

Summary

Monitoring and Assessment

Missouri River Basin Watersheds

Upper Big Sioux, Lower Big Sioux, Rock, Little Sioux rivers



About the study

Portions of four major watersheds in southwestern Minnesota lie in the Missouri River Basin: Upper Big Sioux, Lower Big Sioux, Rock, and Little Sioux river watersheds. They cover about 1,783 square miles in Lincoln, Pipestone, Murray, Rock, Nobles, and Jackson counties.

A recent study assessed 93 of 181 stream sections for aquatic life or aquatic recreation. Of these, only three were considered fully supporting of aquatic life, and one fully supporting of aquatic recreation. Fifty three sections were non-supporting of aquatic life and 31 non-supporting of aquatic recreation. None of the lakes in the Missouri River Basin met the aquatic recreation standard.

Key issues

Drinking water, recreation and aquatic life uses are affected by high nitrate, bacteria and turbidity levels. These stressors also are likely impacting biological life. Biotic impairments are likely a result of nonpoint source pollution and localized stressors linked to unstable channel conditions and poor in-stream habitat. Both of these conditions can be associated with high sediment loads. High nitrogen levels also are potentially impacting macroinvertebrate communities, as seen in other watersheds across southern Minnesota.

Turbidity concerns are prolific and are as universal as impairments due to *E. coli*. Improvements need to be made in the watersheds to significantly reduce overland erosion by implementing soil conservation efforts and restoring natural vegetation along riparian zones.

Watershed monitoring approach

The watershed approach is a 10-year rotation for monitoring and assessing waters of the state on the level of Minnesota's 81 major watersheds. The MPCA also has a long-term statewide monitoring network that measures levels of key pollutants in the state's watersheds annually.

Citizen and local monitoring is an important component of the watershed approach. Grant funding passes from MPCA to local groups such as counties, soil and water conservation districts, watershed districts, nonprofits and educational institutions to support lake and stream water chemistry monitoring. The MPCA also coordinates two citizen volunteer programs: Citizen Lake Monitoring Program and Citizen Stream Monitoring Program.

Assessment methods

Numeric water quality standards represent concentrations of specific pollutants that protect a specific designated use. Narrative standards are statements of conditions in and on the water, such as biological condition. Biological monitoring is a direct means to assess aquatic life use support, as aquatic life tends to integrate the effects of all pollutants and stressors over time. The biological monitoring component of the intensive watershed monitoring was

completed during the summer of 2011 and spring of 2012. Mercury was analyzed in fish tissue samples collected from the Rock River and six lakes.

In streams, aquatic recreation is assessed by measuring the concentration of *E. coli* bacteria. To determine if a lake supports aquatic recreational activities, its trophic status is evaluated, using total phosphorus, secchi depth and chlorophyll-a as indicators.

For beneficial uses related to human health, such as drinking water or aquatic recreation, the relationship is well understood. The assessment process is a relatively simple comparison of monitoring data to numeric standards.

The data must meet rigorous quality assurance protocols. All monitoring data required or paid for by MPCA are entered into EQUIS (Environmental Quality Information System), MPCA's data system, and are also uploaded to the US Environmental Protection Agency's data warehouse. The MPCA uses data collected over the most recent 10-year period for all water quality assessments.



Summaries and recommendations

Due to the many impairments found throughout the Missouri River Basin, there is a great need for exploration of major stressors. Measures to reduce land use impacts are needed. Nonpoint source pollution from the agricultural practices is likely negatively impacting immediate and downstream water quality. Future efforts to control sediment should include measures to stabilize stream bank channels, largely by allowing less access to streams by cattle.

Best management practices (BMPs) should be implemented in a targeted approach to sensitive landscapes known to impact surface water quality, and to ensure that funds are spent where they will do the most good.

Addressing nonpoint source pollution would benefit from identifying features in watersheds that are more prone to be pathways of contamination, and working with landowners to limit potential contaminants from reaching those sensitive areas. Only by collaborating with landowners will the agricultural economy of the region move forward in a sustainable way that does not neglect water quality.

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To view the full reports visit:

Rock River: www.pca.state.mn.us/gp0rde6

Little Sioux River: <http://www.pca.state.mn.us/sbizde7>

Lower Big Sioux River: <http://www.pca.state.mn.us/qzqhe02>

Upper Big Sioux River: <http://www.pca.state.mn.us/zihyde8>

