



# NONPOINT SOURCE SUCCESS STORY

## Virginia

### Agricultural Best Management Practices Improve Aquatic Life in the Blackwater River

#### Waterbodies Improved

High sediment loadings led to violations of the general standard for aquatic life use in Virginia's Blackwater River. As a result, the Virginia Department of Environmental Quality (DEQ) added two segments of the Lower Blackwater River to the 2008 Clean Water Act (CWA) section 303(d) list of impaired waters. Landowners installed agricultural best management practices (BMPs); these decreased edge-of-field sediment loading and helped improve water quality. Because of this improvement, DEQ removed two segments of the Blackwater River from Virginia's 2014 list of impaired waters for biological impairment.

#### Problem

The Blackwater River watershed is in Franklin County, Virginia, in the Roanoke River Basin (USGS Hydrologic Unit Code 03010101). The watershed lies north of Rocky Mount, Virginia, approximately 15 miles south of Roanoke, Virginia. The Blackwater River flows southeastward and empties into Smith Mountain Lake (Figure 1). The Upper Blackwater River watershed (70,303 acres) is 69% forest, 18% pasture and hayland, 7% cropland and less than 1% urban. The Lower Blackwater River watershed (20,504 acres) is 58% forest, 33% agricultural, 8% urban and 2% water.

Biological sampling conducted at monitoring station 4ABWR029.51 in 2004 showed Virginia Stream Condition Index (VSCI) scores of 60.7 in the spring and 50.1 in the fall. The VSCI score is a macroinvertebrate and fish community index, a composite measure of the number and types of pollution-sensitive aquatic insects inhabiting a waterbody. A VSCI rating score of 60 or above indicates that a waterbody supports its biological integrity and meets its aquatic life designated use.

Because 2004 data showed that the Blackwater River failed to support biological integrity year-round, DEQ added two segments—Blackwater River assessment units VAW-L08R \_ BWR01A00 (3.02 miles long) and VAW-L08R \_ BWR01B06 (2.97 miles long)—to Virginia's 2008 CWA section 303(d) list for violating the general standard (benthic impairments). Water quality data analyses and field observations indicated that the primary cause of the benthic impairment in

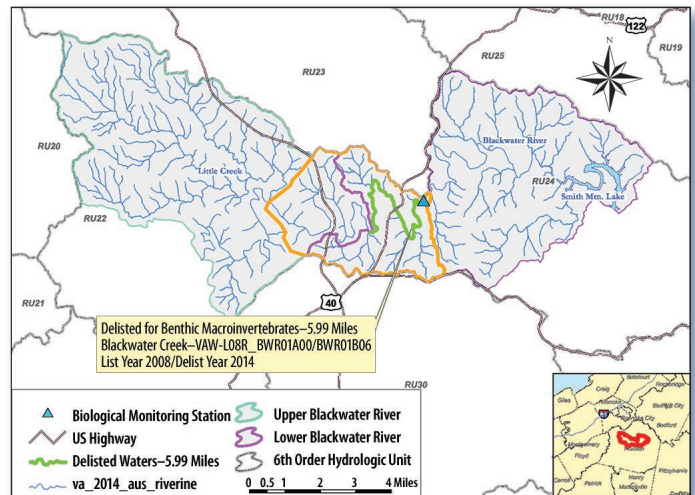


Figure 1. The Blackwater River is in southwest Virginia.

these segments was excessive sedimentation. The subwatershed area of the listed segments consists of 7,707 acres and is in the upstream reach of the Lower Blackwater River watershed.

DEQ developed total maximum daily loads (TMDLs) for Upper Blackwater River, Middle Blackwater, North Fork Blackwater and South Fork Blackwater River (for bacteria in 2001 and for sediment in 2004). TMDLs for Lower Blackwater River and Maggodee Creek were developed for bacteria in 2001. The Virginia Department of Conservation and Recreation (DCR) developed TMDL implementation plans for the Upper Blackwater River in 2001 and for the Lower Blackwater River, Maggodee Creek and Gills Creek in 2006.



Figure 2. BMPs installed in the Blackwater River watershed include alternative livestock watering systems (left), and small grain cover crops (right). Photos courtesy of Blue Ridge Soil and Water Conservation District.

## Project Highlights

A number of agricultural BMPs were installed from 2002 to 2012 to reduce sediment loads in the subwatershed area containing the impaired segments. These BMPs include 29,323 linear feet (5.6 miles) of livestock exclusion fencing, 258 acres of small grain cover crop, 37 acres of harvestable cover crop and 38 acres of legume cover crop (Figure 2). Also, various BMPs were installed in the Upper Blackwater River watershed, which affected downstream sediment loads and helped improve water quality. These BMPs include 42,660 linear feet (8.2 miles) of livestock exclusion fencing, 2,211 acres of small grain cover crop, 344 acres of harvestable cover crop and 96 acres of legume cover crop. Also, four animal waste storage facilities were installed in the watersheds.

## Results

Water quality in the Blackwater River has improved due to the installation of agricultural BMPs. The spring 2012 VSCI score fell slightly below the non-impaired threshold (field personnel noted a high flow event two weeks prior to sampling that might have negatively affected the score); however, the remaining spring and fall scores all remained well above the threshold value (Figure 3).

The increased VSCI scores reflect an improvement in biological condition which fully supports the aquatic life designated uses of the stream. Because of these improvements, the two previously impaired segments of the Blackwater River were removed from the state's impaired waters list in 2014 (as reflected in the 2014 Water Quality Assessment 305(b)/303(d) Integrated Report).

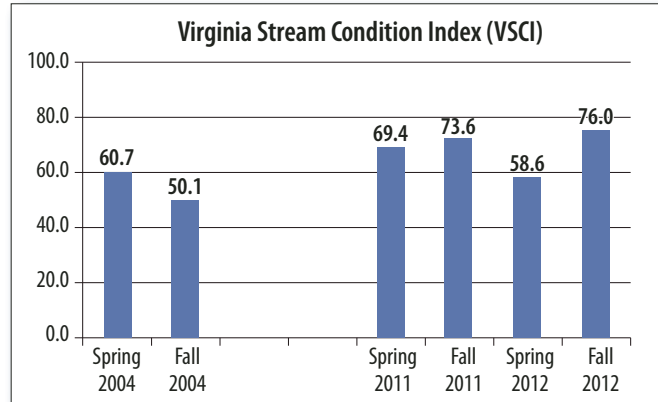


Figure 3. Biological assessment VSCI scores in the Lower Blackwater River (river mile 29.51) improved after BMP implementation. A score of 60 and above is considered to be meeting the aquatic life designated use.

## Partners and Funding

The improved water quality in the Blackwater River has largely been the result of partnerships between Blue Ridge Soil and Water Conservation District (BRSWCD) and several federal and state agencies, including DCR, DEQ, and the U.S. Department of Agriculture's (USDA's) Natural Resources Conservation Service.

TMDL implementation, including cost-share funding, outreach activities and technical assistance to implement agricultural BMPs, was locally administered by BRSWCD. Outreach efforts included conducting watershed tours and meetings, making contact with individuals, and presenting BMP material to landowners and community organizations in the impaired watersheds.

DCR administered six CWA section 319(h) awards that collectively provided \$329,056 in agricultural BMP and residential septic cost-share and technical-assistance funds. DCR also provided \$205,127 in state agricultural cost-share funds (including the state portion of the Conservation Reserve Enhancement Program [CREP] funding). The USDA provided approximately \$9,783 through CREP. Landowners and participants provided an estimated \$230,678 of cost-share funds for their portion of installed practices.



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