NONPOINT SOURCE SUCCESS STORY

Maryland

Remediating Acid Mine Drainage Increases Brook Trout in Spiker Run

Waterbody Improved

Maryland's Spiker Run, a tributary to Casselman River in Garrett County, was affected by episodic low pH associated with acid mine drainage (AMD) and listed as impaired in 1996. An assessment of an AMD seep impacting the headwaters of Spiker Run ranked this stream as a high priority for mitigation in the Casselman River watershed. Successful implementation of two AMD mitigation measures brought the stream into compliance with the state water quality standard for pH. Monitoring of brook trout demonstrated that the standing crop of adults was five times greater after implementation than before. The Maryland Department of the Environment (MDE) will pursue delisting Spiker Run for its pH impairment in Maryland's 2018 Integrated Report.

Problem

Western Maryland's Casselman River watershed drains to Pennsylvania toward the Ohio River. Before World War II, the river and its tributaries were commonly high-quality waterways that supported native brook trout. During several following decades, coal mining changed local hydrology, resulting in AMD that caused pH declines in numerous streams. One of the affected streams is Spiker Run, which flows into the mainstem of Casselman River (Figure 1). Its headwaters are in Maryland's Savage River State Forest near Maryland Route 40, west of Grantsville.

The Casselman River watershed was listed for pH impairment in 1996. About 1.6 miles of Spiker Run exhibited pH impairment. In 2005 water quality monitoring to support pH total maximum daily load (TMDL) development found that pH levels in Spiker Run were intermittently below the Maryland water quality standard, which requires a pH range of 6.5–8.5. Also in 2005, MDE's consultant completed an assessment of streams with pH impairment in the Casselman River watershed and identified Spiker Run as a high priority for AMD remediation.

In 2008 EPA approved the pH TMDL for Spiker Run and other pH-impaired streams in Western Maryland. Water quality monitoring in 2010–2013 showed that in-stream pH continued to intermittently fall below Maryland's water quality pH standard. Maryland's 2014 Integrated Report clarified the pH conditions in the Casselman River watershed by separately listing each stream segment that has pH impairment and a pH TMDL, which includes Spiker Run.

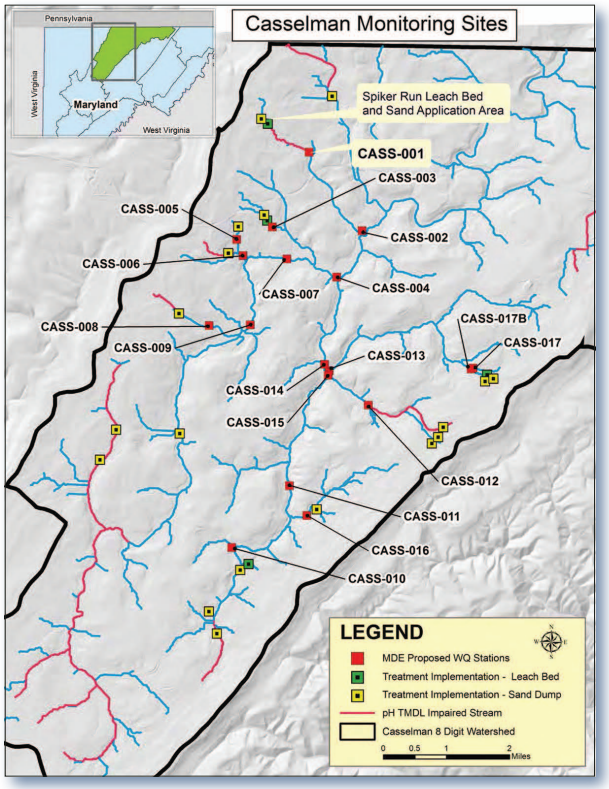

Figure 1. Spiker Run (CASS-01) is in western Maryland.

Story Highlights

In late 2008 MDE initiated watershed planning to make the Casselman River watershed eligible for Clean Water Act (CWA) section 319(h) grant implementation funds. The planning process included an assessment of potential AMD mitigation sites in the watershed, including along Spiker Run, for potential high-priority

Figure 2. A limestone sand application site was installed at the edge of Spiker Run.

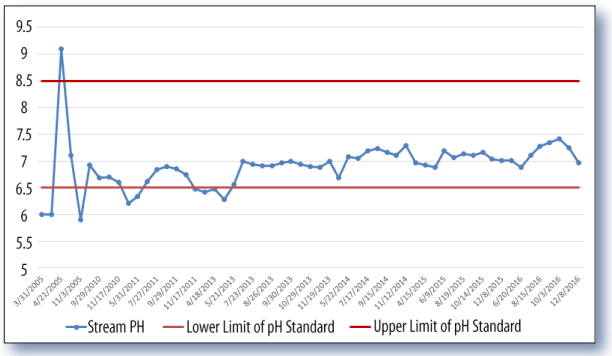

Figure 3. Spiker Run pH has met water quality standards since mid-2013.

action. The plan also analyzed AMD mitigation technologies. One of the technologies recommended to constrain capital, operation and maintenance costs was limestone sand application, sometimes called a limestone sand dump. This technique involves constructing a driveway for a dump truck to pull up adjacent to the stream so that measured quantities of limestone crushed to sand-sized particles can be delivered directly to stream edge. Then, natural variation in stream flow distributes the particles downstream. The limestone particles raise in-stream pH and increase acid neutralizing capacity. The amount and timing of limestone sand application is determined by periodic monitoring and in-stream pH measurements.

In early 2011 the U.S. Environmental Protection Agency accepted the Casselman River Watershed Plan for pH Remediation, and MDE approved CWA section 319(h) grant funding for a project to mitigate AMD-impacted areas in the Casselman River watershed. Spiker Run was selected to be one of 11 Phase I projects for construction because the land was publicly owned, the site was accessible and permit requirements were attainable.

In mid-2013 a leachbed and a limestone sand application site were installed to treat AMD flows entering Spiker Run (Figure 2). During the first year, the application site received 34.89 tons of limestone sand. More applications will continue at varying levels depending on stream conditions for the foreseeable future. Following installation of the leachbed and limestone sand application site, MDE's Abandoned Mine Land Division (AMLD) periodically monitored the pH at Spiker Run and scheduled delivery of limestone sand to the application sites as needed.

Results

After an adjustment period (late 2013 and 2014), data collected in Spiker Run in 2015–2016 demonstrated that in-stream pH consistently met Maryland's water quality standard (Figure 3). In addition, the standing crop of brook trout in Spiker Run increased from 13 kilograms per hectare (kg/ha) in 2008 to 67 kg/ha in 2016. As a result, MDE will pursue delisting Spiker Run for its pH impairment in Maryland's 2018 Integrated Report.

Partners and Funding

MDE's AMLD and Water Quality Protection and Restoration (WQPR) programs wrote the Casselman River Watershed Plan for pH Remediation. AMLD used $55,000 from the federal fiscal year (FFY) 2008 CWA section 319(h) grant for their part of the planning effort. Implementation of the 11 Phase I AMD mitigation projects was led by AMLD, using $644,115 from the FFY 2009 CWA section 319(h) grant. The Garrett Soil Conservation District oversaw contractor hiring, construction management and inspection of projects. Capital cost to install the Spiker Run leach bed and limestone sand application site totaled $71,850.

Other partners contributed work at no cost to the project. Watershed plan drafting by MDE WQPR staff was funded by the 319(h) grant through ongoing projects that support the state nonpoint source management program. Also, water quality monitoring by MDE's Field Services Program were funded by separate ongoing 319(h) grant projects. The Maryland Fisheries Service assessment and analysis was funded by the state of Maryland.

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-18-001I
March 2018

For additional information contact:

Connie Loucks
MDE, Abandoned Mine Lands Division
301-689-1461 • connie.loucks@maryland.gov
Ken Shanks
MDE, Abandoned Mine Lands Division
410-537-4216 • kenneth.shanks@maryland.gov