

# Missouri River Basin Watersheds

## Watershed Restoration and Protection Strategies (WRAPS) Report Summary

Minnesota has adopted a watershed approach to gauge the health of lakes and streams in the state's 80 major watersheds. This approach looks at a drainage area as a whole instead of focusing on lakes and stream sections one at a time. It incorporates the following into a 10-year cycle:

- Water quality monitoring and assessment
- Watershed data analysis
- Civic engagement
- Planning
- Implementation
- Measurement of results

The main purpose of the WRAPS report is to summarize all the technical information so that local partners like Soil and Water Conservation Districts can use it for planning and implement the best strategies in prioritized locations.



The Minnesota Pollution Control Agency (MPCA) leads the technical work, and coordinates and supports strategy development with local partners. The first cycle of the Watershed Approach in the Missouri River Basin watersheds started in 2011. The scope of the report is surface water bodies and their aquatic life and aquatic recreation uses. The primary audience for the WRAPS report includes local planners, decision makers, and conservation practice implementers; watershed residents and landowners, neighboring downstream states, agricultural business, and governmental agencies.

### Watershed characteristics

- Size: 1.14 million acres (in Minnesota) of drainage area from four major watersheds that flow into South Dakota and Iowa to the Big Sioux River.
- Major watersheds (8-digit Hydrologic Unit Code): Upper Big Sioux (10170202), Lower Big Sioux (10170203), Rock (10170204), Little Sioux (10230003).
- Counties: Jackson, Nobles, Murray, Rock, Pipestone, Lincoln.
- Ecoregions: Western Corn Belt Plains, Northern Glaciated Plains.
- Population: Approximately 30,000 (including 25 cities and towns).
- Land use: Predominantly agriculture, 80% cultivated crops.

- **Landscape:** The Missouri watersheds contain a significant geologic feature, the Coteau des Prairies, an elevated plateau of glacial deposits separating the Missouri River and Mississippi River basins.

### **Assessments: Are waters meeting standards and providing beneficial uses?**

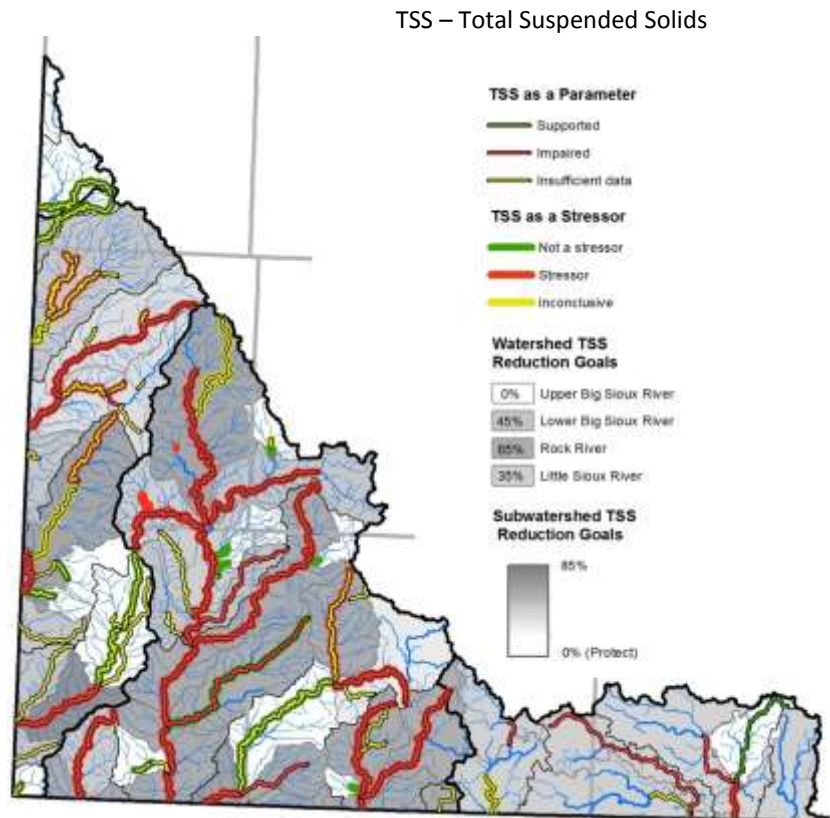
Water quality conditions in the Missouri watersheds reflect general water quality trends across southern and western Minnesota: The majority of monitored stream reaches and lakes are not meeting water quality standards for fishing and swimming. These waters should be restored through greater adoption of best management practices (BMPs) and minor changes to land use. However, some localized areas in the Missouri watersheds do meet water quality standards, and the land uses and BMPs that enable this clean water should be protected.

### **Impairments:**

Many of monitored stream reaches and lakes are impaired by excessive algae and sediment, affecting aquatic recreation (swimming) and/or aquatic life (fish and macroinvertebrates). Only three stream reaches are fully supporting aquatic life; one stream section is supporting aquatic recreation, and no lakes are supporting aquatic recreation. Several stream reaches with an aquatic life impairment were impaired due to low or imbalanced fish or macroinvertebrate populations.

The associated Total Maximum Daily Load (TMDL) report is a continuation of previously completed TMDL studies in the

Lower Big Sioux River, Little Sioux River, and Rock River watersheds. A TMDL determines the maximum amount of a pollutant that a water body may receive and still meet its water quality standards. This TMDL addresses 15 turbidity (total suspended solids) impaired reaches and 28 bacteria impaired reaches in the Lower Big Sioux River, Little Sioux River, and Rock River Watersheds. Turbidity is a measurement of cloudy or murky water, caused by sediment and other particles. This TMDL also addresses nutrient (phosphorus) impairments for eight lakes in the Little Sioux River Watershed.



### **Stressors:**

The stressor identification reports for the Missouri watersheds identify conditions affecting fish and bugs: High phosphorus, high nitrates, lack of habitat, low dissolved oxygen, high turbidity, and altered hydrology (from ditching and subsurface field tile).

Due to the lack of a long-term stream gage data set in the Missouri watersheds, altered hydrology was not analyzed in the Stressor Identification reports. The DNR's (2014b) [Missouri River Basin Hydrology, Connectivity, and Geomorphology Assessment Report](#) has identified excessive stream erosion across the Missouri watersheds, in many cases accelerated by altered hydrology.

### **Restoration and protection strategies:**

High priority strategies developed and presented in the WRAPS report for restoring and protecting waters include: Maintaining a higher level of perennial vegetation on the landscape, maintaining and spreading the good things (BMPs) happening on the landscape, and mitigating any future changes to hydrology.

With 80% of the area in cultivated crops, the largest opportunity for water quality improvement involves land use. Restoration depends on greater adoption of BMPs, including the following high priority practices: Grassed waterways, reduced tillage, cover crops, improved fertilizer and manure management, increased crop diversity, buffers, and improved pasture management.

Priority areas for surface water quality restoration and protection are presented throughout the WRAPS report including: Goals maps, modeled pollutant yields, and Geographic Information System-modeled hydrologic alteration. Local partners should further prioritize and target to integrate surface water quality priorities with other local priorities (like drinking water) to identify priority areas with multiple benefits.

Social strategies to accelerate BMP adoption include: Increased networking and education, developing markets for small grains and perennials, enforcement of existing and new ordinances, and making changes to crop programs.

### **Next steps and measuring results:**

Conservation implementation plans (i.e. One Watershed One Plan-1W1P, watershed district plans, county local water plans, and Environmental Protection Agency Section 319 work plans) developed subsequent to the WRAPS report should prioritize and target the strategies to identify critical areas and set measurable goals.

1W1P aligns local water planning on major watershed boundaries instead of by county. The Board of Water and Soil Resources provided funding for the Missouri River Watershed 1W1P in early 2017 to begin the planning process. The Missouri River

Watershed 1W1P brings six counties, six soil and water conservation districts, and two watershed districts together to develop a comprehensive plan that will address water management in the Missouri River Watershed. The Missouri River Watershed 1W1P will be locally-led and use state strategies (including the WRAPS information) toward prioritized, targeted and measurable implementation plans. In addition, once local water quality restoration projects have been determined, local units of government can apply for federal Clean Water Act Section 319 implementation grants.



Measurable means that implementation activities should produce measurable results. Work plans should include information on how the results of their proposed work will be measured.

Critical areas are the result of prioritizing and targeting efforts and are high priority locations to implement practices to help achieve the needed pollutant and stressor reductions.

**Key conclusions of the first 10-year cycle:**

- The majority of monitored stream reaches and lakes are not meeting water quality standards for fishing and swimming.
- Primary impairments to streams are sediment and bacteria that affect aquatic life and recreation.
- The identified stressors are: high phosphorus, high nitrates, lack of habitat, low dissolved oxygen, high turbidity, and altered hydrology.
- Lakes are impaired for nutrients such as phosphorus that cause algal growth and blooms.
- With 80% of the area in cultivated crops, the largest opportunity for water quality improvement is from changes in this land use.
- Several social strategies to accelerate BMP adoption include: increased networking and education, developing markets for small grains and perennials, enforcement of existing and new ordinances, and making changes to crop programs.

**Contact**

Mark T. Hanson, MPCA-Marshall, 507-476-4259, [mark.hanson@state.mn.us](mailto:mark.hanson@state.mn.us).

**Full report**

On the web go to [www.pca.state.mn.us](http://www.pca.state.mn.us) and search "Rock River."