Water Quality Credit Trading Workshop

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Why Trade? TN Reduction Cost Comparisons

![Graph showing TN reduction cost comparisons for different categories of facilities. The graph compares the unit treatment cost ($) per lb across discharge limits (mg/L) for Base Case and Nonpoint Source. The categories include Nonpoint Sources (NP1, NP2, NP3), Wastewater Treatment Facilities (WT1, WT2, WT3), and Electric Power Facilities (EP1, EP2, EP3, EP4).]
## Why Trade?

- **Minnesota has:**
  - Two point-nonpoint permits
  - One basin overlay point-point permit

- Trading allows new NPDES discharge into a fully allocated river

- Saves on cost of upgrades for some

- Rahr Malting, point-nonpoint, costs per credit ~$3.50 (Feng Fang, JAWRA, 2005)

- Point-point trading costs $2 – $13 a credit

- Small WWTP upgrade costs of $0.5 M WQT 20-year costs ~$10K to $20K
Water Quality Credit Trading

**The Minnesota story**
- Regulatory requirements
- Estimation of credits
- Discussion on where trading works
- Why Minnesota trades
- Lessons learned
- Nonpoint site examples
### Regulatory Authority Requirements on Credits

- **“Credit” is a unit of mass for a given period of time**

- **A credit is:**
  - Accountable / enforceable
  - Additional to what is already being done
  - Equivalent, same time, same parameter and same location
  - Economic (decisions are the permittees)
### NPDES Permit Requirements for Trades

- **Enforceable NPDES permit provisions**
  - Monitoring and reporting requirements
  - Effluent limits
    - Conventional treatment requirements
    - Water Quality Credit Trading
  - Trading structure in special actions section
    - Coverage
    - Credit structure (organization)
      - Location factors
      - Equivalence factors (if appropriate)
  - Trade Ratio
    - Net benefit for water resource
    - Uncertainty factors (safety factor)
Generating a Credit

*Reductions beyond what’s required!*

- **Point sources (effluent mass limit)**
  - Trade credits created when treatment is beyond Water Quality Based Effluent Limits (WQBEL)
  - Monitoring and reporting
    - Daily flow and sufficient concentration sampling

- **NPDES permit adjustment**

Trading limits:

= old mass limit – credits obligated
### Generating a Credit

- **Non-permitted nonpoint sources**
  - Monitoring (establishment)
  - Modeling of load reduction
  - Uncertainty factor
  - Verification, adaptive management

- **Established baseline**
  - TMDL, rules or requirements not eligible
  - Legally binding agreements (civil contracts)

\[
\text{Credit} = \text{Load reduction} - \text{requirements}
\]
Wastewater Minimum Requirements

Total Phosphorus (mg/l)

- Raw: Must Treat
- Secondary: Tradable
- TMDL
Wastewater Minimum Requirements

Total Phosphorus (mg/l)

- Raw: Tradable = 0
- Past Standard: Tradable = 0
- TMDL: Tradable = 0

Must Treat
## Where Trading Works

- Regulators willing
- New plant in a capped watershed
- Existing facilities with new and expensive nutrient limits
- Confidence in supply of credits
- Efficient mechanisms for transaction cost management
Where Trading Works (continued)

- **Pollutant suitability**
  - Persistent in the environment
  - Cumulative source problem
  - Common to buyer and seller

- **Pollutant Parameters:**
  - sediment, nutrients, DO stressors

- **No bioaccumulative pollutants:**
  - mercury, pesticides, PCBs
Where Trading Works (concluded)

Watershed settings

- Scale of watershed ➔ large enough to provide multiple sources with excess reductions
- Will not “cause or contribute” to a water quality violation
  - Local hotspots
  - Watershed plan in place for water resource of concern
    - (TMDL, schedule, nondegradation, …)
Why Minnesota Trades

Resolves drivers and compliance uses

- **Managing TMDLs, measurable milestones**
  - Negotiation of wasteload allocations
  - Longer TMDL compliance schedules
  - Leverage cumulative source control
- **Manage future growth in a fully allocated water**
- **Leverage variance applications**
- **Implements emerging water quality issues**
  - Nutrient standards
Minnesota River Basin
Point - Nonpoint

SMBSC Facility

Dissolved Oxygen Impaired Reach

Rahr Malting Facility
## Two Types of Trades
### Same Issue

<table>
<thead>
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<tbody>
<tr>
<td>Multi-parameters affecting DO</td>
<td>Phosphorus</td>
</tr>
<tr>
<td>By sediment and sediment attached; erosion protection</td>
<td>By sediment attached phosphorus; erosion protection</td>
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<tr>
<td>Direct BOD/Ammonia</td>
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Phosphorus Causing Dissolved Oxygen Problems

Phosphorus

Increases algae

Algae die

Bacteria use oxygen as they break down algae

Other sources use oxygen (BOD*)

Results: decreased oxygen

MPCA TMDL
Rahr Malting Company
Southern Minnesota Beet Sugar Cooperative
## Lessons Learned

**Point - Nonpoint**

- **Individual permit public notice extended on both permits; resolving comments and concerns**

- **Understanding the watershed:**
  - High flow BMP contribution to low flow issues
  - Contributions from different sectors

- **Weak Law of Large Numbers; averaging works best across many sites**
Lessons Learned
Point - Nonpoint (Concluded)

- Administrative overhead high
  - Accountability Documentation
  - Door knocking for new sites

- Short Best Management Practice life versus long life or permanent easements

- Public concerns need to be addressed
  - “Buying their way out”
  - “NRCS erosion estimates are overestimating reality”

- Local champions are important
Minnesota River Basin Point to Point (2005)

Areas Covered By the Permit
- MN River Basin from Jordan to Shakopee
- MN River Basin Watersheds Upstream of Jordan

Areas Not Covered By the Permit
- Not Covered By Permit

Minnesota River Basin Phosphorus Permit Coverage
### Minnesota River Basin
#### General Phosphorus Permit

<table>
<thead>
<tr>
<th>Phase</th>
<th>Goal</th>
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| Phase I  
Collect data for use by other TMDLs |
| Phase II  
2010 – 2015 | Achieve 51% cumulative reduction  
1 mg/l TP effluent  
Adaptive management |
## Minnesota River Basin General Phosphorus Permit

### Initial coverage:
- 40 large continuously discharging WWTF (98% of WWTP loading)
- 29 smaller continuously discharging WWTF
- 71 controlled discharge ponds
- 12 unsewered and untreated communities
- Future growth
Lessons Learned

- MPCA pleased
- Developing state-wide rule
- Permit removed a pending law suite
- Managing future growth (4 new facilities) with no net increase in phosphorus loads
- Accelerated TMDL load reductions when compared to normal reissuance schedule
Lessons Learned (concluded)

- 2008 began reduction requirements
- 14 buyers and 3 sellers Traded (~1/3 of WWTPs required to reduce)
- Leveraged other WWTP to upgrade within this permit cycle
- Some plants will use trading in the long-term; those that have loadings that are slightly above their allocation
Rahr Malting, 8 Mile Creek
Rahr Malting, Rush River Site
Rahr Malting, Minnesota and Cottonwood River
SMBSC, Spring Cover Crops
58,832 Acres in 2005
SMBSC,
West Fork Beaver Creek
Water Quality Credit Trading Workshop

Questions