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:

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](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

2006 Draft List of Impaired Waters – Conventional
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
County Ditch #57

- Unnamed Ditch to Clearwater River

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

Lost River Fecal Coliform Impairment
Silver Creek to Hill River
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](http://www.pca.state.mn.us/water/tmdl.html)
- RLWD Website
  - [www.redlakewatershed.org](http://www.redlakewatershed.org)