



NONPOINT SOURCE SUCCESS STORY

Virginia

Implementing Best Management Practices Improves Benthic Communities in Willis River

Waterbodies Improved

Two segments of the Willis River were listed in 2008 as impaired on Virginia's Clean Water Act (CWA) section 303(d) Total Maximum Daily Load (TMDL) Priority List and Report. The segments were impaired due to not meeting the state's water quality General Standard for aquatic life. Installing agricultural best management practices (BMPs) in the watershed helped improve habitat and benthic macroinvertebrate communities, resulting in removal of both segments from the state's impaired waters list on the 2014 CWA sections 305(b)/303(d) Water Quality Assessment Integrated Report.

Problem

The Willis River is part of the James River Basin (HUC 02080205; VAC-H35R and VAC H36R) in Cumberland and Buckingham counties, Virginia (Figure 1). Primary land uses in the 177,936-acre Willis River watershed are woodlands and pasture. The watershed is comprised of forest (75 percent), agricultural (21 percent), wetlands (2 percent), water (1 percent), and urban (1 percent) land uses.

Two segments of the Willis River were placed on Virginia's CWA section 303(d) list due to violations of the Commonwealth of Virginia's water quality General Standards for aquatic life during the 2008 assessment period. The impaired segments, VAC-H36R_WLS01B08 (4.83 miles) and VAC-H36R_WLS01C10 (15.2 miles), extend from the confluence with Buffalo Creek to the northern Cumberland State Forest boundary.

The Willis River segments were sampled for biologic integrity at monitoring station 2-WLS024.61 under the Virginia Department of Environmental Quality (DEQ)'s Probabilistic Monitoring program in 2001 and 2002. Below-normal precipitation during the period resulted in the sampling occurring under low-flow conditions. The Index of Biological Integrity scores received were 39 and 74 (spring 2001), 51 (fall 2001), 47 (spring 2002) and 45 (fall 2002). DEQ employs the Virginia Stream Condition Index (VSCI) to evaluate biological conditions of a stream. A stream that achieves a rating of 60 or above is considered to be supporting biological integrity and meets the aquatic life use.

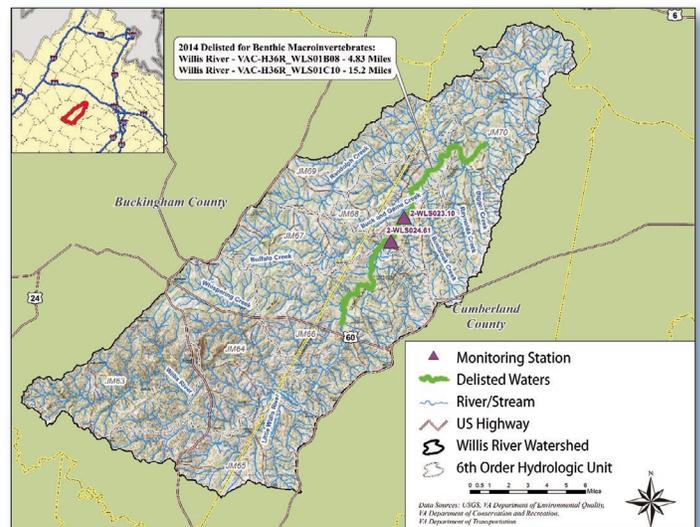


Figure 1. Delisted segments and biological monitoring stations in southern Virginia's Willis River watershed.

DEQ developed a fecal coliform TMDL for the Willis River watershed in 2002. Livestock, failing septic systems, pets and wildlife were identified as primary pollution sources in the watershed. In 2005 the Virginia Department of Conservation and Recreation (DCR), with extensive input from Peter Francisco Soil and Water Conservation District (PFSWCD) and other stakeholders, developed an implementation plan and commenced an implementation project that involved installing agricultural and residential BMPs in the Willis River watershed.

Photo courtesy: PFSWCD



Figure 2. Cows gather in a loafing lot facility installed in the Willis River watershed.

Photo courtesy: PFSWCD



Figure 3. Livestock stream exclusion fencing and a buffer were installed in the Willis River watershed.

Story Highlights

Installing residential and agricultural conservation practices have largely been the result of active partnerships between the PFSWCD and several state agencies, including DCR, DEQ, Virginia Department of Health, Virginia Cooperative Extension, Buckingham County Farm Bureau, and the U.S. Department of Agriculture’s Natural Resources Conservation Service. Multiple farmers’ tours, field days, presentations at civic clubs throughout the watersheds, postcard mailings advertising the program, and personal contacts with farmers and residents were conducted to engage with the community about the water quality improvements and to encourage implementation of various conservations measures.

From July 2005 through December 31, 2012, multiple agricultural and residential projects were completed. Approximately 823 head of livestock have been excluded from the stream with 85,482 feet (16.2 miles) of livestock exclusion fencing. Other agricultural practices installed include 66 acres placed under afforestation of erodible crop and pasture land, 50 acres under small grain and mixed cover crop, 36 acres of riparian forest buffer planting, 35 acres supported for extension of a Conservation Reserve Enhancement Program (CREP) watering system, and three animal waste control (e.g., loafing lots) and composted facilities (Figures 2 and 3).

Under the residential program, 15 septic tank pump-outs, three septic system repairs and two septic tank system replacements were completed in the watershed.

Results

The BMPs installed in watershed from 2002 through 2012 helped reduce pollutant loadings to the Willis River. The biological monitoring performed at a station 2-WLS023.10 (1.51 miles downstream of listed station) in spring 2011 indicated an improvement in the benthic macroinvertebrate community. It was reflected through a VSCI scores of 67, well above the threshold value of 60, indicating full support of aquatic life use. Accordingly, both segments (4.83 and 15.20 miles) were delisted from the state’s 2014 CWA sections 303(d)/305(b) Water Quality Assessment Integrated Report.

Partners and Funding

The improvement in the benthic communities in the Willis River watershed is a result of partnerships among the PFSWCD and several state and federal agencies, including the DCR, DEQ, and NRCS. BMP implementation in watershed was administered by the PFSWCD and NRCS and included CWA section 319 federal grants totaling \$369,888 in 2005–2012. Also, BMPs were funded through the DCR’s contribution to CREP (\$22,055) and through Virginia’s state cost-share funds (\$106,265). The CWA section 319(h) grant program also provided PFSWCD with \$304,745 to fund a full-time equivalent position from 2005 to 2012 to provide technical assistance and service for BMP design and installation for the larger Willis River implementation plan area.



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