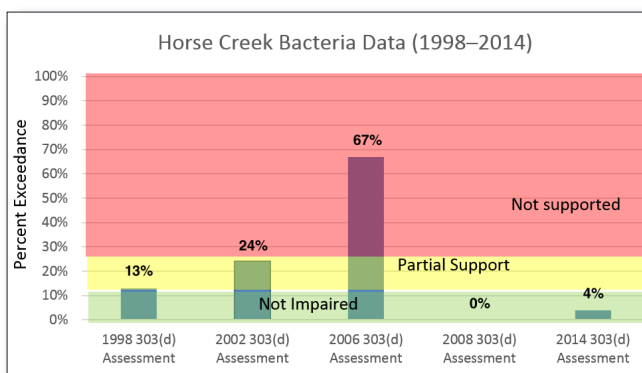


Figure 4. FC bacteria levels met water quality standards at station SV-072 in 2008 and 2104.



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