



# NONPOINT SOURCE SUCCESS STORY

## Virginia

### Control Measures Reduced Pollutants in Powell River and Tributaries

#### Waterbody Improved

Two segments (12.30 miles) of Powell River were listed in 2002 and 2004 as impaired on Virginia's Clean Water Act (CWA) Section 303(d) Total Maximum Daily Load (TMDL) Priority List and Report because they did not attain the Commonwealth's water quality general standard for aquatic life. Two more segments (4.69 miles) within the watershed were listed in 2006 for exceeding Virginia's bacteria water quality standards (WQS) for designated recreation (swimming) use. A TMDL study identified primary pollutant sources for each category. Implementing best management practices (BMPs) helped reduce bacteria and sediment loadings and improved biological health in the Powell River. As a result, the two benthic-impaired segments were removed from the impaired waters list in Virginia's 2018 and 2020 305(b)/303(d) Water Quality Assessment Integrated Report (Integrated Report) and the two bacteria-impaired segments were removed in the 2014 and 2020 Integrated Reports.

#### Problem

The majority of the Powell River and tributaries watershed is in Virginia's Lee and Wise counties in the Tennessee/Big Sandy River basin (Figure 1). The watershed land area is approximately 293,000 acres, with forest and woodlands as primary land use (73%), followed by pasture and hayland (18%); the remaining area includes developed mines and water land uses.

Biological assessments were conducted for the Powell River and South Fork Powell River segments at stations 6BPOW120.69 and 6BPLL002.55, respectively, under Virginia Department of Environmental Quality's (DEQ) probabilistic monitoring program. The biological integrity scores (Virginia Stream Condition Index, or VSCI) for Powell River and South Fork Powell River were less than the minimum threshold score of 60 for the 2002 and 2004 assessment periods, respectively. Therefore, both segments were placed on Virginia's 2002 and 2004 303(d) list of impaired waters.

In addition, water quality monitoring in Powell River and Town Creek was conducted under DEQ's ambient monitoring program. Water samples collected for the 2006 assessment period for Powell River (stations 6BWAL000.12) and Town Creek (station 6BTOW001.32) indicated two out of eight samples (25%) and five out of nine samples (55%), respectively, exceeded WQS for *Escherichia coli* bacteria. Based on greater than 10% exceedance criteria, these segments were placed on Virginia's 2006 303(d) list of impaired waters.

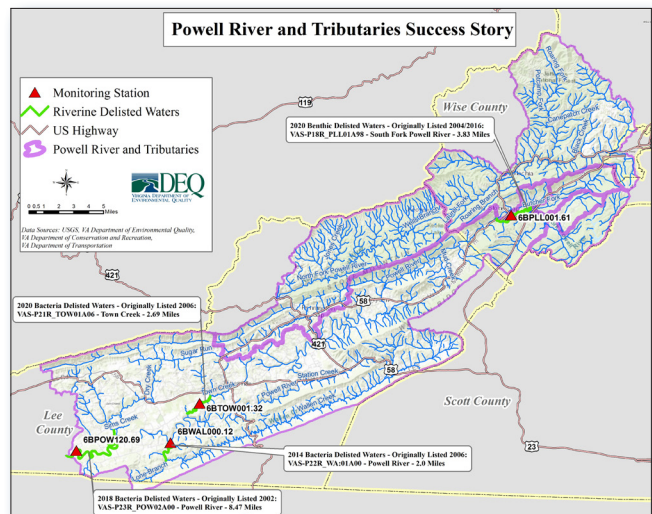


Figure 1. Delisted segments and bacteria and benthic monitoring stations in southwest Virginia's Powell River watershed.

The 2011 bacteria and benthic TMDL for Powell River and its tributaries identified primary pollutant sources for the bacteria impairment—animal wastes, failing septic systems, pets, and wildlife—and for the benthic impairment—sediment transport through stream flow and stream bank scour. In 2018, DEQ developed an implementation plan with input from federal and state government agencies, the Daniel Boone Soil and Water Conservation District (DBSWCD), the Lonesome Pine Soil and Water Conservation District (LSWCD), and watershed stakeholders.

Photo courtesy of LSWCD



Figure 2. High-tensile electric fence installed in the South Fork Powell River watershed.

## Story Highlights

Agricultural BMP projects, administered by DBSWCD, LSWCD, and the Natural Resources Conservation Service (NRCS), were executed with combined efforts of federal, state, and local agencies and stakeholders, including Virginia Department of Conservation and Recreation (DCR), DEQ, Virginia Cooperative Extension (VCE), and the Farm Bureau. Outreach activities included farm visits, county fairs, meetings, and mailings to watershed stakeholders.

BMPs installed between 2002 and 2018 included 136,608 linear feet of stream exclusion fencing with grazing land management, 172 acres of grazing land management, 40 acres of permanent vegetative cover on critical area, and 5 acres of riparian forest buffer filter area planted under the NRCS's Conservation Reserve Enhancement Program (Figure 2). In addition, stakeholders added 400 linear feet of stream diversion, protected 850 linear feet of crop stream, and treated 145 tons per year of animal waste in the watershed.

## Results

BMP installation resulted in water quality improvement, which is reflected in decreased bacteria exceedances and increased VSCI scores. The biological samples collected showed VSCI scores exceeding the minimum threshold value of 60 at monitoring station 6POW120.12 for the 2018 assessment period and at station 6BPLL001.66 for the 2020 assessment period (both sites showed scores of 72 and 79 in spring and

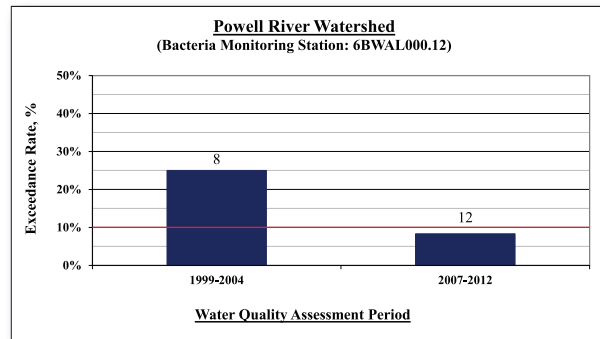


Figure 3. Bacteria exceedance rate (%) and number of samples collected in Powell River.

fall, respectively), indicating a fully supporting status for both segments. Based on these improvements, segments of Powell River (8.47 miles) and South Fork Powell River (3.83 miles) were removed from DEQ's 2018 and 2020 Integrated Reports, respectively.

Also, 12 samples collected at monitoring station 6WAL000.12 for the 2014 assessment period (Figure 3) and at station 6BTOW001.32 for the 2020 assessment period showed bacteria exceedance of less than 10% of the *E. coli* standards, indicating fully supporting bacteria standards for the designated recreation (swimming) use. Based on these improvements, the Powell River (2 miles) and Town Creek (2.69 miles) segments were removed from DEQ's 2014 and 2020 Integrated Reports, respectively.

## Partners and Funding

The improvements in the Powell River watershed are a result of combined efforts of DBSWCD, LSWCD, and state and federal agencies, including DCR, DEQ, NRCS, Lee County and Wise County Farm Bureau, VCE Services, and watershed stakeholders. Total funding from 2002 through 2018 was \$2,231,582, which includes \$1,766,356 from Virginia Agricultural Cost-share Program (VACS); \$136,784 from VACS-outside Chesapeake Bay Fund; \$42,154 as state contributions to CREP; \$85,523 from Southern River supplemental fund; and \$199,200 from the Commonwealth's Water Quality Improvement Funds. The projects were coordinated by DEQ's Nonpoint Source Program staff.

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