Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
West Virginia

Treating Acid Mine Drainage Improves Sovern Run

Waterbody Improved

Acid mine drainage (AMD) from abandoned coal mines impaired West Virginia's Sovern Run. As a result, the West Virginia Department of Environmental Protection (DEP) added the 4.7-mile-long stream to its Clean Water Act (CWA) section 303(d) list of impaired waters in 1998. Project partners have installed numerous passive AMD treatment systems, which have significantly reduced the metals and acidity loadings into Sovern Run, allowing benthic macroinvertebrate populations to rebound in 3.3 miles of the 4.7 listed stream miles.

Problem

The Sovern Run watershed is a sub-watershed of the Big Sandy Creek watershed, which is part of the Cheat River watershed in West Virginia. The Sovern Run watershed drains approximately 5.36 square miles and empties into Big Sandy Creek at Rockville, West Virginia (Figure 1).

This region of West Virginia historically supported numerous coal mining operations. Before 1977, no regulations requiring stabilization of coal mining operations were in place, so many were abandoned without any effort to seal the mine shafts and remove refuse. Over the years, water percolating through the mines and waste areas has reacted with coal-bearing minerals containing crystalline forms of iron sulfide, forming AMD. The headwaters of Sovern Run are heavily polluted by AMD from several deep mine discharges and acidic seeps throughout the watershed.

Data collected in 1996 in Sovern Run showed low pH levels and high concentrations of manganese, iron and aluminum. As a result, DEP added the entire 4.7-mile length of the stream to the 1998 CWA section 303(d) list of impaired waters for pH and metals. In 2001 DEP developed a total maximum daily load (TMDL) for numerous impaired waters in the Cheat River watershed, including Sovern Run. After West Virginia's water quality standards were revised, DEP developed a revised TMDL in 2010. The revised TMDL provides updated load allocations for aluminum, iron and net acidity (pH).

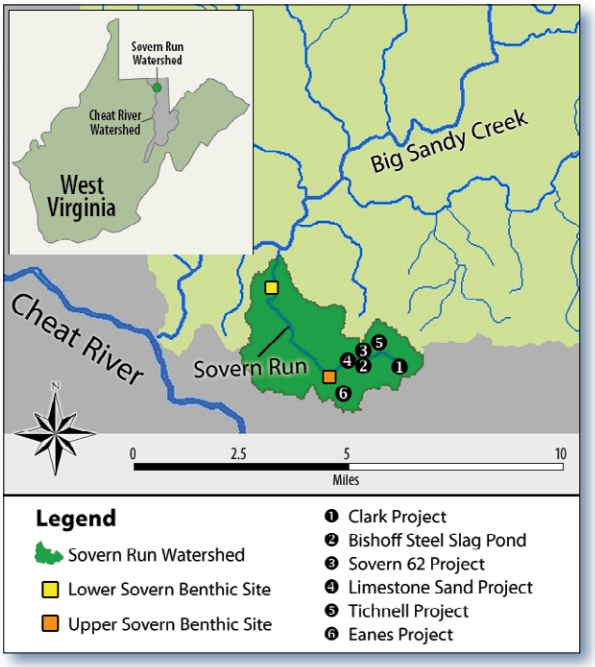

Figure 1. Sovern Run is in northern West Virginia.

Project Highlights

In 1995 the River of Promise, a partnership of state and federal agencies, academia, concerned citizens and Friends of the Cheat (FOC), was formed to assess and remediate AMD in the lower Cheat River watershed. In 2005 the partnership developed a watershed-based plan (WBP) for the lower Cheat River watershed, and the U.S. Environmental Protection Agency (EPA) approved the plan. Having such a plan in place enabled FOC and West Virginia University's National Mine Land Reclamation Center (NMLRC) to pursue CWA section 319 funding from DEP's Nonpoint Source Program to design, construct and monitor AMD systems.

Since then, watershed partners have installed passive AMD treatment systems in the Sovern Run watershed (see Figure 1) with cooperation from

Figure 2. The Bishoff Steel slag bed treatment system, constructed in 2010, adds excess alkalinity to the main stem of Sovern Run.

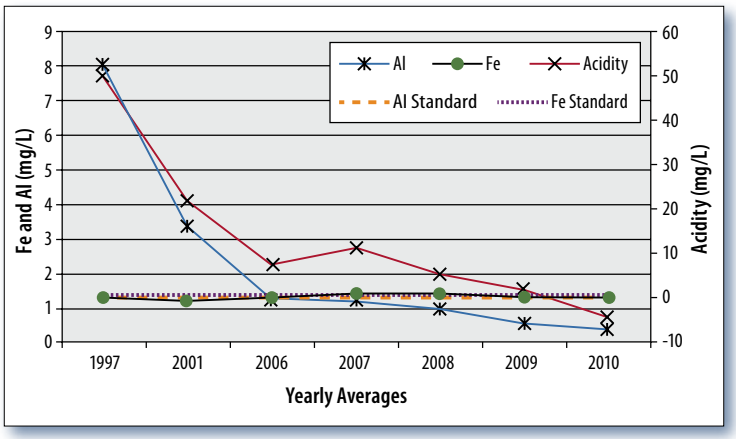

Figure 3. Data collected at the mouth of Sovern Run show that pollutant levels have dropped since 1997.

private landowners. The treatment systems include a mix of open limestone channels, limestone leach beds, limestone separation dams, addition of limestone fines, steel slag check dams, and steel slag leach beds (Figure 2). They also include natural ponds and wetlands to neutralize acidity, add alkalinity and capture metals. In addition, the partners plan to install one new AMD treatment system and improve an old system in 2013.

Results

Since 2003 the AMD treatment systems have yielded significant load reductions—an estimated 442,000 pounds per year (lb/yr) in net acidity, 45,000 lb/yr in aluminum, 33,800 lb/yr in iron and 3,200 lb/yr in manganese. The estimated load reductions are translating into water quality improvements. FOC and its partners have been collecting data on Sovern Run since the late 1990s. The data show that levels of metals and acidity have dropped, particularly between 1997 and 2006, coinciding with the installation of the first three treatment systems. By 2010 data collected at the mouth of Sovern Run showed that levels of aluminum, iron and acidity met water quality standards (Figure 3).

Aquatic habitat conditions have also improved. FOC recently completed its biannual benthic macroinvertebrate sampling to monitor changes in biological integrity. The data are still being analyzed, but field observations indicate increased populations and diversity of macroinvertebrates. In addition, property owners have noted that fish and aquatic plants have returned to the stream. DEP has not yet removed Sovern Run from the list of impaired waters, but it has noted dramatic improvements on at least 3.3 miles of the 4.7-mile-long listed segment.

Partners and Funding

These projects were implemented by River of Promise partners, including FOC, NMLRC, DEP's Nonpoint Source and Abandoned Mine Land Reclamation (AMLR) programs, the federal Office of Surface Mining (OSM), private businesses, landowners and many volunteers.

FOC staff and volunteers, in cooperation with NMLRC staff, completed the chemical and field sampling for the projects. NMLRC generated the conceptual designs for the systems. Private consultants and contractors conducted the surveying, engineering and construction. Volunteer landowners Mark Dixon and Brian Sell constructed the Sovern Sands site.

Total restoration costs to date are approximately $2.2 million, of which about 40 percent ($891,000) has been funded through EPA CWA section 319 grants provided by DEP's Nonpoint Source Program. Cost-share support has been provided by the OSM's Watershed Cooperative Agreement Program ($244,000) and private industry funds from mitigation administered by DEP's AMLR Program ($683,000). DEP's Division of Mining and Reclamation Program also provided support through its Stream Restoration Fund ($395,000), and the NiSource Environmental Challenge provided some Sovern Sands site funding ($3,000).

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