



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Pennsylvania

Group Restores Stream Degraded by Abandoned Coal Mine Discharges

Waterbody Improved

Discharges from abandoned coal mines and runoff from coal spoil material used on roads contributed acidic water and elevated levels of metals (particularly aluminum and manganese) to Pennsylvania's Miller Run. Consequently, in 1996 the Pennsylvania Department of Environmental Protection (DEP) added Miller Run to the state's Clean Water Act (CWA) section 303(d) list of impaired waters for metals and low pH impairments. Watershed partners used several funding sources to construct acid mine drainage (AMD) treatment systems and remove coal spoil material from roads. Water quality improved, and PA DEP expects to remove the 4.47-mile stream segment from the CWA section 303(d) list in 2012.

Problem

Miller Run flows through the Broad Top coal fields in Pennsylvania's Huntingdon County. It is a tributary of Shoup Run, which empties into the Raystown Branch of the Juniata River. This area of Pennsylvania supported deep-mining operations dating back to the early 1900s and surface mining operations; both were mostly abandoned by the 1980s. Before 1977, no regulations were in place to mandate stabilization of coal mining operations. Improperly reclaimed coal-mining areas in the watershed left minerals such as iron sulfide (pyrite) exposed to the elements. Pyrite chemically reacts with water (provided by rain, stormwater runoff or groundwater) and produces acidic (low-pH) water, which often carries toxic levels of iron, manganese and aluminum into nearby waterbodies. Low pH and elevated metal loads place stress on aquatic organisms, sometimes to the point at which the organisms perish and the streams become lifeless.

By the 1990s Miller Run could support fish only in its headwaters, upstream of the most significant AMD impacts. Water quality monitoring showed that Miller Run exceeded the state's water quality criteria for metals and pH, prompting PA DEP to add a 4.47-mile segment of the stream to the 1996 CWA section 303(d) list of impaired waters.

A PA DEP biologist's survey in June 2004 near the mouth of Miller Run documented metal precipitates in the stream and an impaired aquatic community with only acid- and metal-tolerant macroinvertebrate species present. Other surveys conducted in the watershed at the same time indicated that the headwaters and tributaries of Miller Run (above the AMD sources on the Miller Run main stem) were unimpaired.



Figure 1. This limestone pond treats AMD in the Miller Run watershed.

Project Highlights

The Shoup Run Watershed Association (SRWA) formed in 1998 and began working to restore Shoup Run and its tributary, Miller Run. Since the late 1990s, SRWA has completed many nonpoint source pollution control projects, including installing AMD treatment systems (the group's primary focus), stabilizing stream banks and restoring stream channels.

AMD sources are typically addressed through a variety of remediation approaches. For example, the alkalinity of the polluted streams is increased to neutralize the acidity of the water and reduce metal loads, enabling aquatic organisms to return. SRWA installed passive treatment systems in the Miller Run watershed, including several limestone ponds (Figure 1) and wetlands, which allow metal precipitates to settle out. Limestone sand added



Figure 2. Partners added limestone rock to roadside ditches on the State Game Lands #67 access road to provide passive treatment for runoff.

directly to Miller Run and one of its tributaries raised the pH of the water. The group also stabilized areas on the land surface that were contributing AMD runoff to Miller Run.

In one reclamation effort, SRWA and the Huntingdon County Conservation District (HCCD) partnered to install a passive alkalinity project for an unpaved access road to State Game Lands #67, which runs along Miller Run. The

road had been built out of coal mine spoil and was contributing AMD to Miller Run with each runoff-producing rainfall event. The partners removed the acid-producing material from the roadway and replaced it with limestone rock. They also placed limestone rock in more than a mile of roadside ditches to reduce erosion and raise the alkalinity of runoff flowing to Miller Run (Figure 2).

Results

Samples collected show that water quality in Miller Run has improved significantly and now meets state water quality criteria for metals and pH (Figures 3, 4 and 5). As a result, PA DEP expects to remove the 4.47-mile segment of Miller Run

from the CWA section 303(d) list in 2012. Miller Run now supports a healthy brook trout population from its mouth to its headwaters. The Coldwater Heritage Foundation is funding a project to develop a Coldwater Conservation Plan for the stream to ensure that Miller Run's good water quality can be maintained. SWRA has begun working on the plan and is seeking public input.

Partners and Funding

Funding provided by the Western Pennsylvania Coalition for Abandoned Mine Reclamation helped launch SRWA's work in the Shoup Run watershed. SRWA acquired funds from PA Growing Greener, the CWA section 319 program, and the federal Office of Surface Mining (OSM) to support remediation efforts in Miller Run. Since the work began, SWRA has partnered with EPA, OSM, PA DEP, PA Game Commission, HCCD and the Western Pennsylvania Watershed Program, as well as many other public and private organizations.

Since the late 1990s, approximately \$500,000 has been spent building 11 projects to remediate Miller Run. Several projects consisted of two phases of treatment system upgrades. Most of the cost and effort was directed toward addressing AMD; however, a few smaller projects addressed eroding stream banks and flooding issues. Approximately \$300,000 in CWA section 319 program funding was awarded through the PA DEP Watershed Management Program.

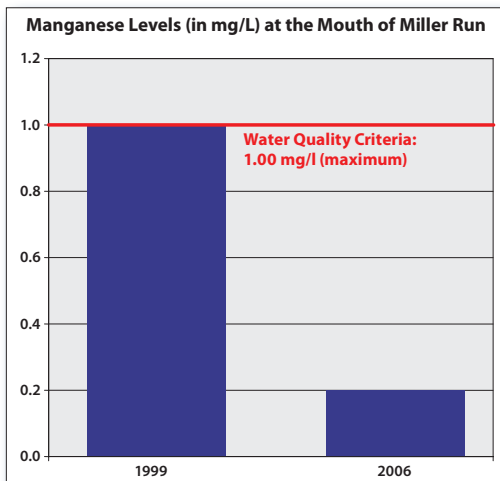


Figure 3. Manganese levels in Miller Run meet water quality standards.

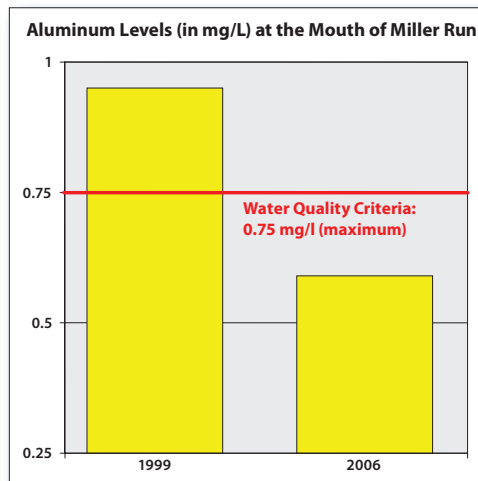


Figure 4. Aluminum levels in Miller Run meet water quality standards.

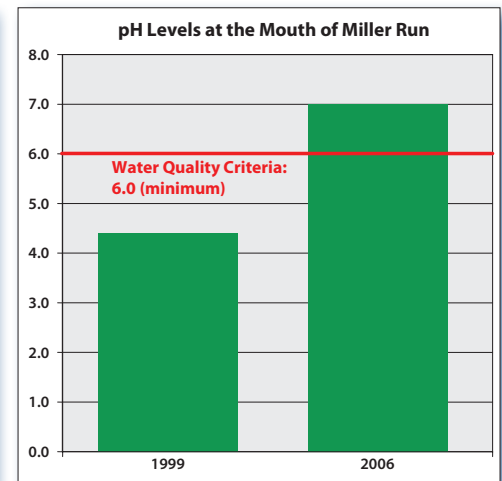


Figure 5. pH levels in Miller Run meet water quality standards.



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