NONPOINT SOURCE SUCCESS STORY

Virginia

Improving Stream Aquatic Health by Implementing Best Management Practices in Mountain Run Watershed

Waterbodies Improved

Two segments of Mountain Run were listed as impaired on Virginia's 2002 Clean Water Act (CWA) *Section 303(d) Total Maximum Daily Load Priority List and Report*. The segments were impaired due to violations of the state's water quality general standard for aquatic life. Installing agricultural best management practices (BMPs) in the watershed helped reduce sediment and improve benthic macroinvertebrate communities, allowing Commonwealth of Virginia to remove both segments from the state's impaired waters list in 2014.

Problem

The Mountain Run watershed (4,595 acres), in Rockingham County, Virginia, is a part of the southeastern portion of the Smith Creek watershed (Hydrologic Unit Code 020700060202) (Figure 1). Mountain Run empties into Smith Creek, which flows northward from headwaters to its confluence with the North Fork Shenandoah River. The watershed predominantly is forested, followed by pasture/hayland, cropland and urban land uses.

The impaired segments begin in the headwaters and end at their confluence with Smith Creek. The segments were listed on the CWA section 303(d) list for violating the state's water quality general standard for aquatic life during the 2002 assessment period. The impairment at station #4076 was based on bioassessment performed by the U.S. Forest Service using the Macroinvertebrate Aggregated Index for Streams (MAIS), based on the Rapid Bioassessment Protocols methodology. A stream having an index of 12 and above was considered to be in a good condition. Two segments of Mountain Run (5.69 miles and 0.95 miles) received a MAIS score of 11.5, which failed to meet the minimum threshold. As a result, both segments were categorized as moderately impaired and were added to the 2002 CWA section 303(d) list of impaired waters. The Virginia Department of Environmental Quality (DEQ) developed total maximum daily loads in 2004, and created an implementation plan in cooperation with the Virginia Department of Conservation and Recreation (DCR) in 2009 that addressed aquatic life impairments in the Smith Creek watershed, including Mountain Run.

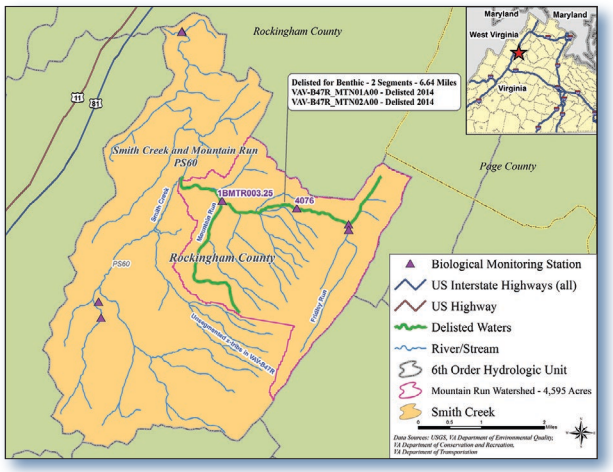

Figure 1. Delisted segments and biological monitoring stations in northwest Virginia's Mountain Run watershed.

DEQ now 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 meeting the stream's aquatic life use.

Story Highlights

The BMPs installed in the watershed from 2002 through 2012 included 155 acres of harvestable cover crop, 71 acres of small grain cover crop, 25 acres of riparian forest buffer, 15 acres of riparian buffer, and 30 acres of legume based cover crop (Figure 2). Also, 23 acres of pasture and hayland forage was improved, and 1,815 feet of streambank protection and two animal control facilities were installed. BMP

implementation is still ongoing; from 2013 through mid-2016 farmers added 4,405 feet of stream exclusion fencing, 89 acres of harvestable cover crop, 163 acres of small grain cover crop, and 29 acres of legume-based cover crop in the watershed.

Results

The BMPs installed in the watershed from 2002 to 2012 helped reduce sediment loadings to the stream. The biological monitoring conducted by DEQ at station 1BMTR003.25 in 2011–2014 indicated an improvement in the benthic macroinvertebrate community, reflected through VSCI scores that met the threshold for full support of aquatic life. Although a single spring 2012 score of 58 fell slightly below the threshold, the overall average scores indicate full support (Figure 3). In addition, water quality data collected at U.S. Forest Service station 4076 (headwaters) indicated full support of aquatic life use beginning in 2007 (Figure 4). Based on these data, both segments (5.69 miles: VAVB47R_MTN01A00, and 0.95 miles: VAVB47R_MTN02A00) were removed from the state's impaired waters list in 2014.

Partners and Funding

The improvement in the aquatic communities in the Mountain Run is a result of partnerships among the Shenandoah Valley Soil and Water Conservation District (SVSWCD) and several state and federal agencies, including the DCR, DEQ, and the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). BMP implementation was administered by the SVSWCD and NRCS and included cost-share assistance totaling $275,134 from 2002 to 2012. Also, BMPs were funded through Virginia's Water Quality Improvement Fund ($33,407), DCR's contribution to the Conservation Reserve Enhancement Program ($9,991), and NRCS funding ($50,860). The funding for BMPs installed from 2013 through mid-2016 was provided through state cost-share funds ($57,985), a CWA section 319 federal grant ($8,094), and NRCS ($114,797).

Photo: Shenandoah Valley SWCD

Figure 2. Livestock exclusion stream fencing and riparian buffer in Mountain Run watershed.

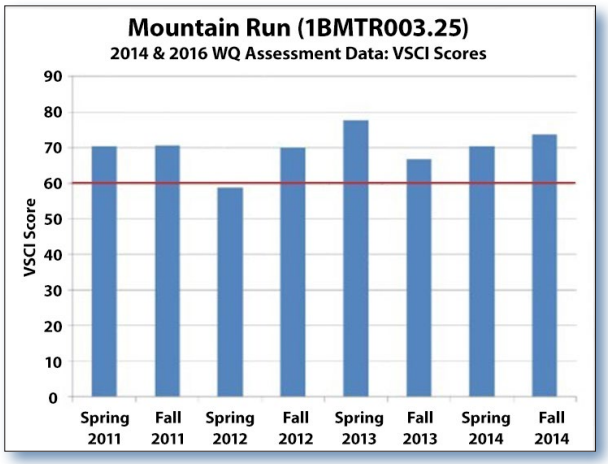

Figure 3. VSCI scores show aquatic life use support at the downstream monitoring station 1BMTR003.25.

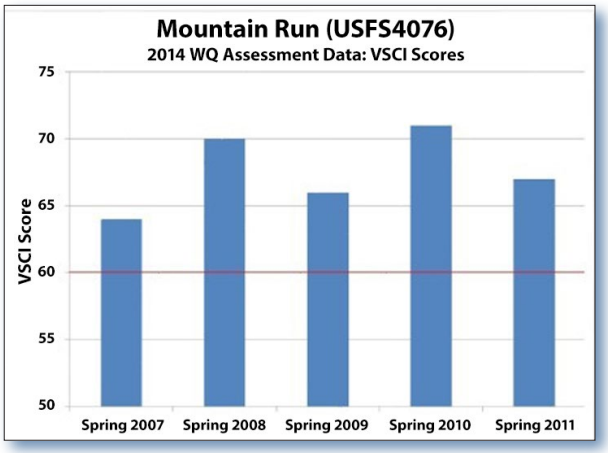

Figure 4. VSCI scores show aquatic life use support at the headwaters monitoring station 4076.

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