

Minnesota's Impaired Waters

Upper Mississippi River Bacteria TMDL Project



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NPS Miss River Forum 4/24/09

Outline



1. Minnesota's Impaired Waters
2. TMDL Study Process
3. UMR Bacteria TMDL Project

Clean Water Act (1972)

Goal - Restore and maintain the chemical, physical, and biological integrity of U.S. waters

Section 303 of CWA

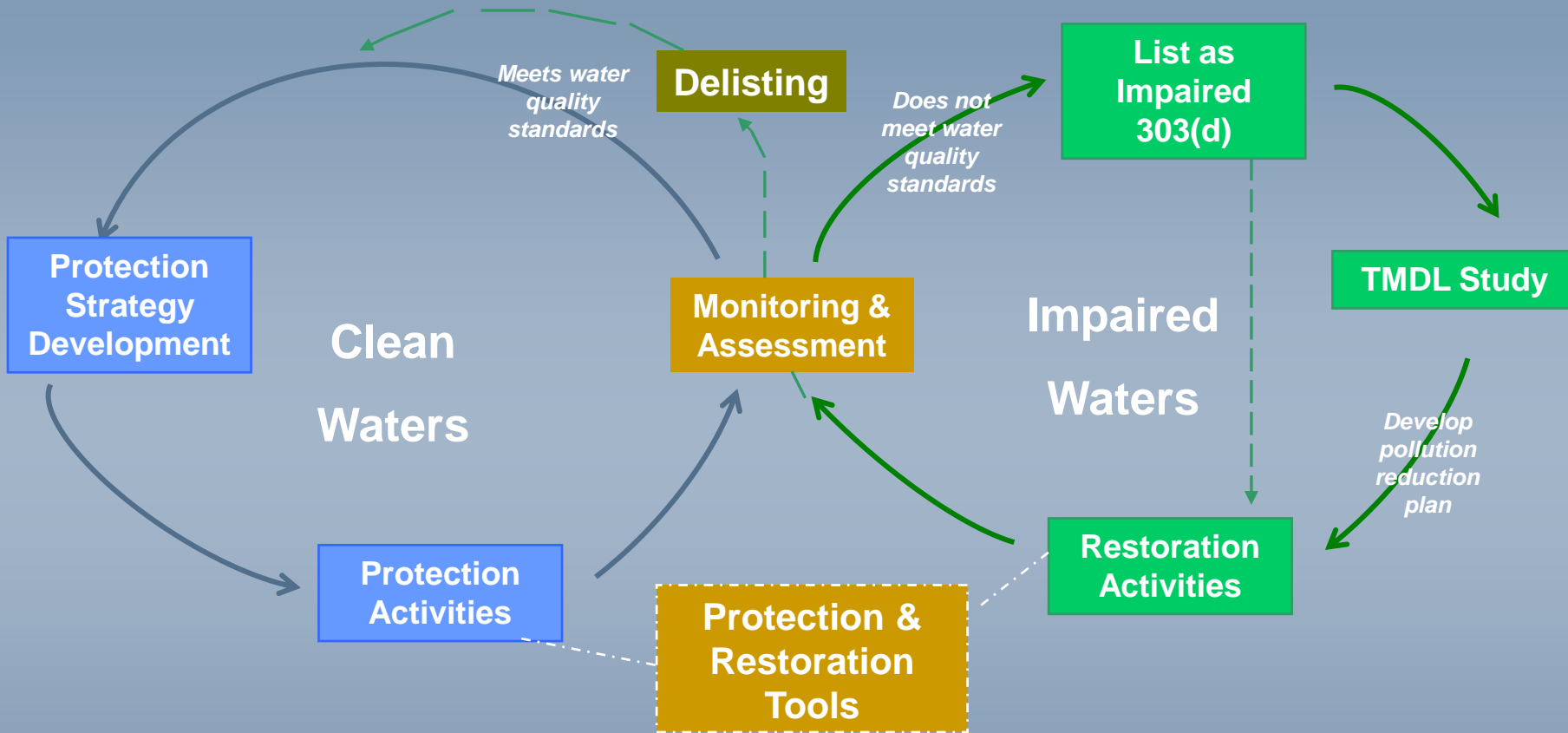
1. Assess State Waters - meet water-quality standards?
2. List Impaired Waters - 303(d) List
3. Conduct TMDL Studies - set pollutant reduction goals



Water Quality

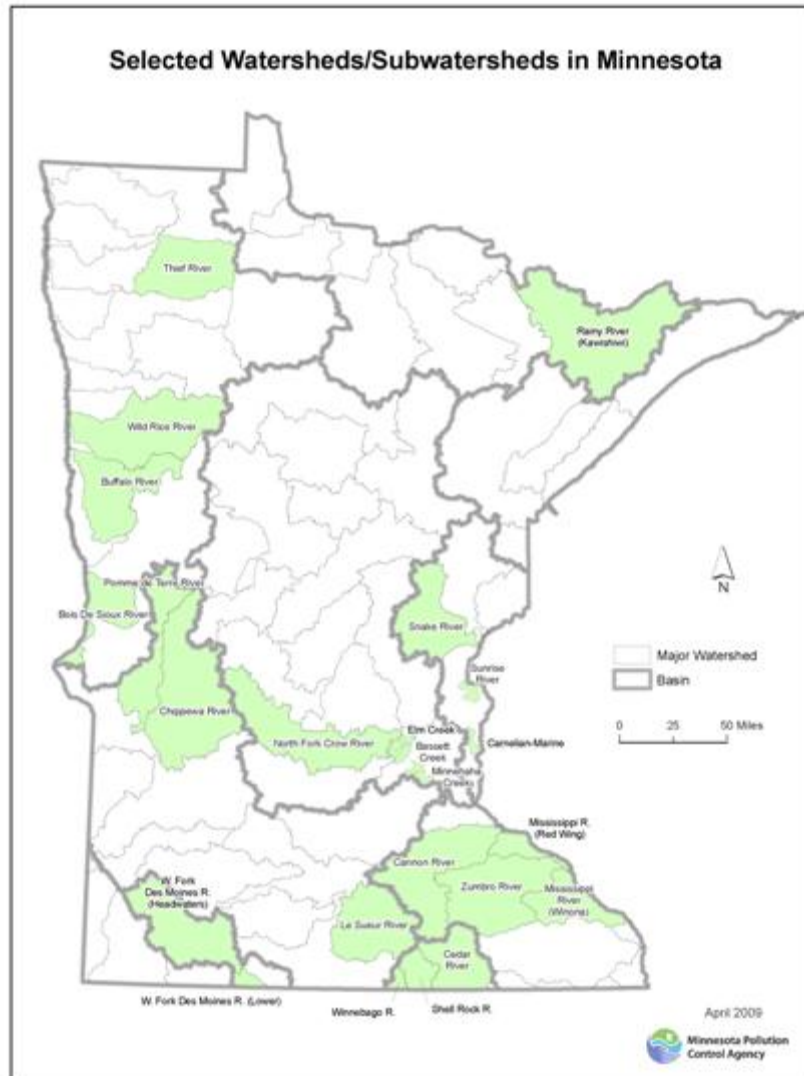
Protecting

Improving



Watershed Framework: One Water

Integrates Watershed Monitoring, Planning, & Implementation Efforts



- 10-year cycle
- Major watershed scale (8-digit HUC scale)
- Identify all impairments & waters that need protection
- Coordinates agency/local efforts – monitoring/water planning
- Track trends over time



**Beneficial
Uses**



Beneficial Use Classifications

| Use Class | Beneficial Use |
|-----------|--|
| Class 1 | Drinking Water |
| Class 2 | Aquatic life and recreation |
| 2A | Cold water fisheries, trout waters |
| 2Bd | Cool and warm water fisheries, drinking water |
| 2B | Cool and warm water fisheries |
| 2C | Indigenous fish and associated aquatic community |
| 2D | Wetlands |
| Class 3 | Industrial uses and cooling |
| Class 4A | Agriculture and wildlife uses |
| Class 5 | Aesthetics and navigation |
| Class 6 | Other uses |
| Class 7 | Limited resource value waters |

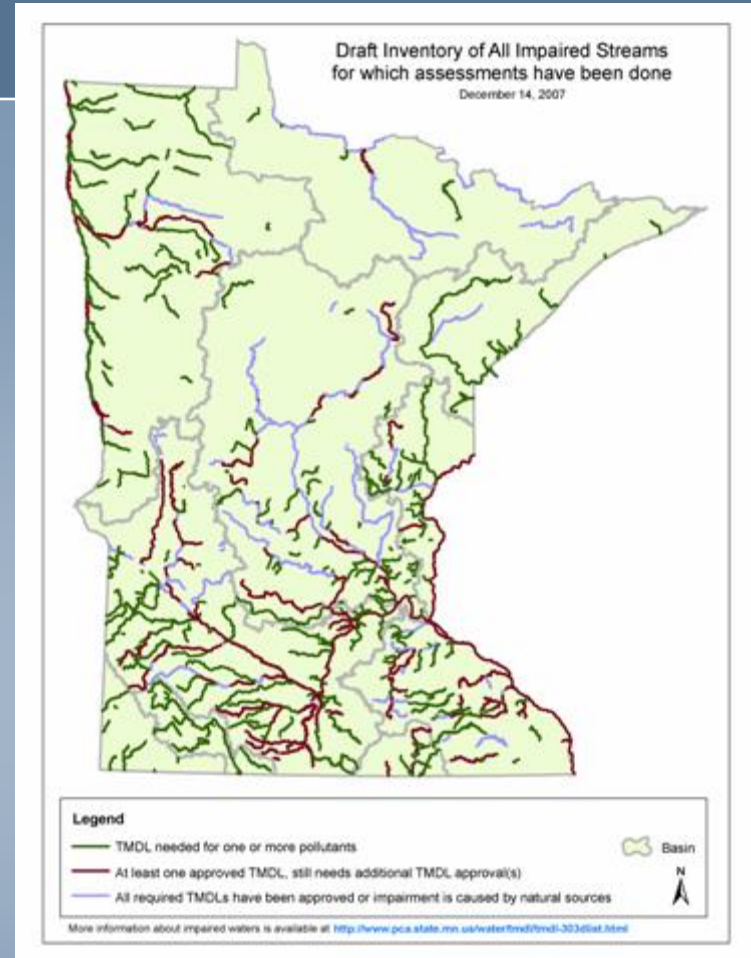
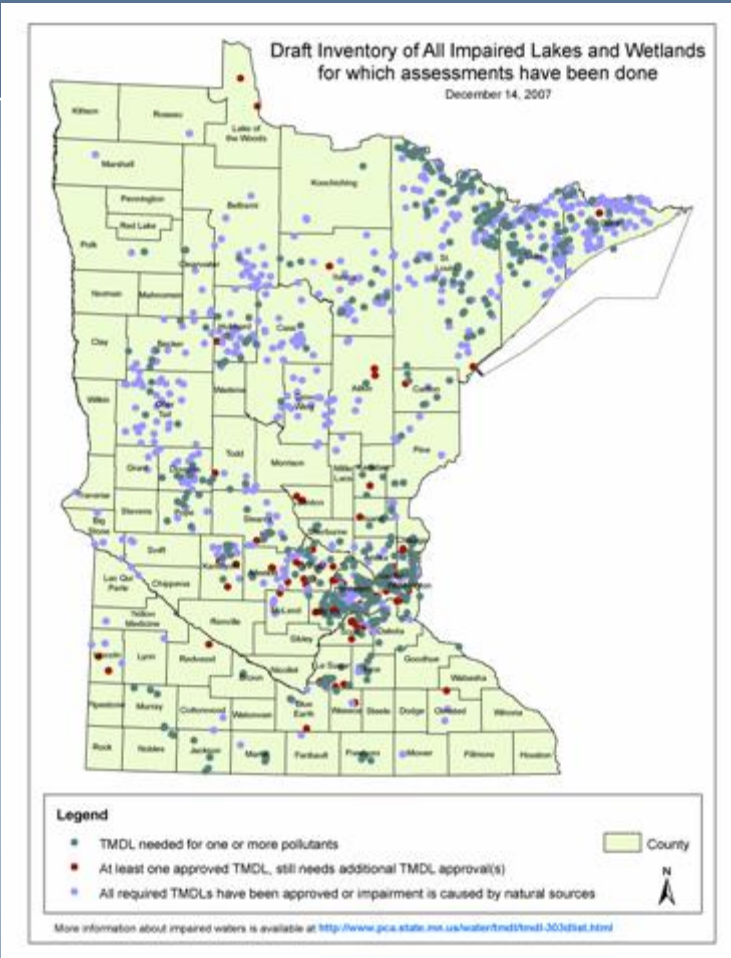
Water Quality Standards



*Aquatic Recreation
(1° and 2° body contact)*

| Bacteria Standard | Units | Notes | Assessment |
|-------------------|---------------------|-----------|--|
| <i>E. coli</i> | 126 orgs per 100 ml | Indicator | Geometric mean of ≥ 5 samples/month (April – October) |

MN Impaired Waters



**2008 Impaired Waters
303(d) List**

**All impaired
waters =
2,575**

**Impaired waters (lakes, rivers,
wetlands) need a TMDL =
1,475**

Impairments by Parameter



- Turbidity - 218
- Nutrients (Phosphorus) – 208
- Bacteria (*E. coli*) - 139
- Impaired Biota (Fish/Aquatic Insects) – 144
- Low Dissolved Oxygen – 54

- PCBs – 141
- Mercury – 1,312
- Others (pH, Chloride, Toxics, Temp) - 34

- About 14% streams & 18% lakes have been assessed in MN
- Of those waterbodies assessed, about 40% of the lakes and streams are impaired for a designated use

Examples of Impairments

Nutrients



Bacteria



Fish & Aquatic Insects



Turbidity

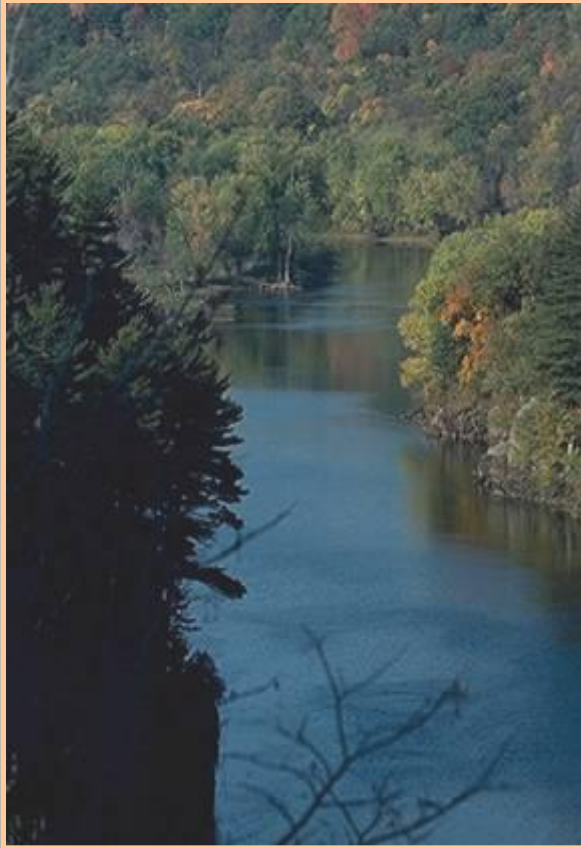


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Total Maximum Daily Load (TMDL)



A TMDL Study -

1. Identifies pollutant sources
2. Determines pollution reduction needed to restore the water quality

TMDL Process

Determine Sources Causing Impairment

- Analyze existing data & conduct monitoring

Allocate Pollutant Loads

- Identify stresses & develop pollutant loads

***Deliverable: TMDL Report**

Develop Implementation Strategies/Plan

- Identify leads/partners & monitoring plan

***Deliverable: Implementation Plan**



Quantifying a TMDL Number

Sum of the allowable loads of a single pollutant from all contributing permitted and non-permitted sources

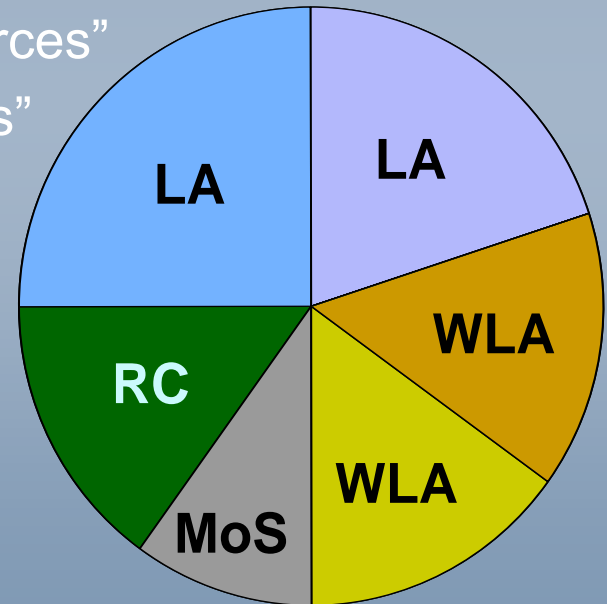
$$\text{TMDL} = \Sigma \text{WLA} + \Sigma \text{LA} + \text{MOS} + \text{RC}$$

WLA = Wasteload Allocation, “permitted sources”

LA = Load Allocation, “non-permitted sources”

MOS = Margin of Safety, “uncertainties”

RC = Reserve Capacity, “future growth”



Progress to Date in Developing TMDL Studies in Minnesota



22 TMDL Studies - Completed

98 TMDL Studies - Underway

51% of conventional pollutant listings are either underway or approved

➤ *2008 303(d) list*

What do TMDL Projects mean for Stakeholders?

- Increased funding opportunities for implementation activities & improved WQ
- Better understanding of links between water quality monitoring data and potential pollutant sources
- Possible changes in permits



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Upper Mississippi River Bacteria TMDL Project



Overall Goal

- Improve and restore the water quality of the Upper Mississippi River

Joint Effort

- MPCA & MDH, Partners, EOR
- Beneficial use designation
- MDH Source Water Protection/MPCA TMDL

Draft Timeline

- 2008 - Project Start (Work Plan, Stakeholder Meetings)
- 2012-2014 - Draft TMDL/Implementation Plan

Upper Mississippi River Bacteria Impairments



Upper Mississippi River Bacteria TMDL Project

Major Project Objectives

- Summarize Existing Data
- *E. coli* ~ pathogens/sediment
- Monitoring Plan
- CWA/SDWA Policies
- Additional Monitoring
- Bacteria “Hot Spots” & Sources
- Special Studies
- Refine Project Scope
- TMDL – bacteria reductions
- Implementation Activities



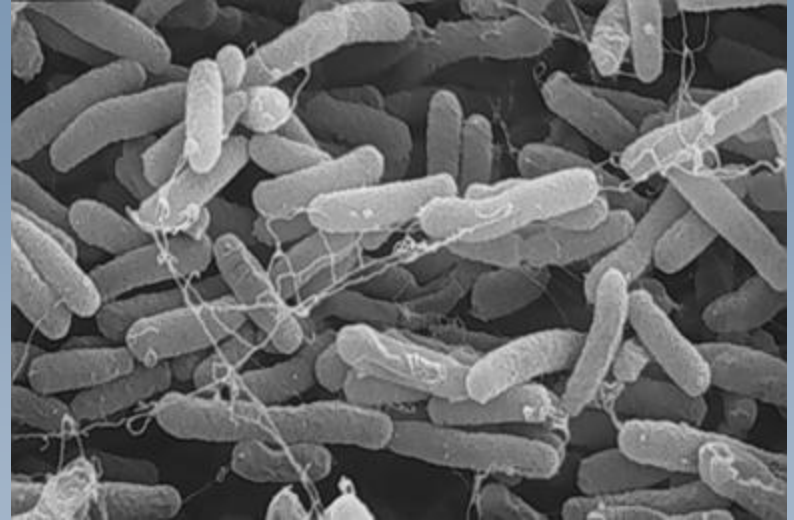
Bacteria TMDL Projects

Monitoring Data

- Stream flow, bacteria concentrations, precipitation, land use, subwatershed size

Potential sources

- Septic systems
- Livestock operations
- Stormwater (various sources)
- Wildlife and pet populations
- Wastewater treatment facilities
- Manure spreading & storage



Potential Sources of Bacteria



Best Management Practices: Bacteria Removal



Potential sources

- *Septic systems*
- *Livestock operations*
- *Stormwater (sources vary)*



Potential solutions

- Enforce compliance for failing septic systems
- Reduce feedlot/pasture runoff in priority areas (fencing, buffers)
- Filter stormwater (rain gardens, infiltration basins), reduce sediment (street sweeping)

Best Management Practices: Bacteria Removal

Potential sources

➤ *Wildlife and pet populations*



➤ *Wastewater treatment facilities*



➤ *Manure spreading & storage*



Potential solutions

➤ Evaluate pet waste & wildlife feeding ordinances, create educational materials

➤ Identify illicit sewer connections

➤ Reduce bacteria from land application of manure (stream/ditch buffers, immediate incorporation, conservation tillage, lined structures)



For More Information

- TMDL Protocols, Training Modules, 303d list, Projects Underway



www.pca.state.mn.us/water/tmdl