



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

South Carolina

Implementing Best Management Practices and Upgrading Wastewater Infrastructure Improves Water Quality

Waterbodies Improved

In the Cane Creek and Little Cane Creek watersheds, urban and agricultural runoff and aging wastewater infrastructure had increased levels of fecal coliform bacteria, prompting the state to add two sites to the 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for fecal coliform. Project partners worked to reduce fecal coliform counts in the two watersheds by installing agricultural best management practices (BMPs), repairing on-site wastewater treatment systems, and inspecting and replacing the wastewater infrastructure. According to an assessment in the year after implementing the project, two sites in the watersheds now meet South Carolina's water quality standards for fecal coliform.

Problem

The watersheds of Cane and Little Cane Creeks are in Oconee County, in the foothills of the Blue Ridge Mountains of northwestern South Carolina. Little Cane Creek is a tributary of Cane Creek, which flows into Lake Keowee. Most of Walhalla and West Union fall in the Cane Creek watershed. The 15.3-square-mile Cane Creek watershed is largely forested (76 percent), but it has some urban area (11 percent) and pasture and cropland (11 percent). The 13.9-square-mile Little Cane Creek watershed is even more forested (90 percent), with some pasture and cropland (9 percent).

Nonpoint source pollutants were determined to be the predominant cause for the fecal coliform impairment in both watersheds. The most probable sources of fecal coliform bacteria common to both creeks were runoff from agricultural lands, failing septic systems and wild animals. However, in Cane Creek, local residents helped identify urban runoff along with sewer overflows and leaks from an aging wastewater system (Figures 1 and 2) as contributors to the fecal coliform load.

Monitoring data revealed that fecal coliform counts violated the portion of the water quality standard that requires that no more than 10 percent of samples exceed an instantaneous 400 colony-forming units (cfu) per 100 milliliters (mL). As a result, the state placed two sites in the Cane and Little Cane Creek watersheds on the 1998 CWA section 303(d)



Figures 1 and 2. Manholes like this one in a park adjacent to Cane Creek would routinely overflow and spill raw sewage during rain events.



list of impaired waters for fecal coliform. A total maximum daily load (TMDL) for fecal coliform was approved in May 2005 for the two water quality monitoring sites and their associated watersheds. In February 2006, CWA section 319 funding was awarded to the Friends of Lake Keowee Society (FOLKS) to lead a three-year effort to implement watershed-based plans for both creeks.

Project Highlights

To meet the designated water quality standard and the load allocation in the approved TMDL, the goal of this project was to significantly lower fecal coliform bacteria levels in the Cane and Little Cane Creek watersheds. FOLKS worked with the local agricultural extension agent, Cattlemen's Association and local septic contractors to provide landowners with information on fecal coliform

bacteria and BMPs that could help improve water quality. Cost-share assistance was provided to participating landowners for all BMPs.

BMPs implemented as a result of this project include 17 alternate watering sources (Figure 3), 2,680 feet of pipeline to supply water to the alternative watering sources, 15 protected heavy use areas, 18 on-site wastewater treatment systems and 6,933 feet of exclusion fencing (excluding 65 cattle and 85 goats). In addition, FOLKS worked with a local Boy Scout Troop to mark storm drains in the urbanized portion of the watersheds (Figure 4).



Figure 3. Landowners installed 17 alternate water sources like this one to provide clean, fresh water for cattle excluded from Cane Creek.

Figure 4. A local Boy Scout troop coordinated an effort to identify and stencil the storm drains with a picture of a fish and the words "Dump No Waste. Drains to Cane Creek and Lake Keowee."



In addition to implementing BMPs using CWA section 319 grant funds, FOLKS worked with Walhalla to identify and repair problems with its wastewater collection system. Local residents notified FOLKS about manhole covers that allowed sewer overflows during severe storms. FOLKS worked with city and the South Carolina Department of Health and Environmental Control (SCDHEC) staff to identify and correct the problems. Extensive investigation uncovered broken sewer lines and missing or overflowing manholes that were, in some cases, putting untreated wastewater directly into Cane Creek. Thanks to the effort, project partners replaced 500 feet of damaged collection line and installed 12 bolted-down manhole covers.

Results

SCDHEC monitored the fecal coliform bacteria levels in Cane and Little Cane creeks for the life of the implementation project, plus one additional year. Monitoring data at two sites in the watersheds indicate that water quality standards for fecal coliform (no more than 10 percent of samples may exceed an instantaneous 400 cfu/100 mL) are now being met as a result of the project.

At SV-342 (Cane Creek), of the 48 samples collected in the year after the project ended, only 4 exceeded the water quality standard. That represents 8.33 percent of the samples. At SV-343 (Little Cane Creek), only 5 of 51 samples, or 9.80 percent, exceeded the standard (Table 1). On the basis of the data collected the year after implementing the project, two sites in Cane and Little Cane Creek watersheds now meet South Carolina's water quality standards for fecal coliform.

Table 1. SCDHEC fecal coliform bacteria data summary for Cane and Little Cane creeks

	Cane Creek SV-342		Little Cane Creek SV-343	
	Before and during project	After project	Before and during project	After project
Number of samples	129	48	90	91
Number of samples > 400 cfu/100 mL (# exceeding)	21	4	31	5
Percent of samples > 400 cfu/100 mL (% exceeding)	16.28%	8.33%	34.44%	9.80%

Partners and Funding

The project received \$266,495 in U.S. Environmental Protection Agency section 319 funding and a nonfederal match of \$174,009 provided by landowners and project partners. Participating partners included SCDHEC; FOLKS; Oconee County Soil and Water District; Oconee County Natural Resource Conservation Service; Clemson University; Oconee County Cattlemen's Association; Oconee County; Keep Oconee Beautiful Association; Walhalla Police Department; ENTRIX, Inc.; Walhalla; and local residents.



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