

Minimizing mining damage with manure

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U.S. Department of Agriculture (USDA) research confirms that the time-tested practice of amending crop soils with manure also can help restore soils on damaged post-mining landscapes.

Thousands of acres of land with little or no vegetation, once mined for lead and zinc, remain throughout an area of southwestern Missouri, southeastern Kansas, and northeastern Oklahoma. The mining activities also left behind a legacy of lead-contaminated [acidic soils](#), toxic smelter sites, and large quantities of mine tailings called "chat."

Soil scientist Paul White at the Agricultural Research Service (ARS) Sugarcane Research Unit in Houma, La., was part of a team that studied whether adding beef manure compost to soil at post-mining sites would provide the carbon needed to support a healthy plant cover. The scientists also wanted to determine if the compost could reduce levels of lead and zinc that could contaminate runoff during heavy rain. ARS is USDA's chief intramural scientific research agency.

The team amended soils in experimental plots from the mine sites with 20 or 120 tons of beef manure compost per acre, and established a [cover crop](#) of switchgrass on all the plots. Then they took [soil samples](#) from the sites five times during the two-year study.

Two years after the study began, soils in the high-compost plots had significant increases in pH, plant-available phosphorus, total nitrogen, carbon and available water. High-compost amendments also increased microbial biomass, [enzyme activity](#) and nitrification potential, all of

which create and support favorable conditions for plant establishment and growth.

High rates of compost also lowered lead and zinc availability by about 90 percent, which may reduce the amount of lead and zinc that could run off and pollute nearby waterways. Since high levels of bioavailable zinc inhibit plant growth, this binding action also helps to promote the establishment of a vegetative cover that minimizes runoff and [soil erosion](#).

The team published their findings in the October 2012 issue of *Agricultural Research* magazine.

Provided by United States Department of Agriculture

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