



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Pennsylvania

Addressing Abandoned Mine Discharges Allows Stream to Recover

Waterbodies Improved

Elevated metal loads and low pH levels in acid mine drainage (AMD) from abandoned coal mines had degraded water quality in Pennsylvania's Little Coon Run. As a result, the Pennsylvania Department of Environmental Protection (DEP) placed four segments of the stream (totaling 5.12 miles) on the state's 2004 Clean Water Act (CWA) section 303(d) list of impaired waters. Implementing passive AMD treatment systems and plugging an abandoned gas well improved water quality. Little Coon Run now meets state water quality criteria; consequently, DEP intends to remove all four segments of Little Coon Run from the 2012 CWA section 303(d) list of impaired waters.

Problem

Little Coon Run flows north through Clarion County and discharges into Coon Creek, which in turn empties into the Tionesta Reservoir in northwestern Pennsylvania's Forest County (Figure 1). Surface and subsurface coal-mining activities took place in this region between the 1940s and 1960s. 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 can enter local waterbodies.

For decades AMD has impaired Little Coon Run's aquatic life designated use because of low pH and elevated manganese, iron and aluminum loads. 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. In August 1999 a Pennsylvania DEP biologist performed a Statewide Surface Water Assessment Program Survey at the mouth of Little Coon Run, which identified AMD-related impairments (low pH and elevated metal loads) and a lack of pollution-intolerant macroinvertebrates. As a result, the Pennsylvania DEP placed four segments of Little Coon Run on the state's 2004 CWA section 303(d) list of impaired waters for low pH and high levels of manganese. To meet the state's standards, the pH must stay above 6.0 standard units and manganese concentrations may not exceed 1.00 milligram per liter (mg/L).



Figure 1. Little Coon Run is in northwestern Pennsylvania.

Project Highlights

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. Each site, however, can be unique; while one metal might be a problem at one site, another might be a bigger problem at another site. To restore AMD-impaired streams, efforts are usually directed toward reducing the metal loads and neutralizing pH by adding alkalinity to the discharge.

Pennsylvania's Growing Greener Program funded a Watershed Assessment and Restoration Plan on Little Coon Run in 2003. Three discharges were identified as the most significant sources of AMD



Figure 2. Remediation projects to address AMD have significantly improved the water quality in Little Coon Run.

in the watershed and were targeted for treatment. Two of the discharges were abandoned gas wells that were best suited for being plugged. The third source, on State Game Lands #24, required construction of a passive treatment system consisting of an anoxic limestone drain, a settling pond and a constructed wetland. Because the passive AMD treatment sites need to be inspected periodically, the project included constructing nearly a mile of permanent access road. The well plugging and passive system were completed in 2007.

Results

According to the restoration project's final report, sample results from the mouth of Little Coon Run demonstrate significantly improved water quality (Figure 2). In 2001, before the restoration projects were completed, the average pH was 4.5 standard units. The average pH at the same location in 2008 was 6.2, and the final reading in September of that year was 7.0 standard units, which meets state water quality standards for attaining the designated use of aquatic life.

Metal concentrations have also shown significant improvement. The largest decrease was in manganese, which dropped 70 percent between 2001 and 2008; aluminum declined 26 percent. Iron and aluminum concentrations had begun



Figure 3. Biologists found this mottled sculpin, a pollutant-intolerant fish species, near the mouth of Little Coon Run.

to decline before the treatment projects were completed and were already attaining water quality standards in 2001. Monitoring data collected in September 2008 showed manganese levels of 0.22 mg/L, which are well below the state standard of 1.00 mg/L.

In addition, fish collected in a recent (2010) survey indicate water quality has improved as a result of remediation efforts. For example, the 2010 survey found a mottled sculpin (Figure 3), a pollution-intolerant species that is not frequently found in streams with elevated levels of pollutants.

Partners and Funding

Partners involved in the restoration of Little Coon Run include Pennsylvania DEP's Bureau of Abandoned Mine Reclamation, Pennsylvania Game Commission, Farmington Township, Western Pennsylvania Coalition for Abandoned Mine Reclamation and Hedin Environmental. The projects were funded by Pennsylvania DEP's Growing Greener Program (\$40,000 for the watershed assessment) and the Office of Surface Mining's Appalachian Clean Streams Program (more than \$400,000 for constructing the passive treatment system and plugging the wells). Farmington Township provides ongoing operation and maintenance of the passive treatment system.



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