

## TMDLs In the RLWD



## What is a TMDL?

- TMDL stands for Total Maximum Daily Load
- The term TMDL is used in several ways
  - Refers to an impairment of a river reach or lake
  - Reference to Impaired Waters and the MPCA's approach to solving pollution problems
    - TMDL List
    - TMDL Study
    - TMDL Plan

## What is a TMDL?

- A calculation of the maximum amount of a pollutant that a water body can receive and still attain water quality standards
- A plan to attain and maintain water quality standards

## TMDL studies:

- **Recruit stakeholders who use or know the affected water to advise the project**
- **Develop a plan for the study**
- **Identify all sources of the pollutant.**
- **Use scientific information and prediction tools to suggest ways to reduce the pollutant at the source.**

## Study outcomes

- Pollutant sources identified.
- Desired pollutant load defined.
- Strategies to achieve the desired load identified.
- Likelihood of achieving the desired load is predicted.

## Background on TMDLs

- Clean Water Act requires states to adopt water quality standards
- Waters classified to meet uses
- State assesses attainment of standards biennially
- If a lake or stream/river fails to meet standards, it is listed as impaired

## “TMDLese”

- 305(b) Report = Report of ALL assessed waters
- 303(d) List = Waters found to be impaired as a result of assessment
- Designated Uses - Specific uses identified for all waterbodies in the state:
- Drinking water, Aquatic Life and Recreation, Agriculture, Wildlife, Industrial Consumption, Aesthetic Enjoyment, and Navigation.

## Methods for Determination of Impairment

- Based upon EPA standards for Minnesota Waters
- MPCA Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment – 305(b) Report and 303(d) List
  - <http://www.pca.state.mn.us/publications/wq-iw1-06.pdf>

## How impairment is determined

- ❑ **Protection of Aquatic Life** (*Toxicity-based -Trace metals, Un-ionized Ammonia, Chloride*)
- ❑ **Human Health-based** (*Mercury, Polychlorinated Biphenyls (PCBs), Dioxins and Chlorinated Pesticides*)
- ❑ **Wildlife-based** (*DDT, Mercury, PCBs, 2,3,7,8-TCDD*)
- ❑ **Conventional Pollutants** (*Dissolved Oxygen, pH, Turbidity, Temperature*)
- ❑ **Recreation** (*Fecal Coliform*)

## Importance of Oxygen

- Dissolved oxygen (DO) is required for all aquatic organisms to live.
- The more DO in the water (up to about 110 percent of saturation), the better.
- When DO drops, desirable aquatic organisms such as fish can be killed or harmed.

## Diurnal Cycle

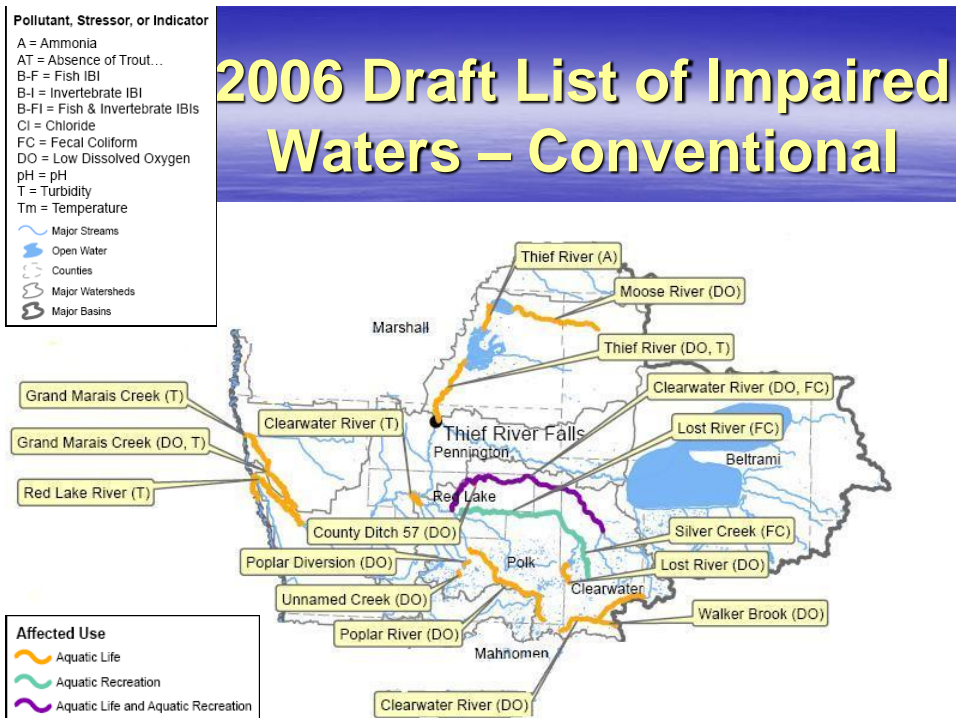
- DO concentrations cycle during the day;
- Concentrations are highest in late afternoon due to photosynthesis by green plants which releases oxygen to the water;
- At nightfall photosynthesis stops, but living matter continues to consume oxygen.
- Dissolved oxygen should be measured two hours after sunrise.

## Oxygen standards by class

- Class 2A. Not less than 7 mg/L as a daily minimum
- • Class 2Bd, 2B, 2C. Not less than 5 mg/L as a daily minimum
- • Class 2D. Maintain background
- • Class 7. Not less than 1 mg/L as a daily average, provided that measurable concentrations are present at all times

# Monitoring for TMDLs

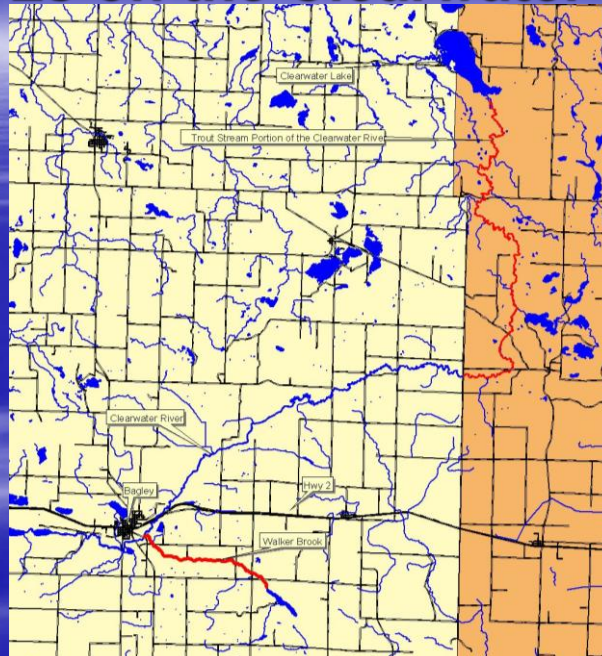
- MPCA uses data stored in the EPA's water quality database – STORET
- Data Requirements
  - From most recent 10 yrs.
  - Conventional – 20 data points



# Past and Current TMDL Projects Within the RLWD

- **Past**
  - TMDLs on the Clearwater River
    - Walker Brook
      - Low Dissolved Oxygen
    - Trout stream portion of the Clearwater River
      - Fecal coliform
- **Current**
  - Red River Basin Turbidity TMDL
    - 25 reaches on main stem of the RR and its tributaries
    - TMDL study led by the MPCA and the Red River Basin Water Quality Team

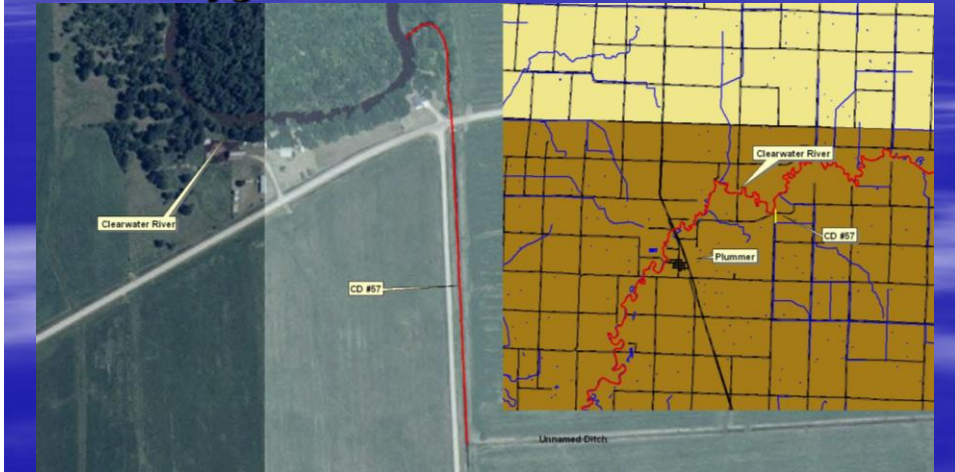
## TMDLs on the Clearwater River





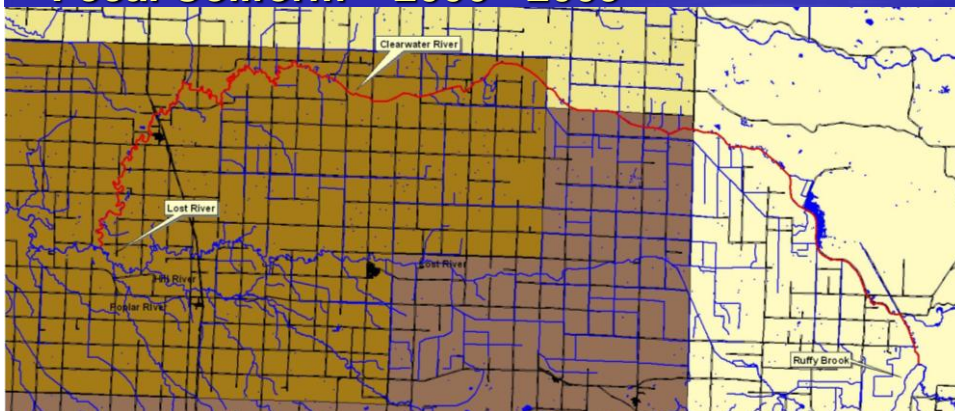
## County Ditch #57

- Unnamed Ditch to Clearwater River
- Low Oxygen: 2004 - 2007



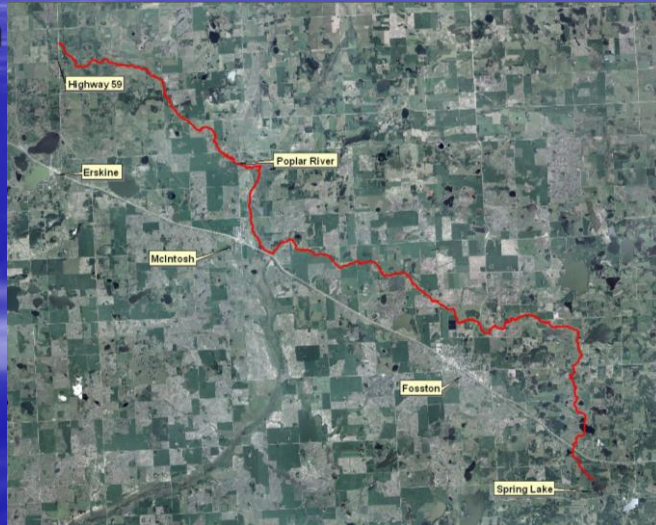
## Clearwater River

- Ruffy Brook to Lost River
- Low Oxygen - 2004 - 2007
- Fecal Coliform - 2006 - 2009



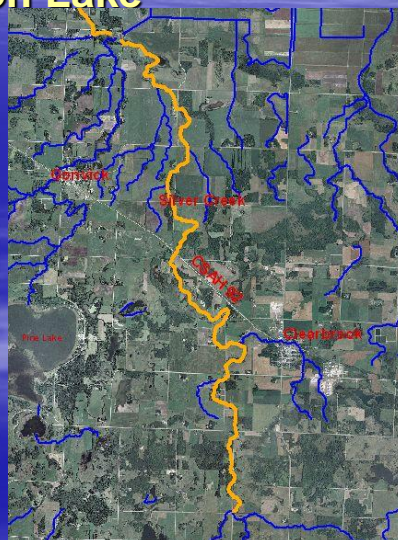
## Poplar River

- Spring Lake to Hwy 59
- Low Oxygen
- 2004 – 2007



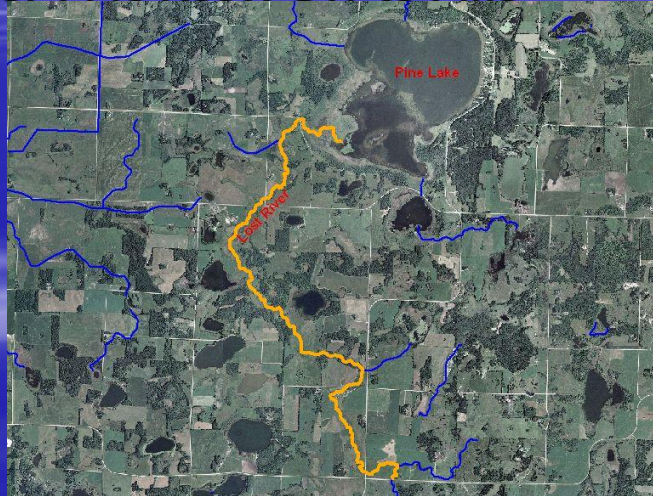
## Silver Creek

- Headwaters to Anderson Lake
- Fecal Coliform
- 2006 – 2009



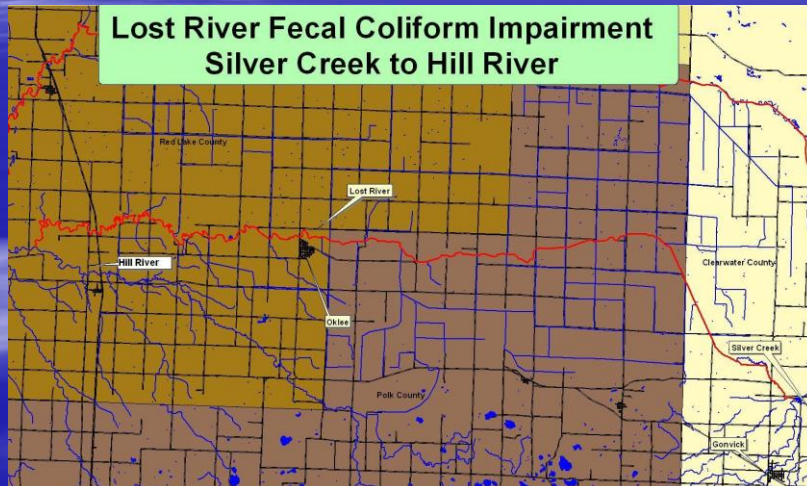
# Lost River

- South Line of T148 R38W S17 to Pine Lake
- Low DO
- 2013 - 2016



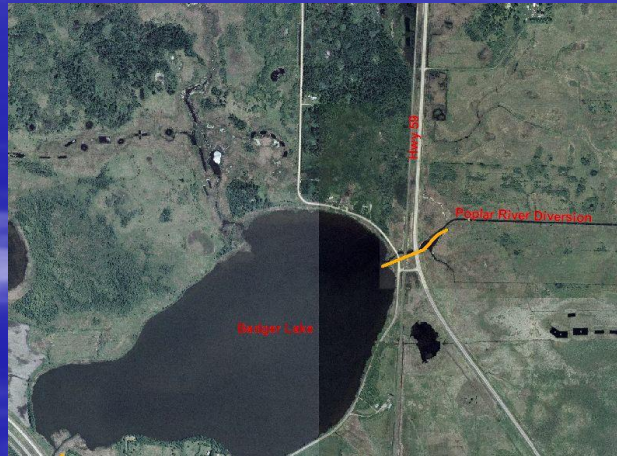
# Lost River

- Silver Creek to Hill River  
– Fecal Coliform



## Poplar River Diversion

- Unnamed Ditch to Badger Lake
- Low DO
- 2013 – 2016



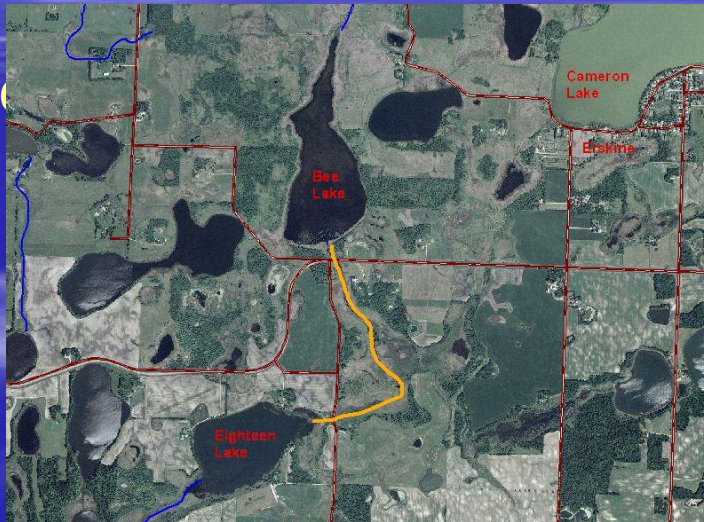
## Badger – Mitchell Lake Channel

- Low DO
- 2013 – 2016



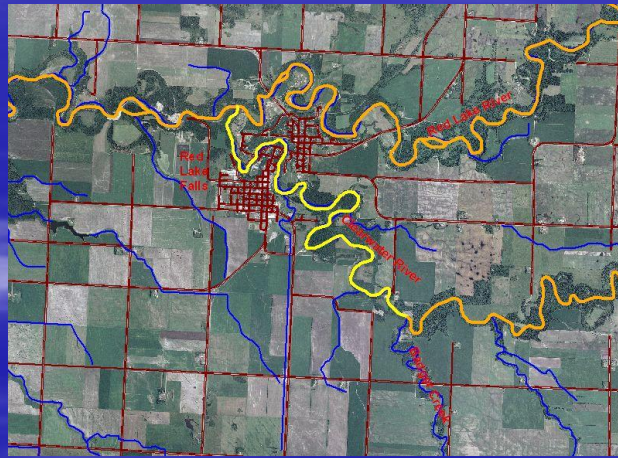
## Unnamed Creek from Eighteen Lake to Bee Lake

- Low DO
- 2013 - 2016



## Clearwater River

- Lower Badger Creek to Red Lake River
- Turbidity
- 2006 - 2009



# TMDLs Influence our Monitoring Strategy

- **Meet MPCA data requirements**
  - Sampling schedule
  - Supplemental sampling
- **Strategic locations for assessment purposes**
  - Assessing new reaches
  - Monitoring existing/past impairments
- **River Watch sites**
  - Discover/monitor/investigate dissolved oxygen and turbidity impairments

## The End

- **Learn More**
- **MPCA's TMDL Website**
  - <http://www.pca.state.mn.us/water/tmdl.html>
- **RLWD Website**
  - [www.redlakewatershed.org](http://www.redlakewatershed.org)