Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Virginia

Implementing Agricultural Best Management Practices Reduced Bacteria in Little Sandy Creek

Waterbody Improved

Bacteria loads from livestock, septic systems, pets and wildlife sources were significant contributors to Little Sandy Creek, causing the creek to violate the water quality standard for bacteria. As a result, the Virginia Department of Environmental Quality (DEQ) added 7.35 miles of Little Sandy Creek to Virginia's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for failing to attain the primary contact recreation designated use. Installing agricultural best management practices (BMPs) decreased bacteria levels in the creek, allowing Virginia to remove a 2.91-mile-long segment of the initially listed 7.35 miles from its 2012 list of impaired waters.

Problem

The 7,649-acre Little Sandy Creek watershed is in Prince Edward County, Virginia, and is a part of the Appomattox River Basin (USGS hydrologic unit code 02080207). Primary watershed land uses include forestland (72 percent) and pastureland (22 percent); the remaining land uses include a mix of wetlands, commercial, residential, cropland and water.

The 7.35-mile segment of Little Sandy Creek (segment VAC-J03R _ LIT01A02) was listed as impaired in 1998, 2002 and 2004 on Virginia's CWA section 303(d) impaired waters list because it did not support the state's fecal coliform water quality standards for recreation/swimming designated uses. The impaired segment begins at the headwaters of Little Sandy Creek and continues downstream to the Sandy River Reservoir (Figure 1).

Before 2003, the applicable bacteria standard required that no more than 10 percent of samples (based on a minimum of 12 samples) could exceed a single sample maximum fecal coliform value of 400 colony-forming units per 100 milliliters of water (cfu/100 mL). The bacteria samples collected over the 1998–2002 assessment period at monitoring station 2-LIT002.40 violated this threshold 23 percent of the time. In 2003 the bacteria standard was changed to one based on *Escherichia coli*. It requires that no more than 10 percent of samples have *E. coli* levels exceeding 235 cfu/100 mL. Data collected from 2002 to 2003 at station 2-LIT002.40 showed the Little Sandy Creek segment violated the new standard 22 percent of the time.

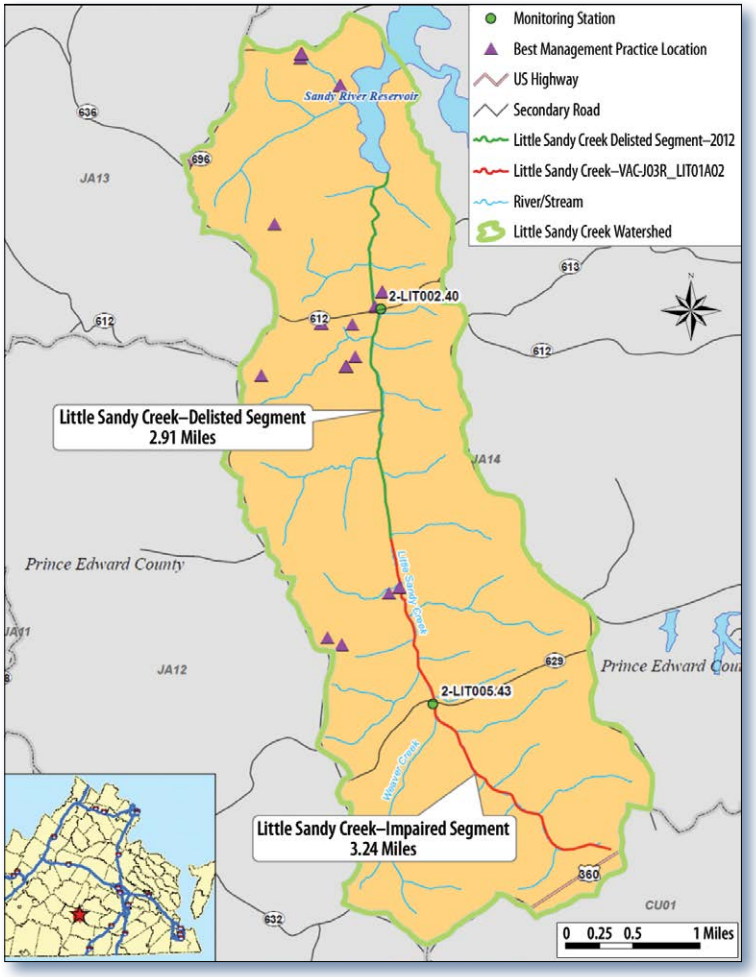

Figure 1. Delisted and impaired segments, best management practices and water quality monitoring stations in the Little Sandy Creek watershed.

DEQ developed a bacteria total maximum daily load (TMDL) for the impaired segment in 2004 (included in the Appomattox River Watershed TMDL). Subsequently, in 2008 the Virginia Department of Conservation and Recreation (DCR) developed a TMDL implementation plan for bacteria in the Little Sandy Creek watershed, in conjunction with Spring Creek, Briery Creek, Bush River and Saylers Creek. The plan included input from federal, state and local government agencies, watershed stakeholders and residents.

Project Highlights

Landowners installed various agricultural BMPs in Little Sandy Creek watershed as part of a 2007–2014 TMDL implementation project. These BMPs addressed bacteria from manure deposited by livestock directly in the streams, by grazing animals on pasture and stored manure spread on cropland. Figure 1 displays the spatial locations of these BMPs within the watershed.

Visits were made to local farms by state and federal conservation specialists to promote the use of agricultural BMPs and to explain their economic and water quality benefits. The personal outreach and farmer-to-farmer communication contributed to the overall project success. The outreach efforts resulted in a variety of BMP installations in the Little Sandy Creek watershed during the implementation period. The agricultural practices include installing approximately 29,529 linear feet (5.6 miles) of livestock stream exclusion fencing, conducting 2,200 linear feet of stream fencing maintenance, constructing a composter facility, and planting 470 acres of small grain cover crop, 300 acres of harvestable cover crop and 18 acres of riparian forest buffer.

Results

Data calculations from DCR's BMP Tracking Database indicated that installing BMPs in the watershed significantly reduced nonpoint source pollutant loadings, including bacteria. Progress in reducing the bacteria loadings in the impaired watershed was reflected in decreasing violation rates of the single sample maximum criterion (Figure 2).

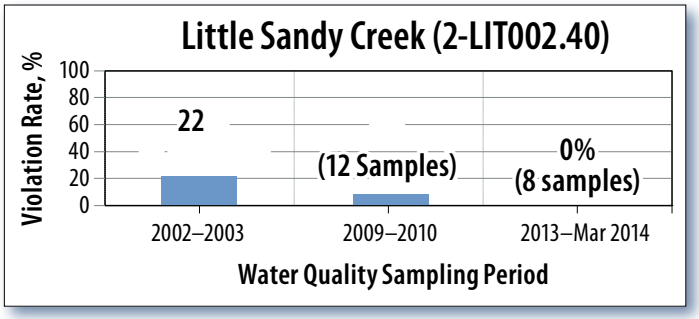

Figure 2. Bacteria violation rate (%) during different sampling periods in Little Sandy Creek watershed.

Of 12 bacteria samples collected from January 2009 through December 2010 at DEQ's ambient water quality monitoring program monitoring station 2-LIT002.40, only one sample (less than 10 percent) exceeded the *E. coli* standard. During the 2013–2014 monitoring period, the violation rate dropped to 0 percent. The temporal decrease in violation rates shows improved water quality. As a result, DEQ removed a 2.91-mile segment of Little Sandy Creek from the state's list of impaired waters in 2012.

Partners and Funding

The water quality improvement in the Little Sandy Creek watershed has primarily resulted from the outreach and financial and technical assistance administered by Piedmont Soil and Water Conservation District (SWCD), and several federal and state agencies including DCR, DEQ and the U.S. Department of Agriculture's (USDA's) Natural Resource Conservation Service (NRCS). Some CWA section 319 funds supported DCR staff time as they provided project oversight and guidance for TMDL implementation. The outreach efforts included personal contacts with farmers and group meetings, watershed tours and presentations to community residents. Funding for the BMP cost share was provided through the state Water Quality Improvement Fund and Virginia Natural Resources Conservation Fund ($78,716), the USDA Farm Service Agency's Conservation Reserve Enhancement Program ($89,912) and the USDA's NRCS funding programs ($44,029). Technical assistance has been funded through state general funds. The state of Virginia also provided $8,943 in the form of tax credits issued to farmers implementing BMPs.

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