



**The New Seascape of  
Impaired Waters:  
Living with  
Total Maximum Daily Loads**

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The background of the slide features a dense arrangement of vibrant green leaves, likely from a tree or shrub, with prominent veins. The bottom portion of the image transitions into a clear, blue-green body of water with gentle ripples, suggesting a natural, outdoor setting. The text is centered within a semi-transparent white rounded rectangle.

# **Anatomy of a TMDL**

**A Primer,  
or Maybe Just Review**



# Total Maximum Daily Load (TMDL)

- “... a scientific study that calculates the amount of a pollutant that may be introduced to a surface water and still ensure that applicable water quality standards for that water are restored and maintained.”
- Or ... point source Wasteload Allocation [WLA] + nonpoint source Load Allocation [LA] + Margin of Safety [MOS]



## Basis for a TMDL

Federal Clean Water Act has required states to develop TMDLs since the 1970s

Federal law vague; left it to states to determine who needed TMDLs based on state water quality standards

New focus because of lawsuits and impacts on development



# Steps in TMDL Development

1. Assessment and 303(d) Listing
2. TMDL Development and Allocation
3. Implementation and Restoration
4. Monitoring and Evaluation

If State does not act, the EPA will



# Step 1a: Assessment

Water Quality Assessment Rules (Minn. R. 7050.0150 *et seq.*) – *updated*

Guidance Manual – identifies how MPCA conducts assessment

Assessment Cycle Transparency Document – identifies the data used

Use Attainability Assessment (UAA)



## Step 1b: 303(d) Listing

- Impaired waters must be placed on state's "303(d) List"
- 1 Lake/Stream Segment + 1 Pollutant = 1 Impairment
- TMDL must be developed in 13 years
- 2006 list – 1,013 lakes, 284 river segments, 2,250 total impairments



## Step 2a: TMDL Study / Report

- Stakeholders identified and convened to scope TMDL study and review outputs
- Consultants hired to collect data and conduct water quality modeling
- Draft TMDL report prepared by consultants under supervision of MPCA and stakeholders
- Public comment and review by MPCA
- Review and final approval by EPA



## Step 2b: TMDL Allocation

$$WLA + LA [+NB] + MOS = TMDL$$

- Point source wasteload allocation [WLA] – POTW's; industrial discharges; septic systems
- Non-point source load allocation [LA] – urban stormwater; lawn and farm field runoff
- Natural background contribution, if any [NB] – often included in nonpoint source LA
- Margin of safety [MOS] – a “fudge factor” for imperfect data and inability to predict the future



## *Friends of the Earth v. EPA (2006)*

- D.C. Circuit overturned two TMDL's for Anacostia River with annual CBOD and seasonal sediment targets
- Held that nothing in "TMDL" specifies anything other than "daily" loads – if intent of the CWA is for something else, then Congress should change it



## *Friends of the Earth v. EPA*

Nothing in this language even hints at the possibility that EPA can approve total maximum “seasonal” or “annual” loads. The law says “daily.” We see nothing ambiguous about this command. “Daily” connotes “every day.” ... Doctors making daily rounds would be of little use to their patients if they appeared seasonally or annually. And no one thinks of “[g]ive us this day our daily bread” as a prayer for sustenance on a seasonal or annual basis. ...



## *Pronsolino v. Nastri* (2002)

- Timber owners appealed sediment TMDL for Garcia River in California, which required only nonpoint sediment source controls
- 9<sup>th</sup> Circuit deferred to EPA position that a TMDL *can* control only nonpoint sources through BMP's, with a point source wasteload allocation of zero



## Step 3: Restoration

- Point Source Regulation
  - NPDES/SDS permits
  - Effluent concentration or mass limits
  - Pretreatment requirements
- Non-Point Source Regulation
  - Best Management Practices (BMP's)
  - Buffer strips; agronomic fertilization
  - Surface tile intake protection



## Step 3: Funding Options

- Federal resources – EPA, USDA, etc.
- WIF/SRF grants and loans
- TMDL Grants – 50% of capital cost
- CWLA Phosphorus Reduction Grants
- Small Community WW Treatment
- Clean Water Partnership / 319 grants



## Step 4: Monitoring / Evaluation

- NPDES permits typically require monitoring by point sources
- Metropolitan Council and public/private partnerships
- Volunteer monitoring efforts – Citizens Lake Monitoring, Stream Monitoring Programs

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# **Lower Minnesota River Dissolved Oxygen TMDL and Nutrient Trading**



# The Minnesota River is Green

1985 Wasteload Allocation Study identified need for a 40% reduction in upstream BOD

MPCA trend analysis found BOD at Jordan had declined 34% from 1977 to 2001

Phosphorus levels at Fort Snelling declined 35%; actual loading from Blue Lake and Seneca plants far below permitted levels

And yet ... DO levels still dropped below 5.0 mg/L during drought conditions in lower 22 miles of MN River



# Issues to be Addressed

A lot had changed since 1985 WLA

No data showed that P reduction would produce algal reduction

Many plants had been built or modified; others had rarely if ever monitored

Lake Pepin TMDL to be developed by 2010

Implementation would be expensive



# TMDL Development

- Tetra Tech EM, Inc. hired to develop water quality model
- HSPF model based on current loads to 61-day river conditions in Aug.-Sept. 1988
- 45-member stakeholder group convened to review model results, discuss allocation and implementation
- TMDL report approved by MPCA in May 2004; by EPA in Sept. 2004

# TMDL Allocation Results

	<u>61-day Low Flow</u>	<u>Lbs. P Per Day</u>
Point Sources	25,389	416
Nonpoint Sources	20,480	336
TMDL P Load	45,869	752



# Reduction Targets by Source

**POTWs:** 807 → 416 lbs. P per day  
(\$9 – \$22 million)

**Septics:** 50 → 6 lbs. P per day  
(\$247 – \$256 million)

**Stormwater:** 201 → 147 lbs. P per day  
(\$34 – \$100 million)

**Agriculture:** 179 → 179 lbs. P per day  
(\$9 – \$17 million)



# MESERB Trading Efforts

Volunteers began meeting Sept. 2003

Told MPCA in March 2004 they wanted point-point trading

- \* 35% P reduction in 5 years
- \* 1999-2000 baseline
- \* Separate 5- and 10-year targets

Formed MESERB committee June 2004; negotiated with MPCA



# TMDL Implementation

MESERB volunteers participated in implementation stakeholder group

Filed comments on possible approaches (CT and Neuse River)

Worked to resolve baseline data shortage issues without penalizing small or progressive POTWs



# “Hybrid” Solution for Phase I

May-Sept. 1999 – 2000 or best data  
based on 75% AWWDF

- \* < 2.5 mg/L: maintain performance
- \* 2.6 – 4.2 mg/L: reduce to 2.5 mg/L
- \* >4.2 mg/L: reduce 43%

Result: *Aggregate* 35% reduction by  
2010; most P reductions made by  
those most able



# Phase I Permit with Trading

## P reduction milestones

- ✓ 15% by 2008
- ✓ 25% by 2009
- ✓ 35% by 2010

## Monitoring requirements

- ✓ May – Sept.: 2x per week
- ✓ Oct. – April: 2x per month



# Nutrient Trading Mechanics

Trading one-to-one or through associations

Currency: Jordan Trading Units (JTUs)

- Each point source has JBOD Factor
- Trade ratio of 1.1:1

Documents filed with MPCA; trading  
May - September

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**What Did We Learn?**



# TMDL Survival Tips

- Is the use existing or attainable? Is it “impaired”? Use the UAA to find out
- Data is, more often than not, your friend – use data collection to your advantage
- Participate early and aggressively in TMDL development
- If you want to trade, *demand it early*



# What We Learned About Trading

- Establish a baseline – find data holes and plug them
- Organize volunteers – it takes money to run a trading program
- Negotiate a target that the traders and regulators can live with
- Be patient – setting up the program may take longer than you think



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