



News Release

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Organic Wastewater Compounds Detected in the Upper Big Sioux River

During 2003-2004, U.S. Geological Survey scientists collected water samples from wastewater effluent and the Big Sioux River near Watertown, Volga, and Brookings. The study was conducted in cooperation with the East Dakota Water Development District. The purpose of the study was to determine the presence and concentrations of organic wastewater compounds in effluent from city wastewater treatment plants and in the upper Big Sioux River. For each city, water samples were collected from the wastewater treatment plant effluent, and from the Big Sioux River upstream and downstream from the wastewater effluent where it enters the Big Sioux River. The samples were analyzed for 125 organic compounds that can be categorized into six classes: human pharmaceuticals, human and veterinary antibiotics, agricultural herbicides, household/industrial/agricultural compounds, polyaromatic hydrocarbons, and sterols.

Sampling revealed that organic wastewater compounds in all six classes were found at the Big Sioux River sampling sites in the Watertown area. Compounds in five of the six classes (all but polyaromatic hydrocarbons) were found at the sampling sites in the Volga and Brookings areas.

Many organic compounds used in or produced by household, industrial, and agricultural activities are soluble and resistant to wastewater treatment processes. As a result, these compounds have been found to occur in wastewater discharges to natural streams. Some of these compounds potentially have long-term effects on aquatic organisms. Human exposure also might occur if the streams are used as water supplies, but the link to human health is unknown. Some organic wastewater compounds are hormonally active and have been shown to disrupt the endocrine systems of some fish and animals.

The study determined that the potential endocrine disrupting compounds found in the upper Big Sioux River probably were derived from two general types of sources: wastewater treatment plant discharges and agricultural sources. One of the potential endocrine disrupting compounds found in the stream was the herbicide atrazine. Exposure to small concentrations of atrazine is known to result in reproductive abnormalities in frogs.

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“The occurrence of endocrine disrupting compounds in aquatic systems is a very complex and sensitive issue,” said Steve Sando, a scientist with the U.S. Geological Survey. “Accurate assessment of potential effects of these compounds, including atrazine, in the upper Big Sioux River is not possible based on the results of this study.”

The concentrations of the organic wastewater compounds found in the upper Big Sioux River were low and generally were similar to concentrations in other streams in the United States. However, concentrations of some of the human and veterinary compounds collected downstream from Watertown were greater than concentrations for other streams in the United States.

A copy of the USGS report describing the results of the sampling can be accessed at <http://pubs.usgs.gov/sir/2005/5249/> or can be purchased by calling 1-888-ASK-USGS.

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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