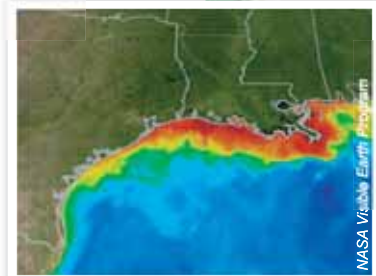


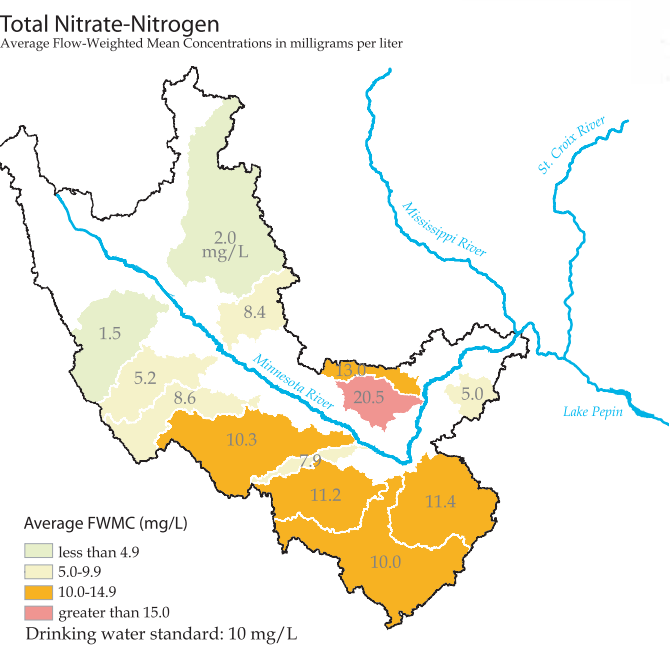
Nutrient Enrichment

Nitrogen

The predominant form of nitrogen in Minnesota River Basin streams is nitrate. Like phosphorus, nitrate can stimulate excessive levels of algal growth in streams. In recent years, this problem has been particularly severe in the Gulf of Mexico where development of a hypoxic zone (hypoxia means "low oxygen") has been linked to elevated nitrate levels carried to the Gulf by the Mississippi River. Reduced oxygen levels in the hypoxic zone, brought on by decomposition of algae, have damaged the shellfish industry and continue to threaten the aquatic ecosystem of the Gulf Region. The Minnesota River has been identified as a substantial contributor of excess nitrate to the Mississippi River and the Gulf Region. In addition to over-stimulation of algae, elevated levels of nitrate in drinking water can cause methemoglobinemia, or blue-baby syndrome.



This image shows the hypoxic zone (sometimes referred to as the dead zone) in the Gulf of Mexico. Reds and orange indicate areas of low oxygen concentration. In July 2006, the hypoxic zone was mapped at 6,662 square miles -- similar to the size of Connecticut and Rhode Island combined.



Nitrate concentrations vary substantially across the Minnesota River Basin. Nitrate levels are lowest in the western part of the Basin, elevated in the central part and greatest in agricultural watersheds in the most easterly part of the Basin. The watersheds shown in orange and red have concentrations that exceed the drinking water standard (10 mg/L). Most of the nitrate in the Minnesota River comes from agricultural drainage.

Environmental Health

Nitrate in Drinking Water

Elevated levels of nitrate in drinking water can cause methemoglobinemia, or blue-baby syndrome. Because of this, both State and Federal regulations limit nitrate in drinking water to 10 parts per million (ppm) to protect prenatal and infant children. During the 2000 to 2005 monitoring period, several tributary streams in the Minnesota River Basin periodically exceeded the 10 ppm standard. The City of Mankato draws drinking water from a shallow aquifer that is connected to, and partially recharged by, the Blue Earth River. Nitrate-N levels in the Blue Earth River strongly influence nitrate levels in Mankato's water intake supply.

Pesticides



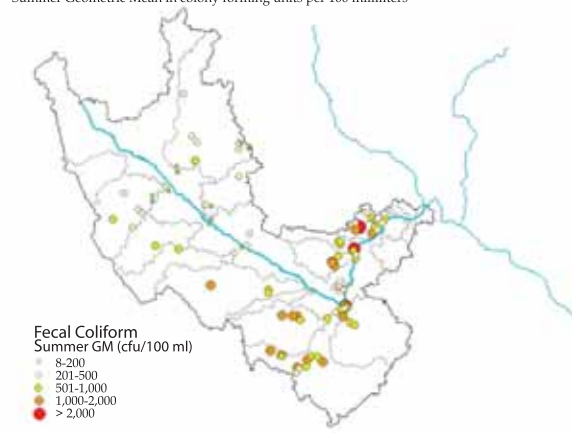
The Minnesota Department of Agriculture (MDA) is the lead state agency for most aspects of pesticide and fertilizer regulatory functions. The MDA Monitoring Unit collects pesticide samples from multiple stream locations in the Minnesota River Basin. Pesticide monitoring data indicate the seasonal presence of several chemicals sometimes at levels of concern. However, to date, no impairments for pesticides have been identified. For more information, see the MDA website for the latest information and reports: <http://www.mda.state.mn.us/appd/ace/maace.htm>



Mercury

In Minnesota, mercury contamination of fish is a well-documented problem. Mercury is tightly bound to proteins in all fish tissue, including muscle. There is no way to reduce the amount of mercury in a fish through cooking or cleaning it. The Minnesota Department of Health advises people to restrict their fish consumption due to mercury accumulation in sport fish from lakes and rivers. Large amounts of mercury in your body may harm your nervous system. For more information, see the Minnesota Department of Health's guideline on fish consumption at <http://www.health.state.mn.us/divs/eh/fish/index.html>

Fecal Coliform Bacteria



Fecal coliform levels are elevated across the entire Minnesota River Basin with over 90 percent of monitored streams exceeding health standards (200 cfu/100ml). Data show the highest concentrations in the eastern portion of the Basin (see map). Many streams require a 80 to 90 percent reduction in levels to meet standards.

For more information, visit the Minnesota River Basin Data Center website: <http://mrdbc.mnsu.edu> Research and photos courtesy of the Minnesota Pollution Control Agency, Metropolitan Council Environmental Services, Minnesota Department of Agriculture, and NOAA Great Lakes Environmental Research Laboratory. Produced by Minnesota State University, Mankato Water Resources Center - 12/06

State of the Minnesota River Water Quality Summary 2000-2005

