NONPOINT SOURCE SUCCESS STORY

Maryland

Little Laurel Run pH Impairment Remedied by Successful Acid Mine Drainage Treatment

Waterbody Improved

Maryland's Little Laurel Run, a tributary to Casselman River in Garrett County, was impaired by low pH associated with acid mine drainage (AMD) from historical coal mining activities in the watershed. An assessment of an AMD seep impacting the headwaters of Little Laurel Run ranked this stream as the number one priority for mitigation in the Casselman River watershed. Implementation of two AMD mitigation measures brought the stream into compliance with Maryland's water quality standard for pH. The Maryland Department of the Environment (MDE) will consider delisting the pH impairment for Little Laurel Run in the 2018 Integrated Report.

Problem

Little Laurel Run is a tributary to the Casselman River in Garrett County, Maryland (Figure 1). Before World War II, the Casselman River and its tributaries were commonly high-quality waterways that supported native brook trout. During several decades after the war, coal mining changed local hydrology, resulting in AMD that caused pH declines in numerous streams. The Casselman River watershed was listed for pH impairment in 1996.

In 2005, water quality monitoring conducted during development of a pH total maximum daily load (TMDL) found that Little Laurel Run intermittently failed to meet the Maryland pH water quality standard's required range of 6.5 to 8.5.

Project Highlights

In late 2008 MDE initiated watershed planning to make the Casselman River watershed eligible for Clean Water Act (CWA) section 319(h) funds. The planning process included assessment of potential AMD mitigation sites (which included Little Laurel Run) as a high priority for action. Limestone sand application, sometimes called a limestone "sand dump," was identified as the preferred action. This technique involves constructing a driveway for a dump truck to pull up adjacent to the stream so that measured quantities of limestone sand can be delivered directly to the stream edge. Then, natural variation in stream flow distributes the particles of limestone downstream. The limestone

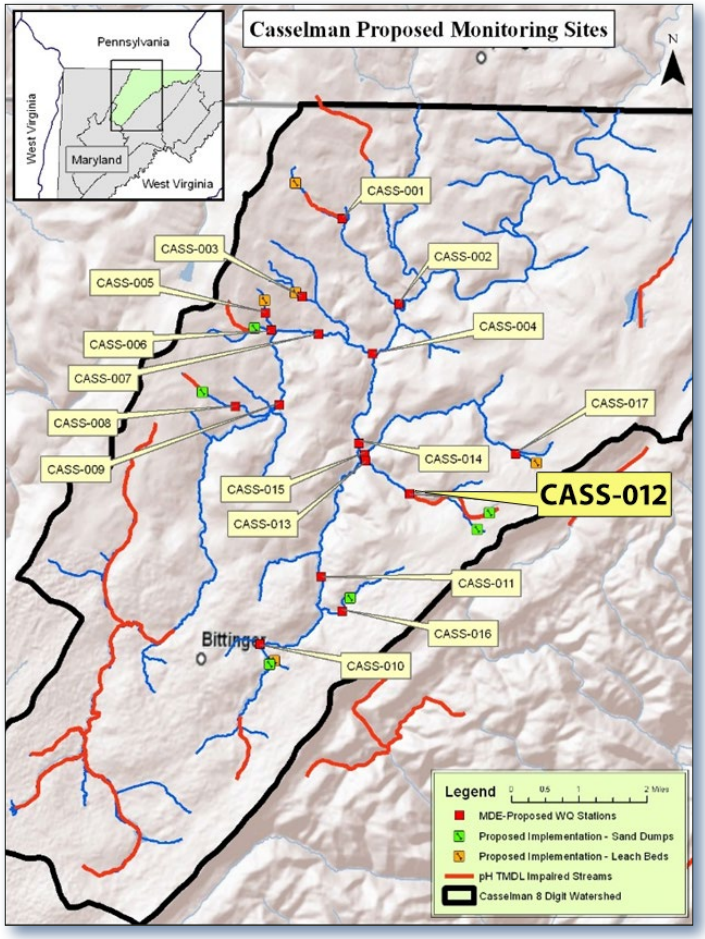

Figure 1. Northwest Maryland's Casselman River watershed was listed as impaired for pH in 1996. To address the impairment, partners developed a watershed plan that outlined proposed monitoring and project implementation site locations throughout the watershed, including along Little Laurel Run (CASS-012 sampling site).

Figure 2. A limestone sand application site was placed adjacent to Little Laurel Run in June 2013.

sand particles in the stream tend to raise in-stream pH and increase acid neutralizing capacity. The amount and timing of limestone sand application at each site is determined by periodic monitoring of in-stream pH.

In early 2011, the U.S. Environmental Protection Agency accepted the Casselman River Watershed Plan for pH Remediation, and CWA section 319(h) grant funds were approved for a project to mitigate AMD-impacted areas in the Casselman River watershed. In mid-2013, two limestone sand application sites were constructed—one on each of the two branches of Little Laurel Run that form its headwaters (Figure 2).

Results

MDE's Abandoned Mine Land Division (AMLD) periodically monitored the pH water quality data collected in Little Laurel Run throughout 2015. These data demonstrated that in-stream pH levels have improved and have remained largely in compliance with Maryland's water quality standard since 2014 (Figure 3). As a result, MDE will consider delisting the pH impairment for Little Laurel Run in the 2018 Integrated Report.

Following these water quality improvements, brook trout populations appear to have responded favorably by showing an increase in total numbers of adult trout, standing crops and reproductive success as compared to before restoration. Adult brook trout numbers in Little Laurel Run showed a two-fold increase. Reproductive success also improved, showing a three-fold increase in young-of-year trout numbers compared to pre-limestone application surveys.

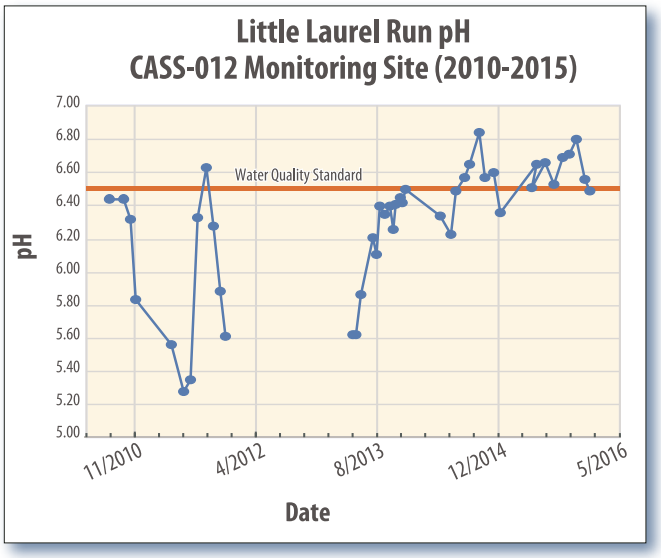

Figure 3. Little Laurel Run's pH levels began stabilizing after two limestone sand practices were installed in June 2013, and have remained largely in compliance with the pH water quality standard since 2014.

Partners and Funding

MDE's Integrated Water Planning Program (IWPP) and AMLD cooperated to write 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 1 Casselman River watershed AMD mitigation sites was led by AMLD using $644,115 from the FFY 2009 319(h) grant. The Garrett Soil Conservation District was chosen to oversee contractor hiring, construction management and inspection of projects. Construction of two limestone sand dumps at Little Laurel Run was completed using $51,500 in CWA section 319 funds.

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

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