

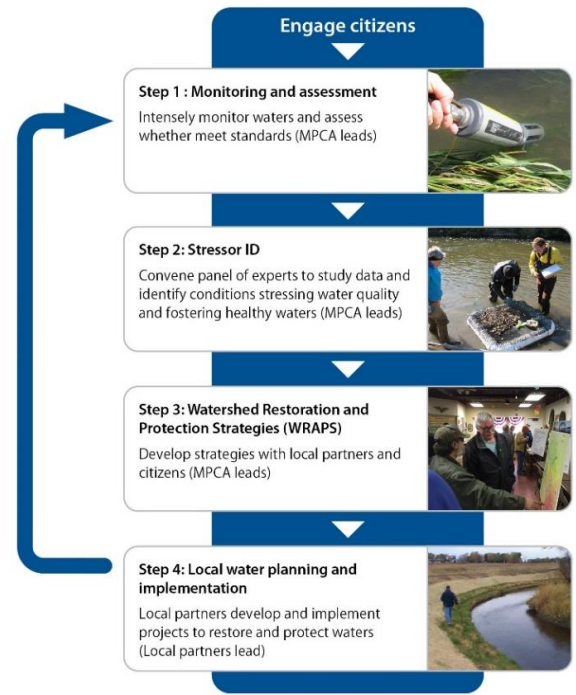


# Redwood River Watershed

## Watershed approach

Minnesota has adopted a watershed approach to address the state's 80 major watersheds. This approach looks at the drainage area as a whole instead of focusing on lakes and stream sections one at a time, thus increasing effectiveness and efficiency. This watershed approach incorporates the following activities into a cycle repeated on a regular basis:

1. Monitoring water bodies and collecting data over two years on water chemistry and biology (2017-2018).
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters (2020-2021).
3. Developing strategies to restore/protect the watershed's water bodies and report them in a document called Watershed Restoration and Protection Strategies (WRAPS) (2021-2022).
4. Coordinating with local One Watershed, One Plan (1W1P) efforts for implementation of restoration/protection projects (2023-beyond).

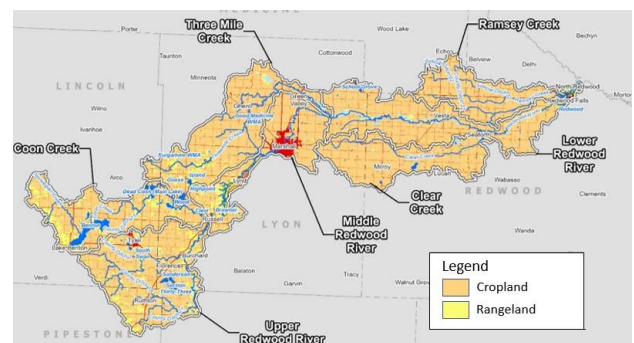


The Minnesota Pollution Control Agency (MPCA) leads the technical work and coordinates and supports strategy development with local, state, and federal partners. Watershed partners are leaders in implementing strategies to restore and protect waters. Their past and current work provides opportunities for watershed improvement and will continue to be a critical component to overall water quality. The main purpose of the WRAPS report is to summarize all the technical information so that local partners such as the Redwood-Cottonwood Rivers Control Area (RCRCA) and county soil and water conservation districts can use it for planning and implementing the best strategies in prioritized locations.

## Watershed characteristics

- Size: 448,000 acres
- Counties: Redwood, Pipestone, Lincoln, Murray, Lyon, Yellow Medicine
- Ecoregions: Western Corn Belt Plains, Northern Glaciated Plains of Southwest Minnesota
- Major streams: Redwood River, Three Mile Creek, Clear Creek, Ramsey Creek, Norwegian Creek
- Towns: Marshall, Redwood Falls, Ruthton, Tyler, Florence, Lake Benton, Russell, Lynd, Ghent, Milroy, Seaforth
- Land cover: Approximately 78% cropland (mostly corn, soybeans), 9% rangeland, 3% wetlands
- The 8-digit hydrologic unit code (HUC): 07020006

## Land cover in the Redwood River Watershed

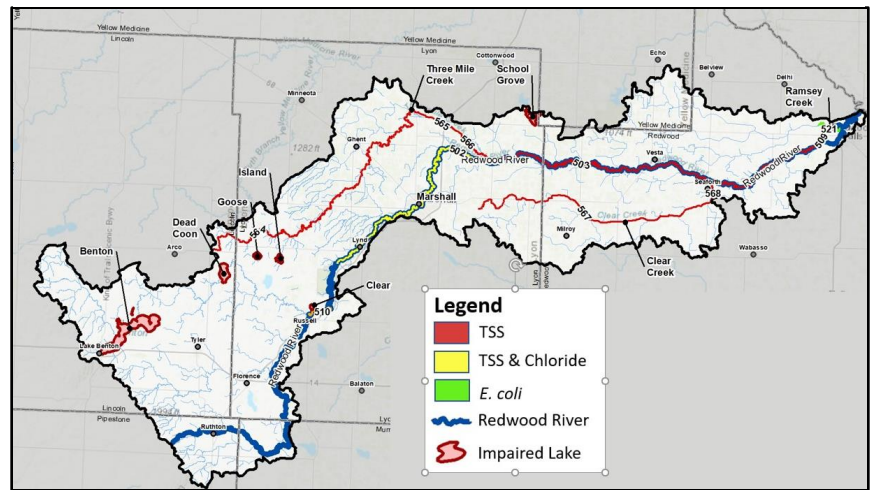


# Assessments: Are waters meeting standards and providing beneficial uses?

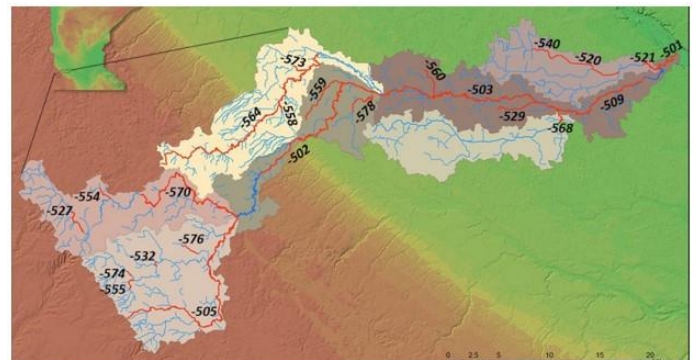
From 2017 to 2018, intensive watershed monitoring (IWM) was conducted across the Redwood River Watershed.

## Redwood River Watershed impairments

**Streams** -- The IWM assessed 35 river/stream reaches for their ability to support aquatic life (fish and bug communities) and/or aquatic recreation. Only seven fully supported aquatic life and none fully supported recreation. Based on previous and current monitoring assessment data, there are 9 turbidity/total suspended solids (TSS) impaired stream reaches, 13 bacteria (*E. coli*) impaired reaches, 18 aquatic insect Index of Biotic Integrity (IBI, e.g., poor habitat) impaired river/stream reaches, 15 fish IBI impaired reaches, 1 chloride impaired reach, and 1 river eutrophication impaired reach.



Factors affecting habitat included stream/landscape alterations such as the straightening of streams and extensive ditching that can increase sedimentation. In addition, high flows associated with spring runoff and summer storms, and extended periods of low flows can negatively affect habitat. The impacts of higher intensity storms and more severe droughts are amplifying these conditions.



**Lakes** -- Of the 18 lakes assessed for excessive nutrients (total phosphorus, TP), which can cause nuisance algae blooms, 6 were determined to be impaired. Eight of the 18 lakes were assessed for recreation. Only two, West and East Twin Lakes, supported recreation and are key lakes to protect.

Lake Redwood was previously deemed impaired but in 2016 an MPCA review team determined the lake functions more like a river than a lake and it was removed from the Impaired Waters List. A reclamation project was completed in 2022 to restore Lake Redwood to improve water quality and recreation.

A stressor identification report was completed for factors affecting fish and aquatic insect communities. The report highlighted river/stream alterations, connectivity (barriers such as perched culverts), lack of physical habitat, low dissolved oxygen, eutrophication (excessive nutrients), suspended solids (excessive sediment), and excessive nutrients (phosphorous, nitrates) as the most common stressors to biologic communities (see map with reach numbers and chart).

Stressors, impairments affecting fish, bug communities

# Reach	Hydrologic Alteration	Connectivity	Habitat	Dissolved Oxygen	Eutrophication	Suspended Solids	Nitrate
558	✓	○	✓	○	○	○	○
573	✓	✗	✗	○	✓	○	✓
502	✓	○	✓	○	✓	✓	✓
559	✓	✓	✓	✓	✓	○	○
578	✓	○	○	○	✓	○	○
503	✓	✗	✓	○	✓	✓	✓
560	✓	✓	○	✓	✓	○	✓
529	✓	✓	✓	✓	○	○	✓
509	○	○	○	○	○	✓	✓
501	○	✗	○	✗	○	✓	○
568	✗	✗	✗	○	✓	✓	✓
540	✓	✓	✓	○	✓	✓	✓
520	○	✓	✓	○	✓	○	✓
521	✗	✓	○	✗	○	○	✓

✓ = Stressor   ✗ = Not a Stressor   ○ = Inconclusive

A Total Maximum Daily Load (TMDL) study was completed for impaired waters in the watershed, which established the amount of each pollutant that a water body can accept and still meet water quality standards. It also estimates the amount of reductions needed to meet the standards. The TMDL report for the Redwood River Watershed addressed nine turbidity/TSS (excessive sediment) impaired reaches, two bacteria impaired reaches, one chloride impaired reach,



and six nutrient impaired lakes. One river eutrophication impaired stream reach will have a separate TMDL at a later time.

## Restoration and protection strategies

Priority resources and strategies for the Redwood River Watershed were determined based on input and professional judgement from local partners, previous planning work, recreational use priorities, and comparing findings with existing priorities outlined in county water plans. Some of the top priorities that were identified for the watershed include:

- Grade stabilization structures and practices (e.g., water and sediment control basins, grassed waterways) in highly-sloped areas, which include two designated DNR trout streams (the Redwood River in Camden State Park, and Ramsey Creek near Redwood Falls)
- Soil health education and outreach
- Restoration and protection of lakes and stream reaches with high recreational use and value (Lake Benton and Norwegian Creek, Redwood River in Camden State Park, and Lower Ramsey Creek)
- Restoration and protection of lakes and stream reaches that are nearly impaired or barely impaired (Three Mile Creek and Clear Creek, School Grove Lake, East Twin Lake, and Sanderson Lake)
- Protection of vulnerable and sensitive groundwater areas (City of Marshall, Lincoln Pipestone Rural Water)

Restoration strategies for addressing issues in the Redwood River Watershed include: implementing stream and riparian buffers, tillage/residue management, adopting cover crops and other strategies to improve soil health, rural water storage, implementing designed erosion control and trapping best management practices (BMPs), nutrient management, pasture management, feedlot runoff controls, septic system improvements, urban stormwater runoff controls, and managing internal phosphorous loading in lakes.

Strategies were also identified for lakes and streams that are currently meeting water quality to maintain and improve current conditions and protect these resources from becoming degraded or impaired. These include protecting groundwater and drinking water, wildlife management areas, and lakes and wetlands with rare and/or sensitive species.



Above left: an example of a stream reach that has been ditched/channelized with very little variability in depth and high amounts of fine sediment, affecting habitat for fish and aquatic insects. Above right: Samples taken during an active fish kill in Coon Creek in 2014 showed elevated levels of phosphorus, blue-green algae and low oxygen levels. Eutrophication, or excessive nutrients such as phosphorus and nitrates, is a stressor in this reach.

### Lake Redwood Reclamation Project

The Redwood River is a tributary to the Minnesota River. Just before entering the Minnesota, the Redwood River enters the Lake Redwood Reservoir. A major reclamation project to remove accumulated sediment and increase the average depth of 2.8 feet to its original maximum depth of 20 feet was completed in 2022. The project was designed to: address impairments in the Minnesota River by trapping up to 16,500 tons of sediment and 11 tons of phosphorus annually,

increase reservoir capacity for hydroelectric power generation for the City of Redwood Falls, and enhance fisheries habitat and regional recreational opportunities.

## Key conclusions of first cycle

- Of 35 stream reaches in the watershed assessed for aquatic use (aquatic life [fish and insect communities] and/or aquatic recreation), only 7 fully supported aquatic life and none fully supported recreation.
- Factors affecting aquatic life habitat include stream/landscape alterations such as the straightening of streams and extensive ditching, large flows associated with spring runoff and summer storms, and extended periods of low flows. The impacts of climate change are amplifying these conditions.
- Of the 18 lakes assessed for excessive nutrients (TP), which can cause nuisance algae blooms, 6 were determined to be impaired. Eight of 18 lakes were assessed for recreation. Two lakes, West and East Twin Lakes, located in the Southwest part of Lyon County, supported recreation and are key lakes to protect.
- Lake Redwood was previously deemed impaired but in 2016 an MPCA review team determined the lake functions more like a river than a lake and it was removed from the Impaired Waters List. A reclamation project was completed in 2022 to restore Lake Redwood and improve water quality and recreation.
- Lake restoration and protection strategies focus on reducing nutrient and TSS loading to lakes through land management (tillage, nutrient management, etc.), structural practices (buffers, lake level management), and internal load controls (rough fish management).

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### Next steps

The Redwood River WRAPS development began in 2017 and was completed in early 2023 with publication of the WRAPS report. The restoration and protection strategies listed in the WRAPS report will be the basis for developing comprehensive local water management plans that include implementation efforts to restore and protect water resources. The WRAPS report lays out goals, milestones, and strategies to address protection and restoration opportunities in the watershed. The targets are intended to provide guidance and “measuring sticks” to assess the watershed’s health and success of actions taken.

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### Full report

To view the full WRAPS report, search “Redwood River Watershed” on the MPCA website at [www.pca.state.mn.us](http://www.pca.state.mn.us).

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### Contact

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