Courtesy, Sally Brown, University of Washington

**Zinc contamination led to the development of a metal salt crust near Leadville, Colo. Mining and smelting resulted in waste being deposited along an 11-mile stretch of the Upper Arkansas River.**

Courtesy, Sally Brown, University of Washington

**The soil near Leadville, Colo., was treated with limestone and biosolids to foster plant growth. Rye grass and native seeds were spread, turning the desolate ground, at left, into a thriving area.**

# **Spaces:** Plants, animals reclaim old hazardous waste dumps

Continued from Page 32

an oasis for more than 130 bird species, river otters, wild hogs and coyotes, nearly 1.5 million tons of construction debris that had been dumped illegally for 15 years had to be removed.

The $50 million remediation process, which also included the creation of nine ponds and wetland chain systems, took about three years, Jones said.

"There was a court order saying the waste couldn't be removed from the property, and it had to remain on the grounds," he said. "The waste was moved out to the perimeter of the property and buried in proper landfills there. There are double-lined landfills on the edge of the property now."

## From pit to fit

Although the Vashon Island landfill in Washington state closed 10 years ago, it left a 200-meter-wide scar as its legacy.

The landfill's operators needed cover soil, so they "borrowed" from the area and left it with a myriad of soil quality issues, said Sally Brown, a University of Washington professor whose research focuses on soil amendments.

Problems ranged from a lack of nutrients to poor water filtration that allowed grass and weeds to overtake the 5-meter-deep pit, Brown said.

"There was never any intention to give the soil back," she said. "When you've taken out the top soil, you have problems getting anything but grass to grow."

To restore the borrow pit, Brown said the university teamed with King County's parks, roads, solid waste and wastewater divisions in September 2009 to create compost mixtures they could apply to its slopes.

The roads division provided organic debris from storms and the wastewater department sent biosolids.

Brown said eight different treatments were used on 20-meter-by-20-meter plots, with biosolids seeing the best results. The groups then planted trees and have watched as the soil has regenerated.

Courtesy, Midewin National Tallgrass Prairie

**Prairie plant life thrives at the 18,500-acre Midewin National Tallgrass Prairie in Illinois. Plants include Blazing Star, the tall and slender purple, red and pink flowers; Rattle Snake Master, the white round ball with small flowers; Big Blue Stem, the tallgrass in the distance towering over the flowers; and Partridge Pea, the yellowish-orange flower at the bottom of the photo. The formerly contaminated land was the home of the U.S. Army's Joliet Arsenal munitions site from the early 1940s to the mid-1970s. Officials at the praire are considering reintroducing American bison to the area.**

Courtesy, Sally Brown, University of Washington

**A small plant grows in an old landfill borrow pit on Vashon Island near Seattle. The soil was restored with a mixture of biosolids and organics.**

Brown said there are still a few spots that need to be finished.

"This land was part of a park on the island," she said. "It's much nicer to be in a forest than to be in a hole."

## Mining past

Brown also has done work restoring barren soils poisoned by mine waste in Bunker Hill, Idaho, and Leadville, Colo.

Bunker Hill was a mining and smelting site for much of the 1900s, which led to contamination from lead, zinc and cadmium.

The metals at the 600-acre site presented a bevy of problems for both wildlife and people, Brown said.

Birds that migrated through the area were poisoned when they ingested the soil while searching for food. Contaminated soil was also picked up by the wind and deposited inside people's homes.

To establish a vegetation barrier at the mine and nearby wetlands in 1997, biosolids were mixed with wood ash to create a nutrient-rich foundation that ultimately led to a decrease in soil acidity.

The plots ranged from 1-meter-by-4-meters to 33-meters-by-33-meters. Brown's team worked on the initial experiments, then the U.S. EPA took over and handled the larger scale treatments, she said.

"[The mixture] made the metals much less available. Plants were able to grow," Brown said.

Mining near Leadville resulted in tailings being washed into the Upper Arkansas River, where it was deposited along an 11-mile stretch. In some areas, a salty crust developed where there was a high concentration of zinc.

Beginning in 1998, limestone and biosolids were applied to the area to foster plant growth and prevent runoff, Brown said. Rye grass and native seeds also were planted on the treated areas.

Brown said the river, which had been too contaminated to support fish, soon became a popular spot for trout and for fishermen.

"It's really rewarding to take materials people think of as waste and make derelict sites beautiful again," Brown said.

## Return of the bison

In Illinois, an old friend may once again roam the prairie in the next 10 years.

Officials at the 18,500-acre Midewin National Tallgrass Prairie – once the home of the U.S. Army's Joliet Arsenal – want to reintroduce a herd of American bison to the ecosystem.

The Joliet Arsenal was a munitions site where explosives were manufactured from the early 1940s to mid-1970s, according to the Joliet Arsenal Development Authority. At its peak during World War II, workers produced 1 billion tons of TNT.

All of the property transferred to Midewin from the Army has had to meet federal contamination restoration requirements, said prairie Supervisor Wade Spang, which should be suitable for bison.

The grazing mammals disappeared from the state in the early 19th century, after overhunting and habitat destruction. By grazing, bison can help prairie plant life sprout anew, Spang said.

Prairie leaders are researching bison genetics to figure out the best location for them.

Midewin, which was established in 1996 and opened to the public in 2004, hopes to plant 75 bison on 1,000 acres. Five to 12 miles of fencing would be needed, and plans call for platforms and a 12-mile tram loop for up-close viewing, according to the National Forest Foundation.

"It will be on an experimental basis," Spang said. "We're just in the beginning stages."

So far, 9,500 acres of the old arsenal are open for public use. People can roam the trail system on foot and go horseback riding.

Maybe, in the not too distant future, bison-watching can be added to the list.

"We have wetlands, areas with oak savanna and grasslands," Spang said. "It's quite picturesque." ■

*Contact Waste & Recycling News reporter Vince Bond Jr. at vbond@crain.com or 313-446-1653.*