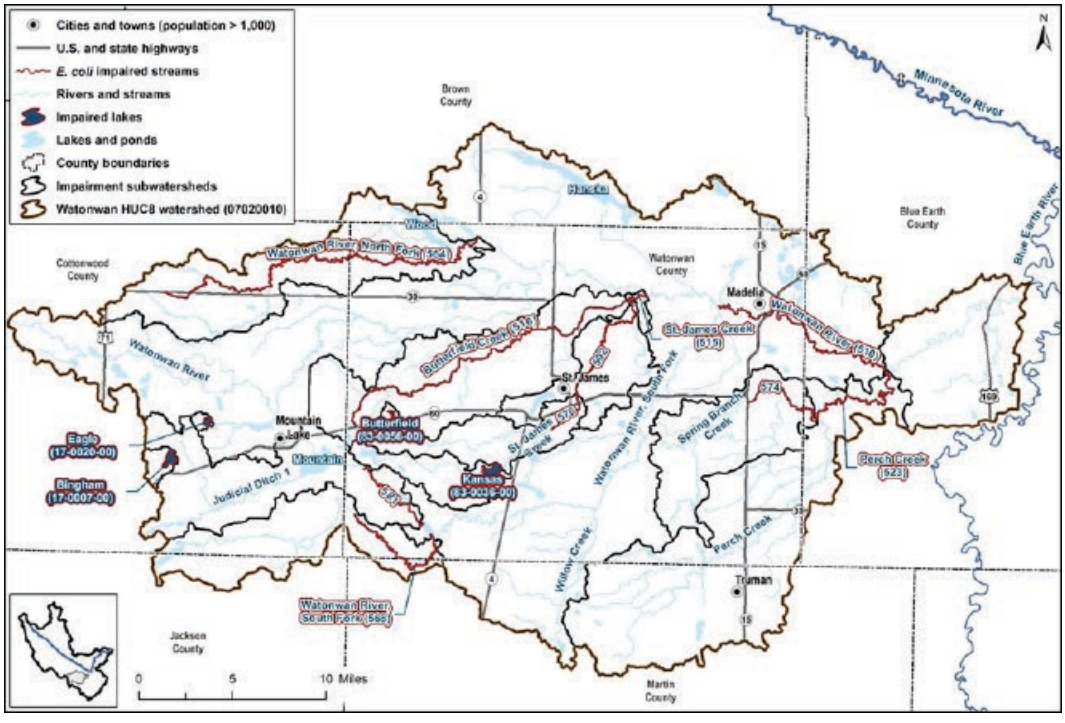
Assessments: Are waters meeting standards?

The Watonwan River Watershed Total Maximum Daily Load report addresses four impaired lakes and ten impaired stream sections. The lakes have aquatic recreation impairments due to eutrophication (phosphorus), and the stream impairments affect aquatic recreation or limited resource value designated uses based on high levels of pathogens (*E. coli*).

Of the 79 stream reaches in the watershed, monitoring was conducted on 39 reaches for aquatic life (fish and bugs) and 16 reaches for aquatic recreation (swimming). Of the 35 assessable lakes, monitoring was conducted on 11 lakes for aquatic life and 15 lakes for aquatic recreation.

Many of the monitored stream reaches and lakes are impaired for aquatic recreation and/or aquatic life. Only five stream reaches are supporting aquatic life; one stream reach is supporting aquatic recreation; one lake is supporting aquatic life; and two lakes are supporting aquatic recreation. Several reaches and lakes need more data to make a scientifically conclusive finding.

The annual flow in the Watonwan River has increased between 1977 and 2013. While Total Suspended Solids and Total Phosphorus concentrations show some improvement, because the total flow has increased and the pollutant load is the product of flow and concentration, the total pollutant load delivered by the river may have increased.



Conditions stressing water quality

Non point sources are the dominant source of pollutants/stressors in the watershed. While the impact of point sources on the total load is minimal, they can be substantial pollutant sources at times of low flow. Primary non-point stressors in the watershed include:

- Habitat: Degraded habitat reduces aquatic life's ability to feed, shelter, and reproduce.
- Altered hydrology: Too much and too little stream flow directly harms aquatic life by creating excessive speeds in the water or reducing the amount of water.
- Nitrogen: Excessive nitrogen can be toxic to fish and bugs.
- Connectivity: A lack of connectivity can obstruct the movement of migratory fish and bugs, causing a negative change in the population and community structure.
- Sediment: Sediment and other suspended solids directly impact aquatic life by reducing visibility, which reduces feeding; clogging gills, which reduces respiration; and smothering substrate, which limits reproduction.
- Dissolved oxygen: Low or highly fluctuating concentrations of DO can have detrimental effects on many fish and bug species.
- Phosphorus: Excess phosphorus can lead to excessive algae growth and eutrophication.
- Fecal bacteria: Fecal matter can make aquatic recreation unsafe because contact with fecal matter can lead to potentially severe illnesses.

Restoration and protection strategies

To address the widespread water quality impairments in agriculturally-dominated watersheds such as the Watonwan River Watershed, comprehensive and layered Best Management Practices suites are likely necessary.

Wide-scale stabilization of eroding streambanks and ravines is cost-prohibitive. Instead, first addressing altered hydrology (e.g. excessive, concentrated flows) within the landscape can help decrease wide-scale stream and ravine erosion problems. In some cases, however, high value property may need to be protected or a ravine/streambank may be experiencing such severe erosion that stabilizing the streambank or ravine is deemed necessary.

Strategies to protect and restore lakes include both strategies to minimize pollutant contributions from the watershed and strategies to implement adjacent and in the lake. Cities and watershed residents also impact water quality. Failing and unmaintained septic systems can pollute waters. Key strategies in the Watonwan River Watershed are:

- Manage nutrients: Carefully planning for and applying phosphorus fertilizers decreases the total amount of phosphorus runoff from cities and fields.
    - Examples: Crop nutrient management, city rules on phosphorus fertilizer use, etc.
- Reduce erosion: Preventing erosion keeps sediment (and attached phosphorus) in place.
    - Examples: Construction controls, vegetation.
- Increase vegetation: More vegetative cover on the ground uses more water and phosphorus and decreases the total amount of runoff coming from fields and cities.
    - Examples: Cover crops, grass buffers, wetlands, prairie gardens/restorations, channel vegetation, etc.
- Install/restore basins: Capturing runoff and decreasing peak flows in a basin allows the sediment (and attached phosphorus) to settle out.
    - Examples: Water and sediment control basins, wetlands, etc.
- Improve soil health: Soils that are healthy need less fertilizer and hold more water.
    - Examples: Reduce/no-till fields, diversified plants in fields and yards.