



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Virginia

## Implementing Agricultural Conservation Practices Improves Water Quality in Flat Creek

### Waterbody Improved

Nonpoint sources of bacteria, including livestock, pets, humans and wildlife, impaired several waterbodies within Virginia's Appomattox River watershed. The Virginia Department of Environmental Quality (DEQ) added an 8.95-mile-long segment of Flat Creek to the state's Clean Water Act section 303(d) list of impaired waters in 1996 for bacteria. Watershed partners worked with local landowners to implement more than 150 agricultural best management practices (BMPs) in the Flat Creek subwatershed to reduce nonpoint source pollutant loadings to waterbodies. Water quality monitoring data show a decreasing trend in bacteria concentrations in Flat Creek. Implementing additional BMPs should result in continued water quality improvement in the creek and the broader Appomattox River watershed.

### Problem

Flat Creek flows into the Appomattox River, which in turn empties into the James River. The 90,752-acre Flat Creek subwatershed drains portions of Amelia and Nottaway counties near Farmville, Virginia. The major land uses in the subwatershed are forest (66 percent) and pasture (25 percent). Of the 24 water quality samples collected in Flat Creek during a 1996 assessment period, seven violated Virginia's water quality standard for fecal coliform bacteria, which requires that the instantaneous bacteria concentration remain below 1,000 colony forming units (CFU) per 100 milliliters (mL) of water. As a result, in 1996 DEQ added an 8.95-mile-long segment of Flat Creek to the state's list of impaired waters for failing to support its primary contact designated use because of fecal coliform bacteria.

In 2004 DEQ completed a bacteria total maximum daily load (TMDL) study for impaired streams in the Appomattox River watershed. The study identified a number of nonpoint sources of bacteria in the watershed, including wildlife, grazing livestock, pets, land application of manure, land application of biosolids, urban/suburban runoff, failing septic systems and uncontrolled discharges (e.g., straight pipes). TMDLs were developed for Flat Creek and other impaired streams in the Appomattox River watershed, including nearby segments of Nibbs, Deep and West creeks (Figure 1). The Flat Creek TMDL stated that bacteria loads from four nonpoint source categories—livestock, humans, pets and wildlife—must be reduced by 99 percent to meet the TMDL load allocation.

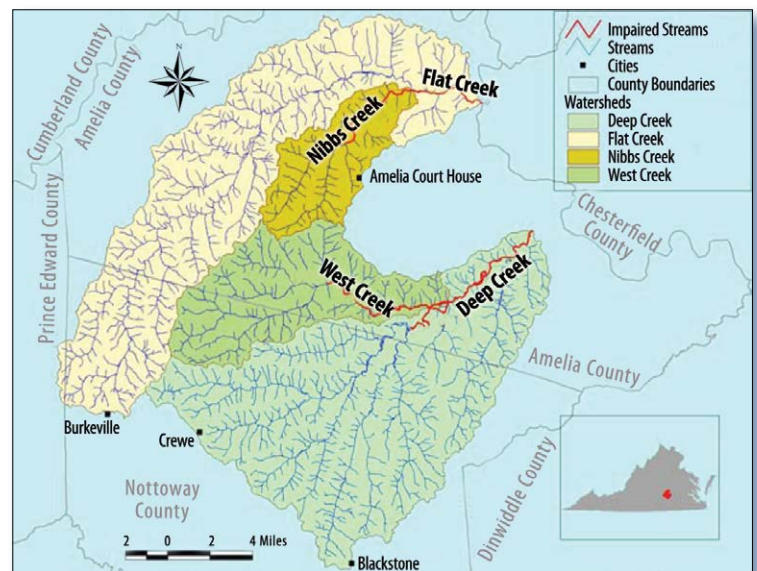


Figure 1. Between 1996 and 2002 Virginia classified Flat Creek and several nearby streams as impaired by bacteria.

### Project Highlights

Pollution control efforts in the Flat Creek subwatershed have been under way since 2002. BMP implementation rates increased significantly in 2006 after the Virginia Department of Conservation and Recreation (DCR) and the Piedmont Soil and Water Conservation District (PSWCD) initiated a coordinated watershed planning effort with other government agencies and stakeholders to reduce the bacteria loading in Flat, Nibbs, West and Deep creeks. In 2008 DCR and PSWCD helped to complete a TMDL

implementation plan for the project area, including all four creek subwatersheds; the plan included a timeline for implementing a variety of BMPs.



Figure 2. Project partners installed alternative water sources for cattle in the Flat Creek watershed.

Between 2007 and 2011, the watershed partners implemented 166 agricultural BMP projects in the Flat Creek subwatershed, including 4.75 miles of stream livestock exclusion fencing (22 percent of the TMDL implementation plan goal) and the construction of alternative water sources for cattle (Figure 2) and two animal waste control facilities. The partners also implemented a number of cropland BMPs aimed

at reducing erosion runoff from fields: more than 2,200 acres of cover crop planting, 254 acres of conservation crop rotation, 37 acres of tree and shrub establishment, and reforestation on 48 acres of erodible crop and pastureland. Approximately 54 acres of pasture and hayland were overseeded with temporary cool-season grass species to provide green cover through the winter months, thereby reducing soil erosion and runoff. The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) worked with landowners to install approximately 18 acres of riparian forest buffer through its Conservation Reserve Enhancement Program (CREP), a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, waters and wildlife habitat.

PSWCD and the NRCS held numerous tours in the project area to promote agricultural BMP implementation. These agencies also coordinated various outreach activities, maintained personal contact with farmers and residents, and hosted meetings to update the community about the water quality improvements achieved. The efforts resulted in a significant increase in BMP implementation during the project period, 2007–2011.

## Results

Implementing agricultural BMPs has reduced pollutant loads (by 32,901 pounds of phosphorus, 114,576 pounds of nitrogen, and 22,567 tons of sediment). In 2002 Virginia began using *Escherichia coli* bacteria as an indicator species for the existence of other pathogenic bacteria. The new bacteria

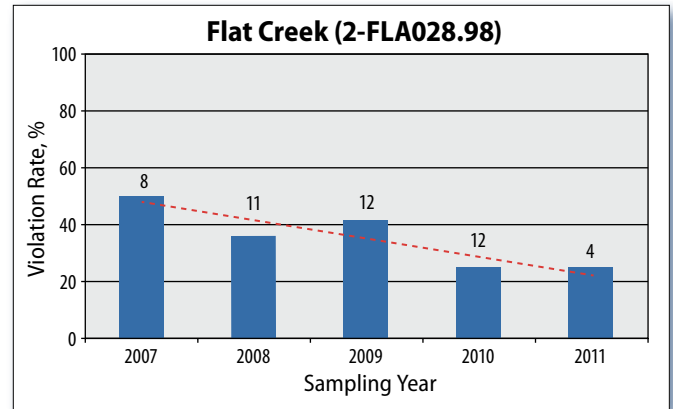


Figure 3. The number of *E. coli* violations (exceeding the 235 CFU/100 mL standard) recorded at monitoring station 2-FLA028.98 has steadily declined.

standard states that *E. coli* levels must not exceed a geometric mean of 126 CFU/100 mL or an instantaneous value of 235 CFU/100 mL.

*E. coli* bacteria monitoring data collected at a Flat Creek ambient water quality monitoring station since 2007 shows a decreasing trend in the frequency of bacteria criteria violations (Figure 3). A second site shows a similar trend. This demonstrated improvement in water quality will help encourage landowners and residents to install more BMPs and to take a more active role in achieving water quality goals in Flat Creek and other nearby impaired watersheds.

## Partners and Funding

Project success to date has been the result of partnerships between the PSWCD, DCR, DEQ, Virginia Cooperative Extension, Amelia and Nottaway county governments, and NRCS. The project is planned to continue beyond June 2013, subject to fund availability. The PSWCD has led community outreach and installation of BMPs during the implementation project. State-funded PSWCD staff work with landowners in the project area. BMPs have been funded by Virginia's Water Quality Improvement Fund (through DCR) and NRCS Environmental Quality Incentive Program cost-share funds (total of \$140,805). The BMP cost-share payments through 2011 for the entire water quality improvement project area total \$779,282, of which \$390,935 has been used in the Flat Creek subwatershed. In addition to federal and state funding, the farmers and residents of the watershed have paid for their share of the cost of the BMP installation.



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