



NONPOINT SOURCE SUCCESS STORY

Virginia

Agricultural and Residential Pollution Control Measures Reduce Bacteria Loading in Rock Island Creek

Waterbody Improved

An 8.88-mile-long segment of the Rock Island Creek was listed as impaired on Virginia's 2004 Clean Water Act (CWA) section 303(d) list. The impairment was due to not attaining the state's bacteria water quality standard (WQS) for designated recreation (swimming) use. Installing agricultural and residential best management practices (BMPs) helped reduce bacteria loading in Rock Island Creek, resulting in the removal of a segment from the state's impaired waters list on 2016 CWA sections 305(b)/303(d) Water Quality Assessment Integrated Report.

Problem

The Rock Island Creek watershed (VAC-H17R-04) is adjacent to the Slate River watershed; both are part of the James River Basin (HUC 02080205). Located in Buckingham County, Virginia, the Rock Island Creek watershed encompasses a geographical area of approximately 13,050 acres with forest as the primary land use (92 percent), followed by pasture/cropland (6 percent), water/wetland (2 percent), and residential (1 percent) land uses (Figure 1).

The water quality of Rock Island Creek was monitored at station 2-RKI003.40 under Virginia Department of Environmental Quality's (DEQ's) ambient and total maximum daily load (TMDL) monitoring programs. The Rock Island Creek segment (VAC-H17R_RKI01A00) was initially placed on Virginia's 2004 CWA section 303(d) list of impaired waters because it failed to meet the state's fecal coliform bacteria-based WQS for its designated recreation (swimming) use. During the 1998–2002 assessment period, three out of 19 samples collected (16 percent) violated fecal coliform instantaneous WQS. The impaired segment begins at the headwaters at river mile 8.84 and ends at confluence with the James River at river mile 0.00 (Figure 1). The segment remained on Virginia's 2006 CWA section 303(d) list of impaired waters for fecal coliform violation because two out of seven (29 percent) samples collected exceeded the bacteria WQS.

In mid-2003, the state changed its bacteria WQS to one based on *Escherichia coli* bacteria levels. The new WQS required that samples not violate the single

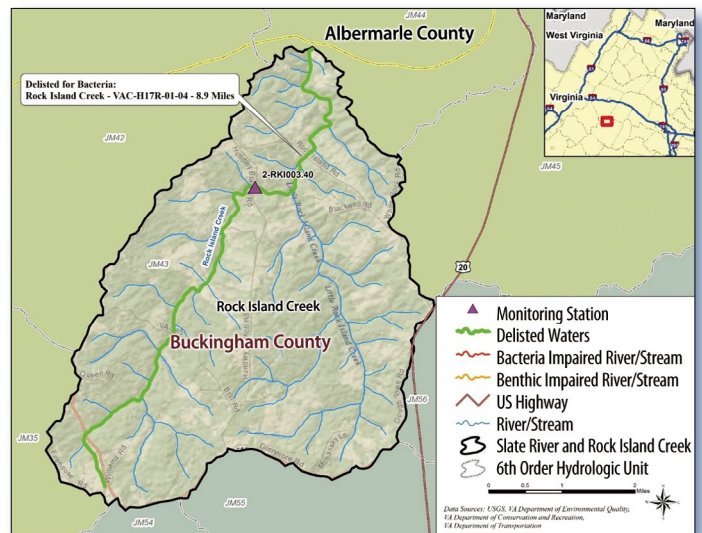


Figure 1. Rock Island Creek is in the James River watershed in south-central Virginia.

sample maximum value of 235 colony-forming units (cfu) per 100 milliliters (mL) of water for more than 10 percent of the time, based on a minimum of 12 samples collected monthly or bimonthly. In addition, if a minimum of four weekly samples are collected within any calendar month, a geometric mean must not exceed 126 cfu/100 mL.

A bacteria TMDL for Rock Island Creek was developed by DEQ in 2007 as a part of the James River Basin TMDL. Livestock, failing septic systems, pets and wildlife were identified as primary bacteria sources in the watershed.



Photo: PFSWCD

Figure 2. Fencing was installed to protect riparian areas and support rotational grazing.

Story Highlights

In 2011 the Virginia Department of Conservation and Recreation, with active participation of Peter Francisco Soil and Water Conservation District (PFSWCD) and other stakeholders, developed an implementation plan and began conducting various outreach activities and installing agricultural and residential BMPs in the Rock Island Creek watershed. Multiple contacts with farmers and landowners, field tours, presentations to civic bodies, and postcard mailings were conducted to promote conservation programs and to enhance environmental awareness in the community.

From the beginning of the implementation project in July 2011 until December 2014, many residential and agricultural BMPs were installed through active partnerships between the PFSWCD and several state, federal and local agencies. The BMPs included 117 acres of small grain and mixed cover crop planted for nutrient management and residue management, 38 head of livestock excluded from stream, and approximately 6,000 linear feet of stream exclusion fencing completed along the creek (Figure 2). In addition, 57 acres were placed under a long-term continuous no-till planting system and two residential septic projects were completed in the Rock Island Creek watershed.

Results

The agricultural and residential control measures installed in the watershed helped reduced bacteria levels in Rock Island Creek. DEQ staff conducted water quality monitoring at station 2-RKI-003.40. Water quality data indicated that only eight percent of samples (one out of 12) exceeded the *E. coli* WQS during the

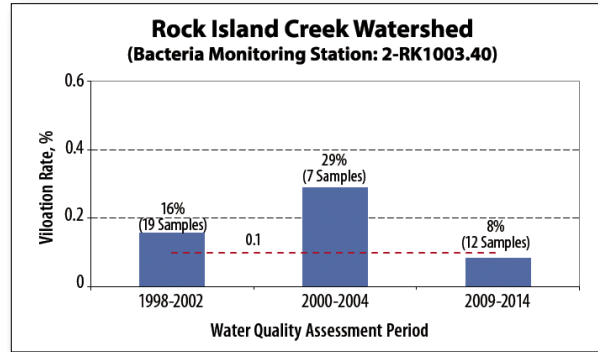


Figure 3. Bacteria levels met the WQS in Rock Island Creek for the 2009–2014 assessment period.

January 2009 to December 2014 assessment period (Figure 3). This exceedance of violation rate is significantly lower than 29 percent (two out of seven) found during the 2000–2004 assessment period, and the 16 percent (three out of 19) found during the 1998–2002 assessment period. On the basis of attaining the WQS (i.e., less than 10 percent violation rate exceedance) in the 2009–2014 assessment period, DEQ removed the 8.88-mile-long segment of Rock Island Creek from the list of impaired waters in the 2016 Final 305(b)/303(d) Water Quality Assessment Integrated Report.

Partners and Funding

The PFSWCD administered implementation projects in the Rock Island Creek watershed and forged active partnerships among several state, federal and local agencies, including the Virginia Department of Conservation and Recreation, Virginia DEQ, Virginia Department of Health, the U.S. Department of Agriculture–Natural Resources Conservation Service, Virginia Cooperative Extension and the Buckingham County Farm Bureau.

The BMPs (completed from 2011 through 2014) included state of Virginia cost-share funds totaling \$31,575, through funding from Virginia Agricultural Cost-Share Program (\$31,300) and \$275 from CWA section 319(h). In addition, the CWA section 319(h) grant program provided \$120,541.22 to fund nonpoint source implementation staff that managed the project and provided technical assistance, in conjunction with ongoing implementation projects in the adjoining Slate River and Willis River watersheds. DEQ estimates that approximately 15 percent of these funds were directly used within the Rock Island Creek watershed area.



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