Changes in selected metals concentrations from the mid-1980s to the mid-2000s in a stream draining the Picher mining district of Oklahoma


The abandoned Picher mining district of northeastern Oklahoma was the largest source of lead and zinc in the world in the 1920s. After abandonment in the late 1960s, the district continued to be affected by severe environmental degradation, such as subsidence and metals such as cadmium and lead seeping from flooded underground mine workings and seeping and running off from as much as 60 million tons of mine tailings remaining at the land surface.

Tar Creek, which drains much of the district, also is the name for the Superfund site, one of the largest in the U.S. Natural attenuation processes may be helping to ameliorate the mobility of trace metals in this abandoned mining district. Water-quality samples collected on a bimonthly or more frequent basis during the mid-1980s and the mid-2000s at the Tar Creek at 22nd Street Bridge in Miami, Oklahoma gaging station (U.S. Geological Survey gage number 07185095), located downstream from much of the district, indicate that total concentrations of iron, manganese, and zinc significantly decreased from the mid-1980s to the mid-2000s. In the mid-1980s, most of the total iron concentrations were between 10,000 and 80,000 micrograms per liter, most of the total manganese concentrations were between 1,000 and 4,000 micrograms per liter, and most of the total zinc concentrations were between 10,000 and 80,000 micrograms per liter in water samples collected at that site. In the mid-2000s, most of the total iron concentrations were between 1,000 and 10,000 micrograms per liter, most of the total manganese concentrations were between 300 and 1,000 micrograms per liter, and most total zinc concentrations were between 1,000 and 4,000 micrograms per liter in water samples collected at the site.

Significant water-quality improvements in this abandoned mining district over those two decades probably are due to a combination of reclamation activities and natural attenuation processes such as stabilization of exposed minerals in flooded underground mine workings, previous wind and water erosion of the most readily erodible metalliferous particles from tailings, and colonization of volunteer plants, which reduce erosion of soils and tailings.