



NONPOINT SOURCE SUCCESS STORY

Virginia

Best Management Practices Help Restore Recreational Use of Buffalo Creek North Fork

Waterbody Improved

Two segments (a total of 7.58 miles) of Buffalo Creek North Fork were listed in 2012 as impaired on Virginia's Clean Water Act (CWA) section 303(d) list of impaired waters. The impairments were due to not attaining the Commonwealth's *Escherichia coli* bacteria water quality standards (WQS) for designated recreation (swimming) use. A total maximum daily load (TMDL) study identified livestock, failing septic systems, pets, and wildlife as primary pollutant sources. The best management practices (BMPs) installed under a water quality improvement plan resulted in improved water quality of Buffalo Creek North Fork. As a result, both segments were removed from the impaired waters list in Virginia's 2018 305(b)/303(d) Water Quality Assessment Integrated Report (Integrated Report).

Problem

The Buffalo Creek North Fork watershed (HUC 020802020503) is part of the Buffalo Creek, Collier Creek, and Cedar Creek watershed within the James River Basin in Rockbridge County, Virginia (Figure 1). The combined 89,456-acre watershed includes forest (74%) and agriculture as the predominant land uses.

Two segments of Buffalo Creek North Fork, VAV-I38R_NBF01A10 (4.65-miles) and VAV-I38R_NBF02A00 (2.93-miles), were listed as impaired for not meeting their designated recreational (swimming) use. The impaired segments consist of the entire segment of Buffalo Creek North Fork, from the headwaters and continuing downstream to its confluence with the Buffalo Creek South Fork tributary.

The water quality samples were collected under Virginia Department of Environmental Quality's (DEQ) ambient water quality monitoring program. Data at monitoring station 2-BFN000.07 collected for 2005–2010 assessment period indicated two of 12 samples (17%) exceeded WQS for *E. coli* bacteria. Figure 2 displays number of samples collected and the violation rates for this assessment period. Based on a greater than 10% exceedance criterion, these segments were initially identified as impaired on Virginia's 2012 303(d) list of impaired waters.

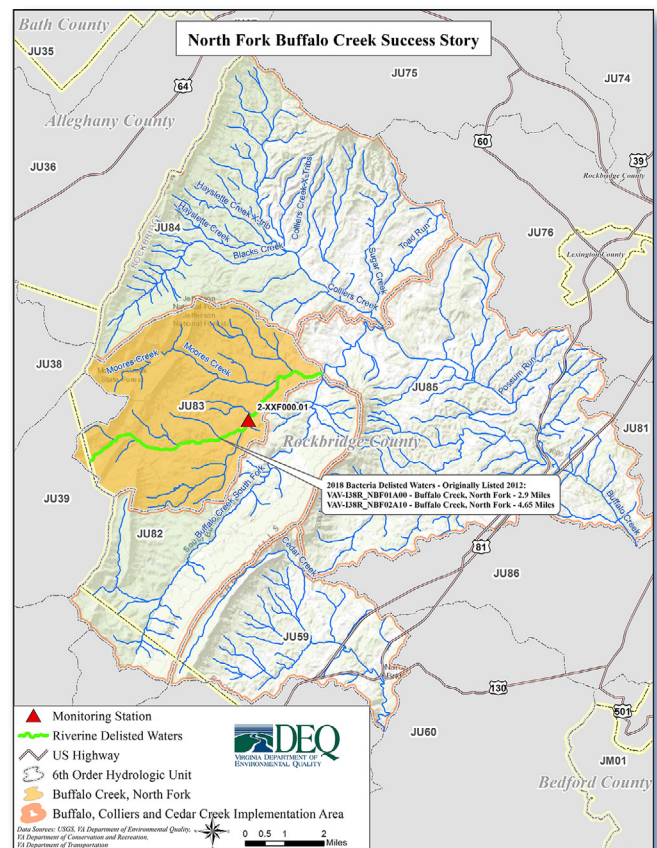


Figure 1. Location of impaired segments and bacteria monitoring station in Buffalo Creek North Fork watershed, Virginia.

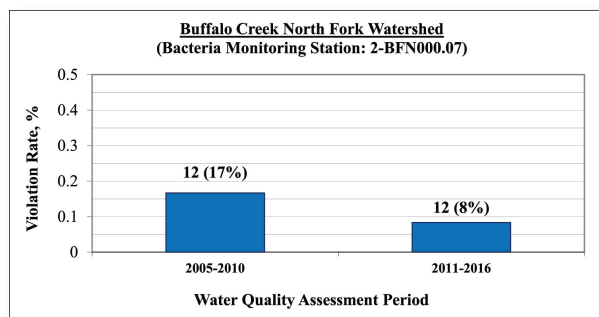


Figure 2. *E. coli* violation rates (exceeding 235 cfu/100 mL standard) in Buffalo Creek North Fork watershed, Virginia.

In 2013, DEQ developed a bacteria and benthic TMDL for Buffalo Creek North Fork in conjunction with Collier Creek and Cedar Creek watersheds. The 2013 TMDL identified the primary sources of the bacteria impairment as livestock, pets, failing septic systems, and wildlife. In 2015, the Virginia Department of Conservation and Recreation (DCR) developed an implementation plan for bacteria and benthic with inputs from federal, state, and local government agencies; the Natural Bridge Soil and Water Conservation District (NBSWCD); and various watershed stakeholders.

Story Highlights

The NBSWCD administered BMP installation with the combined efforts of federal, state, and local agencies and stakeholders, including DCR, DEQ, and Virginia Cooperative Extension (VCE). Diverse outreach activities employed in the watershed included field tours, individual and group stakeholders' meetings, and informational brochures on water quality and environmental improvements.

BMPs installed between 2010 and 2016 include 639 acres of small grain and mixed cover crop; 438 acres of harvestable cover crop; and 13 acres of afforestation of crop, hay, and pastureland. In addition, 800 linear feet of stream exclusion fencing with grazing land management was installed in the Buffalo Creek North Fork watershed. This practice helped to prevent water access by 18 beef cattle.

Results

Installing the above listed BMPs resulted in water quality improvement, which was reflected in decreased bacteria exceedances in Buffalo Creek North Fork. Twelve water quality samples collected in the 2011–2016 assessment period at monitoring station 2-BFN000.07 showed only one sample exceedance of the *E. coli* standards (see Figure 2). Exceedances were less than 10% of collected bacteria samples, resulting in full support of the designated recreation (swimming) use. Based on the improvement, both segments (totaling 7.58 miles) of Buffalo Creek North Fork were removed from DEQ's 2018 Integrated Report.

Partners and Funding

The water quality improvements in Buffalo Creek North Fork watershed were a result of combined efforts of the NBSWCD and state and federal agencies, including DCR, DEQ, VCE, and local stakeholders. Total funding of BMPs installations during the 2010–2016 period was \$121,002. This includes state contributions to Water Quality Improvement Fund (\$61,163) and \$57,840 from Virginia Agricultural Cost-Share Program. The Commonwealth of Virginia also provided technical assistance funds to NBSWCD as operational support for coordinating implementation projects. NPS staff funded by CWA section 319(h) coordinated the projects statewide.



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