

**News Release**

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Editors: Photographs are available at <http://sd.water.usgs.gov/pressrelease/press.html>

## **Amount of Metals Entering Strawberry Creek near the Gilt Edge Mine Quantified by USGS**

During June 2003, the U.S. Geological Survey (USGS) sampled Strawberry Creek and tributary and seep inflow sites along the creek in the vicinity of the Gilt Edge mine, near Deadwood in Lawrence County, South Dakota. The sampling was conducted to identify the locations and amounts of metals entering Strawberry Creek. The sampling also addressed whether metal-rich water in several pit lakes was connected with Strawberry Creek. The results of the sampling are now available in a new report published by the USGS.

Numerous inflows, such as tributaries and seeps, occur along the 2,523-meter (1.6-mile) study reach of Strawberry Creek, mostly as small seeps where water slowly entered the stream. USGS scientists found distinct chemical differences among the inflow samples and results indicated the locations where the chemical composition of the stream substantially changed. Two of the inflow samples were collected in the river reach most affected by mining near one of the shear zones, which are faulted zones that might provide a connection between the pit lakes and Strawberry Creek. These two inflows had the highest concentrations of metals among all the inflow samples. The location of these particular samples and their distinct chemical composition indicate a possible connection to the pit lake. Other inflow samples were collected from areas unaffected by mining and from areas affected by interaction with mine wastes to varying degrees.

The mine-related metals entering Strawberry Creek included cadmium, copper, nickel, and zinc. These metals principally occurred from the discharge from the Gilt Edge mine, and the quantity of these metals decreased substantially downstream. Additional but smaller loadings of metals occurred in the vicinity of the Oro Fino mine shaft and from the two inflows that had the high concentrations. These are both locations where shear zones intersect the stream and may indicate loading associated with these zones. Water downstream from the Oro Fino mine shaft was high in base-metal concentrations, which could indicate a connection with water in the pit lakes. The amount of metals from these downstream sources, however, is small in comparison to that from the initial mine discharge from the Gilt Edge mine and does not appear to have a substantial effect on Strawberry Creek.

The Gilt Edge Mine is part of the famous mining district in the northern Black Hills. Mining for gold, copper, and tungsten started in the Gilt Edge deposits in 1876. A larger open-pit mine began operation in 1986. Three open pits were constructed along with a cyanide heap-leach pad and a large waste-rock dump. Although some clean up of historical tailings was done, the operator of the mine went out of business and was unable to continue site controls. In 2000, the site was proposed for the Superfund National Priorities List, and the U.S. Environmental Protection Agency has developed plans for clean up and control of contaminants.

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As remediation work on the site progressed, it became necessary to understand if the metal-rich water in the pit lakes was connected with Strawberry Creek, which discharges from the mining area to Bear Butte Creek. Shear zones associated with the ore bodies might provide a connection. To determine this possible connection, a spatially detailed chemical sampling of stream and inflow sites occurred during low-flow conditions in June 2003 as part of the study by the USGS.

A copy of the USGS report describing the results of the sampling can be accessed at <http://pubs.usgs.gov/sir/2006/5006/>.

Additional information about the USGS water-resources studies in South Dakota can be obtained by visiting the USGS South Dakota Water Science Center home page at <http://sd.water.usgs.gov/>.

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