

# Redeye River

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



Minnesota has adopted a “watershed approach” to address the state’s 80 “major” watersheds (denoted by 8-digit hydrologic unit code or HUC). 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 10-year cycle:

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



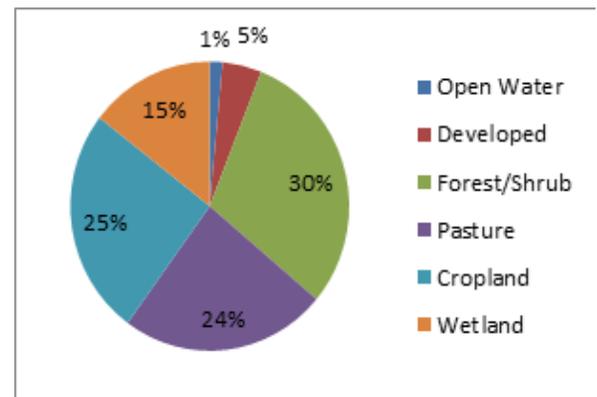
Leaf River on Cty. Road 20, just north of Wadena (Wadena county, 8/2016)

The Redeye River watershed process began in 2011. It was the first time watershed assessments incorporated biology (fish and macroinvertebrates) along with the traditional chemistry and flow for a comprehensive watershed health assessment. The watershed approach adds a protection component for water resources that currently meet standards rather than focusing entirely on restoration of impaired waters.

### Watershed characteristics

- Size: 899 square miles or 575,360 acres.
- Water: ~126 lakes and 316 perennial river miles.
- Counties: Becker, Otter Tail, Todd and Wadena.
- Ecoregions: Northern Lakes and Forests and North Central Hardwood Forests.
- Land use: Predominantly agriculture (rangeland and cropland).
- 2007 population estimates show approximately 19,120 people reside in the watershed. The largest population centers are the towns of Parkers Prairie, Wadena, and Sebeka.
- The 8-digit hydrologic unit code or HUC for the Redeye River Watershed is 07010107

### Land Use in the Redeye River watershed

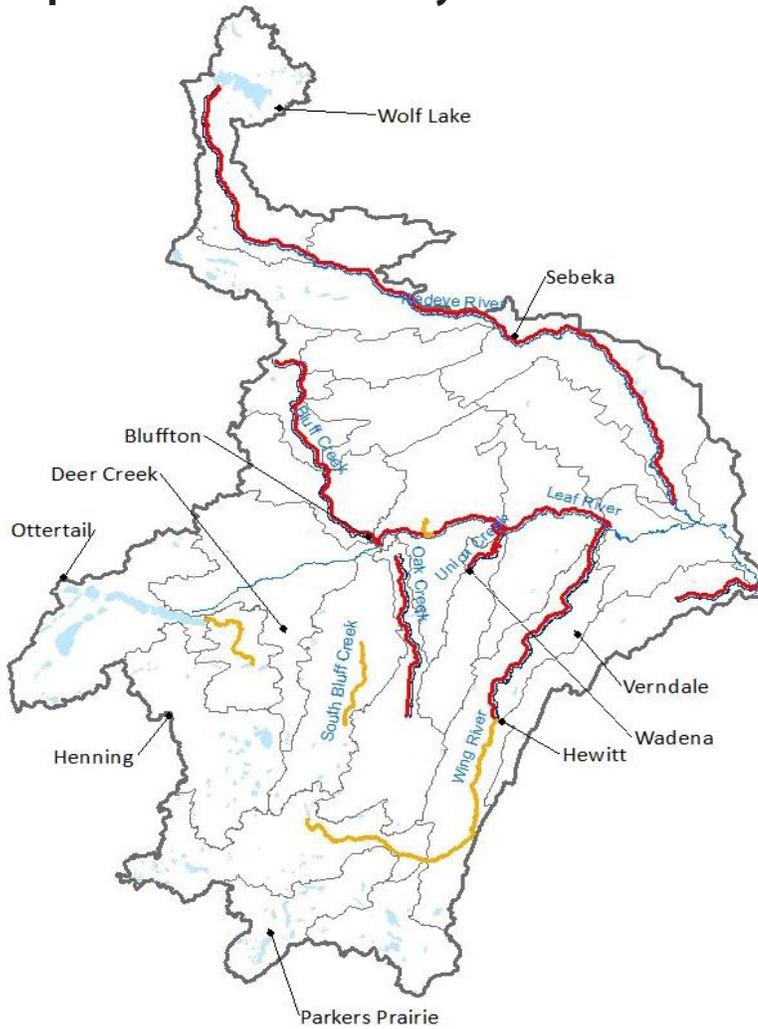


### Assessments: Are waters meeting standards and providing beneficial uses?

During the first phase of the watershed approach – intensive watershed monitoring – the MPCA and local partners collect data about biology such as fish populations, chemistry such as pollutant levels, and flow to determine if lakes and streams are meeting water quality standards.

Waters are “impaired” if they fail to meet standards. The map on the next page shows the impairments for streams in the Redeye River watershed. Under federal and state laws, impaired waters must have Total Maximum Daily Load (TMDL) studies to determine reductions of pollutants needed to again meet water quality standards. In this first WRAPS cycle, the MPCA and local partners completed TMDL studies for 8 stream sections.

# Impairments in the Redeye River Watershed



## Impairments:

- No lakes were found to be impaired in the Redeye River Watershed.
- 8 stream sections were found to have impairments.
- Bacteria: E.coli and/or fecal coliform can indicate sewage or manure in water and makes the water unsafe for swimming.
- Biology: (fish and/or macroinvertebrates): The number and type of fish and bugs are indicators of water's health.

## Legend

- ~ Bacteria
- ~ Biology
- ~ Dissolved Oxygen
- ~ Turbidity
- ~ Polychlorinated Biphenyls
- Nutrients

## Stressors: What factors are affecting fish and bugs?

To develop strategies for restoring or protecting water bodies with biological impairments, agencies and local partners must first identify the possible causes, or stressors, of the impairments. The table below summarizes the predominant stressors of the indicated streams in the Redeye River watershed.

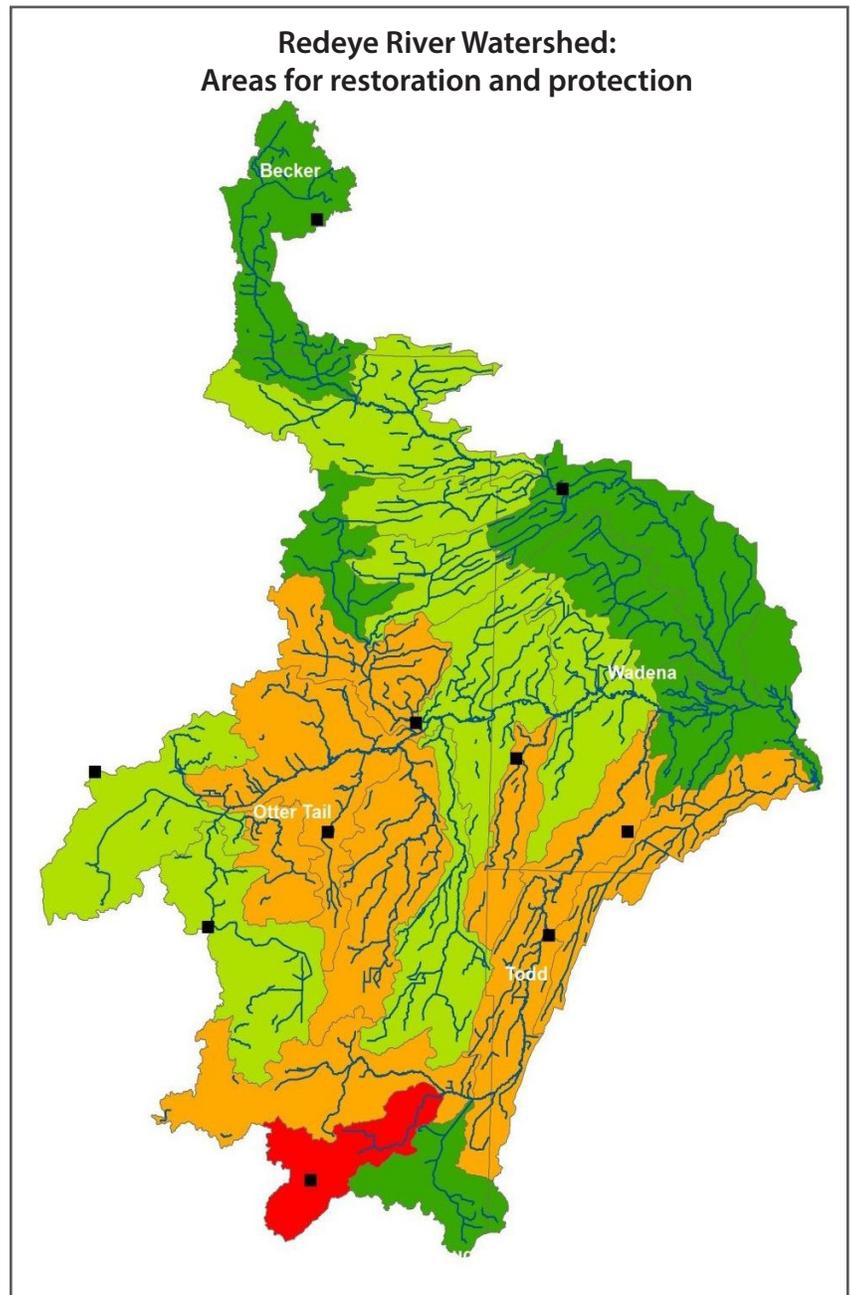
Stressors to Biological Health of	Water Chemistry			Geomorphology			
	Dissolved Oxygen	Elevated Nutrients	Total Suspended Solids	Deposited Sediment (Degrades habitat)	Physical connectivity	Lack of physical habitat	Altered Hydrology (Stream flow changed, runoff)
South Bluff Creek	Main Stressor	Not a stressor	Not a stressor	Main stressor	Not a stressor	Main stressor	Lesser stressor
Trib. to East Leaf Lake				Not a stressor	Lesser stressor		Not a stressor
Wing River	Lesser Stressor	Lesser Stressor		Main stressor	Not a stressor		
Trib. To Leaf River	Lesser Stressor	Lesser Stressor		Not a stressor	Main stressor	Lesser stressor	
Union Creek	Main Stressor	Not a stressor	Main Stressor	Lesser stressor	Not a stressor	Not a stressor	Not a stressor

## Restoration and Protection Strategies

The MPCA created the strategy map to the right using HUC-12 subwatersheds – drainage areas within the larger HUC-8 Redeye River watershed – to help identify priority areas for targeting actions to improve water quality. Multiple sources of data, maps and analysis tools including HSPF, were combined to create this map. The colors on the map indicate:

- Red – High priority restoration (water is Impaired, needs highest attention)
- Orange – Medium priority restoration (water is Impaired)
- Light green – Protection/monitoring (water quality is good but declining or faces threats)
- Dark green – Protect (water quality is good)

Other maps of individual pollutants, such as phosphorus and nitrogen, can be found in the full report.



## Next steps and measuring results

The restoration and protection strategies listed in the WRAPS report will be the basis for developing local implementation plans to restore and protect water resources. The report lays out goals, milestones and responsible entities to address protection and restoration priorities in the Redeye River watershed. The targets are intended to provide guidance and “measuring sticks” to assess the watershed’s health and success of actions taken.

Water quality in Minnesota has declined over many decades. While restoration activities continue, new problems develop, such as converting land to intensive cropping that negatively impacts water quality. The perpetual challenge is to make improvements and keep up with new problems. Impacts from other factors such as climate change are still not completely understood. Consequently, it may take decades to fully restore impaired waters.

## Key conclusions of first cycle

- Protection and restoration strategies are dictated largely by the agricultural land use in the watershed.
- The WRAPS report data and findings provide a base for developing County Water Plans.
- The watershed model was used to link land use changes to watershed responses in water quality, hydrology, hydrogeology and natural features.
- Both long term and interim goals need to be tracked to measure effectiveness.
- Lakes in the watershed meet water quality standards and should be protected to ensure clean water in the future.
- Primary impairments to streams are bacteria which make them unsafe for recreation.
- Stewardship/education programs and activities for restoration and protection efforts in the watershed should be continued.
- The subwatershed of highest priority for restoration is County Ditch No 13 in the southern end of the watershed. Some of the restoration strategies include nutrient management, improving existing water quality through protection of riparian habitat and increasing forest acreage.
- The next WRAPS project cycle for the Redeye River Watershed is expected to begin in 2021.



Leaf River north of Staples. MPCA long-term monitoring site, and location of 1972 erosion control project to protect the Thomastown Covenant Cemetary.

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## Full report

Full report as well as supporting documents can be found at [www.pca.state.mn.us](http://www.pca.state.mn.us) and search "Redeye River".

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## Contacts

- Wadena SWCD: Anne Oldakowski, Water Technician: [anne.oldakowski@mn.nacdnet.net](mailto:anne.oldakowski@mn.nacdnet.net)
- MPCA: Anna Bosch, Project Manager: [anna.bosch@state.mn.us](mailto:anna.bosch@state.mn.us)



Minnesota  
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Agency

## Minnesota Pollution Control Agency

The Clean Water, Land and Legacy Amendment is funding a large part of the MPCA's watershed approach.

