# Summary

Stressor Identification

## Mississippi River-St. Cloud Watershed

### Why is it important?

Within this watershed, the Mississippi River serves a multitude of uses. St. Cloud is the first city along the Mississippi that draws drinking water from the river, and the power plants in Becker and Monitcello use the river for non-contact cooling water. Shorelines throughout the watershed have been heavily developed over the past several years. Working to restore and protect surface waters through best management practices is critical to the environmental and economic health of the watershed.

The watershed has 907 total river miles and has 374 lakes. Cities include Sauk Rapids, St. Cloud, Elk River, Big Lake, and Monticello. The watershed includes all or parts of Benton, Meeker, Mille Lacs, Morrison, Sherburne, Stearns and Wright counties.

### Key issues

**Based on intensive watershed monitoring, which began in 2009, results indicate that a handful of lakes and tributaries do not meet water quality standards due to issues such as:**

- **Low dissolved oxygen and increased nutrients**
- **Altered hydrology and channelization**
- **Loss of habitat due to excess bedded sediment**
- **Loss of connectivity (impoundments/improper culvert placement)**
- **Elevated concentrations of total suspended solids**

### Highlights of report

- Low dissolved oxygen has been identified throughout the watershed, mainly in the areas of Battle Brook, Clearwater River, Upper Elk River, Upper St. Francis and St. Francis Rivers, and Silver Creek.
- Excessive nutrients (like phosphorus and nitrogen) are causing increased plant and algae growth throughout the watershed. This is detrimental to fish and macroinvertebrate communities. Row crop agriculture, animal production, wastewater discharge, lawn/garden maintenance, and pet waste runoff are all contributing to excess nutrient levels in streams.
- Excess amounts of fine material being transported downstream is settling out and filling in pools, smothering rock riffles, and causing a general degradation of in-stream habitat. The loss of coarse stream substrate directly affects the biological communities that depend on this type of stream bottom.
- Ditching and drain tiling throughout the watershed have led to increased rates of runoff into receiving waters. As areas of landscape are drained, they lose the ability to store water and slowly release it over time. The abundance of private and public ditches is significant to the loss of stream habitat due to channelization. There is very little water storage opportunities in the watershed because a large percentage of wetlands have been drained over time for agriculture production and urban development.

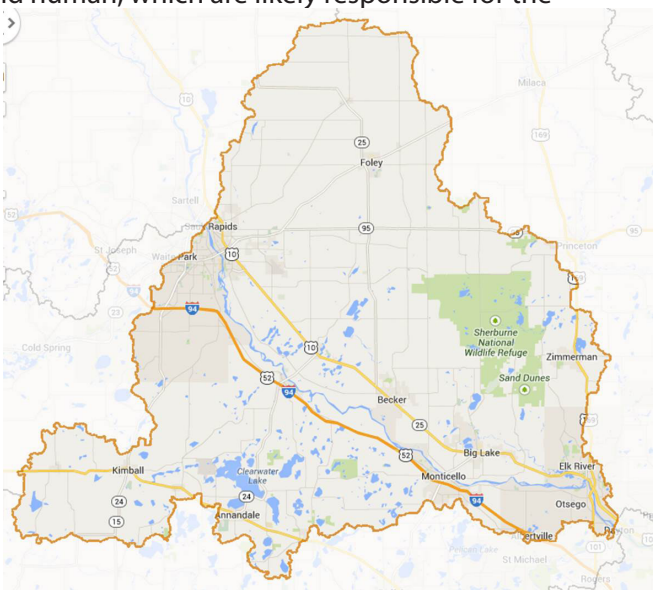
## Highlights
**continued**

- The network of road crossings scattered throughout the watershed pose a threat to the connectivity of area streams. Many culverts are set at elevations that, depending on high or low flow conditions, can create barriers that can make fish passage a challenge.
- Total suspended solids appear to be a significant stressor in the Lower Elk River. The main component of this is elevated phosphorus and algae concentrations coming out of Big Elk Lake.
- Intensive watershed monitoring and assessment, and stressor identification have allowed for a much better understanding of the condition of aquatic life and unique hydrologic characteristics of the watershed. The next round of intensive monitoring is set to begin in 2019.

## About this study

Monitoring of many of the lakes and streams began in 2009, as part of the MPCA's intensive watershed monitoring effort. Those results can be found in the Mississippi River-St. Cloud watershed Monitoring and Assessment report, which is the first step of the watershed restoration and protection strategy (WRAPS) process, and is available on the MPCA website.

This report, the second WRAPS step, or stressor identification, is to find and evaluate factors, natural and human, which are likely responsible for the impaired condition of the fish and macroinvertebrate communities. An important part of stressor identification is to understand the natural features and processes occurring in the watershed, and gaining understanding of the extent of various human activity throughout the watershed that may have potential to degrade streams, rivers, and lakes.




## Full report

To view the full report, go to http://www.pca.state.mn.us/index.php/water/water-types-and-programs/watersheds/missippi-river-st.-cloud.html#overview

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