

Restoring Damaged Streams

Agencies across the state are cooperating in mine drainage cleanup that leads to restored streams and a surprising use for the reclaimed minerals

by Bette McDevitt

FOR 70 YEARS, PAUL SLUSSER LIVED along the Catawissa Creek near Mainville, Columbia County, yet he never once caught a fish in the stream. So, about 10 years ago, he visited the offices of the Columbia County Conservation District and asked how he could help return trout to the creek.

His curiosity was the first trickle in what became a torrent of activity to clean the stream and bring native trout back into the waters. Slusser helped to found the Catawissa Creek Restoration Association, and when he died in 1998, left a legacy than another man fulfilled.

In the spring of 2006, 73-year-old Leonardo Zanolini dropped his line into the creek just downstream of the Zion Grove Bridge. It was the first day of trout season, and although he wasn't hopeful, he had decided to try his luck with his fishing rod.

Zanolini went home that day with four native brook trout, all longer than 10 inches. He could tell by their pink flesh that they were not farm-grown stocked fish, which he explains are gray inside. His wife, Barbara, rolled the fish in flour and fried them in butter.

"They were good," Zanolini recalls with a smile.

That same experience has rippled through streams across Pennsylvania over the last 10 years as volunteers on both sides of the state have been working with the mining industry and the state and federal governments to restore streams damaged by the discharge from mine sites. A num-

ber of groups have even found creative ways to dispose of the metallic byproducts from the cleanup. Thanks to their efforts, the manganese and iron that were once part of a dangerous, ugly eyesore have found new life as beautiful pottery glazes and pigments used by artists.

CLEANUP IN WESTERN PENNSYLVANIA

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"It's the biggest problem in western Pennsylvania that no one ever heard of," says Bruce Golden, director of the Western Pennsylvania Coalition for Abandoned Mine Reclamation. "We are number one in a statistic that I don't care to be a part of, caused by the problems created from the unregulated days of coal mining."

Golden, who provides assistance to watershed coalitions throughout western Pennsylvania, explains how the problem came about. "Prior to 1977, there were no laws making mine operators responsible. But then legislation was passed to require cleanup of any sites being mined."

The federal Surface Mine Control and Reclamation Act established a reclamation fund into which coal operators pay fees for every ton of coal that they produce. The act's regulations became effective in 1979.

On any given Saturday in spring and summer, Margaret Dunn and other members of the Slippery Rock Watershed

Professor Valentin Kefeli leads the planting of willows in the wetlands pond (left), the water moves through a series of pools (right), coming out at the end of the process as clean water (bottom). At the Pottery Dome near Grove City, Bob Isenberg, who uses recovered manganese and iron in his glazes, prepare to take a thrown pot from the wheel.





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Coalition can be found muddy and busy cleaning up abandoned mine sites in a 40-square-mile area of western Pennsylvania.

Dunn was born in West Virginia coal country. Her grandfather was a miner, and she has spent her adult life working as a geologist around coal in western Pennsylvania.

"I only know about rocks and water," she says, but she is far too modest. She and her intrepid volunteers and college interns have restored 11 miles of the Slippery Rock Creek to the point where fish can now live in the waters.

Standing at the site of one of these abandoned mines oozing murky orange acid, Dunn says, "This has been the most rewarding experience of my life."

Cleanup is done with a simple treatment that requires no electricity and little maintenance. Dunn learned about the technique at a workshop in 1992. A small dam is constructed at the source of the drainage from the abandoned mine to divert the stream through three pools. As the water passes through limestone and mushroom compost in the pools, the acidity is neutralized and metals are removed. Today, 15 systems in the area treat 750 million gallons of mine drainage a year. Across the state, 250 similar passive systems are producing the same effects at coal mines abandoned as long as a century ago.

In addition to these passive systems, the mining industry employs hundreds of active cleaning systems that use chemicals and electricity to clean up streams at active mining sites. The mining industry risks steep fines and penalties if the water does not meet high standards. Unfortunately, because the discharge from mines is continuous, all these systems will have to remain in place even after the land has been mined.

FROM UGLY TO BEAUTIFUL

One of the great success stories in the Johnstown area involves the efforts of the volunteers for the Stonycreek-Conemaugh River Improvement Project (SCRIP). The Stonycreek and Little Conemaugh rivers in Somerset and Cambria counties, which encompass 656 square miles around the headwaters of the Conemaugh River, have been badly polluted from 150

years of abandoned mine drainage. In the nearly 20 years since SCRIP was begun, public-private partnerships have been formed to improve water quality and provide renewed recreational and economic opportunities in the Cambria-Somerset region.

"It's now a usable river system where fish live and people enjoy recreation," says Golden of the Western Pennsylvania Coalition for Abandoned Mine Reclamation. "If you give nature half a chance, it can work wonders by itself."

Across western Pennsylvania, cleanup efforts have taken an interesting turn since artists and businesses have discovered new uses for the metallic byproducts from the stream cleanup. When the Slippery Rock Watershed Coalition learned that manganese and iron oxide could be used as a pottery glaze, they joined in a business venture with an area potter. The partnership turns a profit for the group and brings a bit of flair to the volunteers' hard work.

Bob Isenberg, who creates this glazed pottery at the Pottery Dome near Grove City, liked the idea of producing mugs, vases and teapots with glazes containing both recovered manganese and iron. "I was worried how the first load in the kiln would come out," he says. "But, the iron ore creates a transparent yellow glaze, and the manganese gives rich earth tones."

With the catchy label of Clean Creek Pottery, his pottery has become a hot-ticket item, and the coalition has sold more than 300 mugs throughout the country.

In Pittsburgh, a company has taken the iron recovery concept to a business scale. Since its inception in 1994, Hedin Environmental has collected and sold about 3,000 tons of iron oxide recovered from stream restoration sites to a pigment manufacturer in Virginia. EnvironOxide pigments are used to color a wide range of products from paints and cement to plastics, paper and mulch.

Robert Hedin, founder of the company, says that his wife is now developing a pigmented clothing line that will be called "rusted threads."

"We're going to start with t-shirts made of organic cotton and, of course, color them with our pigments," explains Hedin.

EFFORTS IN EASTERN PENNSYLVANIA

Unlike the western part of the state where bituminous, (soft) coal is mined, the anthracite (hard) coal mined in northeastern Pennsylvania presents a different set of abandoned mine land problems. The Eastern Pennsylvania Coalition for Abandoned Mine Reclamation has been working for 12 years to reclaim abandoned mine lands and restore streams throughout the anthracite coal region, which stretches from Forest City in Susquehanna County to Millersburg in Dauphin County. Between this coalition and its counterpart in the west, 45 of Pennsylvania's 67 counties are involved in some type of mine reclamation.

"We have a different set of problems because of the way the coal rolls in the northeastern part of the state," says Robert E. Hughes, executive director for the eastern Pennsylvania coalition. "Before and during the World Wars, we had deep and near vertical underground mining to the depths of 500 to 1,000 feet. Since World War II, surface mining came into use, and the mines have filled with water. Every open shaft, slope, tunnel, airway, drift and borehole became an orifice for water to flow out of when the pumps were shut down."

The Jeddo mine tunnel is an example of this, where 50 million gallons of water per day are still not treated. Not enough land area is available to treat such a monstrous flow of water polluted with aluminum and iron that ends up in the Little Nescopeck Creek.

"We have bigger water flows here than in the western region," says Hughes. "They are harder to control, and less land is available to treat the discharges. In some urban areas, discharges are coming out by towns and rivers with no surrounding land available for constructing treatment options."

But cleanup efforts are under way. In one project near Hazelton, acid mine water pouring from the Audenreid abandoned mine tunnel at 8,000 gallons per minute is diverted into three concrete containers the size of manure storage tanks. Using a process similar to the Slippery Rock reclamation, the tanks are filled with 12,000 tons of limestone which act to remove the aluminum that is polluting the water. Thanks to the efforts of volunteer organizations that have joined with the state to complete the project, 36 miles of the Catawissa Creek have been restored, and native brook trout, like the ones that made their way to Zanolini's frying pan, have returned to live there.

Just as in western Pennsylvania, new uses for the byproducts of the hard coal cleanup efforts have been sought. The Eastern Pennsylvania Coalition for Abandoned Mine Reclamation works with nearly five dozen local artists who use the iron oxide waste as pigment in their paints, watercolors, acrylics, Venetian oils,

paper mache and pottery glazes. Portions of the proceeds from the sales of the artists' work help support the coalition's environmental education and outreach programs in the region.

Because the metal levels in the mine drainage are typically lower in the eastern part of the state, other uses for the mine water are also being explored. "If the technologies can be developed and implemented to remove and recycle the metal, the water could be used for generation of electricity, industrial wastewater recycling, geothermal heating and cooling, and even future water supplies," suggests Hughes.

Living a quarter mile from the Avondale Pit, a large abandoned, open water-filled anthracite mining strip in Luzerne County, Hughes has been keeping an eye on the reclamation of the nearly 500-acre area. Completion of the cleanup is projected within the next three years.

"I will breathe a huge sigh of relief when the project is complete," he says. "I won't have to worry about the safety of my two children playing in the woods behind the house. It will make me feel very much at ease." ♣

—Bette McDevitt is a regular contributor from Pittsburgh.

Participants in the program raise their mugs to successful efforts in cleaning mine drainage.



Want to Learn More?

Volunteers are always being sought to join in the effort of cleaning the streams of acid mine damage and helping to overcome Pennsylvania's largest environmental problem. If you are interested, call your County Conservation District Office or contact the following organizations:

Western Pennsylvania Coalition for Abandoned Mine Reclamation, www.wpcamr.org.

Eastern Pennsylvania Coalition for Abandoned Mine Reclamation, www.orangewaternetwork.org.

To see the pottery and other products made from mining cleanup byproducts, visit Slippery Rock Watershed Coalition at www.srwc.org or Hedin Environmental at www.hedinenv.com. ■