Phosphorus Management in Wisconsin: Big Changes A Comin’

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Cleaning Water Today For Tomorrow's Generations
Lower Green Bay and Fox River Examples of Water Resource Degradation

- Water quality gradient from Fox River mouth to mid-bay
- Inner Bay 90% Fox River water
- Annual phosphorus load from Fox River 500,000-750,000 kg/yr
- Annual TSS load from Fox River to Green Bay averages 100-300 million kg/year (equivalent of 27 dump truck loads of sediment per day)

Modis Satellite Image from May 19, 2000
Sources of Phosphorus to Green Bay from Fox River

- 80% of phosphorus load comes from soil erosion, animal waste, fertilizers, urban stormwater and other “nonpoint sources” in Fox-Wolf Basin
- 20% of phosphorus load comes from sewage and industrial wastewater discharges
Impaired Waterways in Wisconsin

- **Phosphorus**
  - Nutrient found in fertilizers, dish soap, laundry detergent, etc.

- **In excess, can cause:**
  - Nuisance algae blooms, including toxic algae conditions
  - Low dissolved oxygen levels in streams and lakes
  - Negative impacts on swimming and fishery uses, and decreases tourism

Runoff from Agricultural Field; Tributary Stream to Ashwaubenon Creek

The Lower Fox River at Kimberly, WI
June 2007
Phosphorus Impaired Waterways

- **Statewide**
  - 20% Point Sources
  - 80% Nonpoint Sources
- **Point Source**: An industry, wastewater treatment plant, or other that has a pipe leading directly to water
- **Nonpoint Source**: Farm, rural, or urban runoff

Map prepared by UW-Extension Environmental Resources Center
Estimated Annual Phosphorus Loading to Lower Green Bay from the Fox/Wolf Watershed Basin

- Point Sources: 22.6%
- Nonpoint Sources: 77.4%
Adopted Phosphorus Standards

- Water bodies on DNR’s Impaired 303d List
- Proposed Phosphorus Limits
  - 100 ug/L (100 ug/L) for rivers
  - 75 ug/L (75 ug/L) for streams
  - Lakes and reservoirs (15-40 ug/L)
  - Lake Michigan (7 ug/L)
  - Lake Superior (5 ug/L)
Phosphorus Rule Changes

- NR 102 and NR 217 changes became effective December 1, 2010
- NR 151 changes became effective January 1, 2011
  - Considered “quasi-enforceable”; only if cost share available
- Guidance for permit writers in draft form in September 2011
  - WQBEL calculation process
  - Adaptive Management Option
  - Areas with approved TMDLs
- Governor’s attempt to postpone implementation of new P limits until ~ June 2013; repeal higher TSS control standard in NR 151
Impacts to WPDES Permittees

- Many permitees now looking at phosphorus limits of 0.1 mg/L or less
- Preliminary review suggests that most facilities will need to install tertiary treatment to comply
- Major concern expressed during NR 217 process that desired level of water quality improvements would not be met even with major expenditures by point sources
- Input from stakeholders led to DNR inclusion of flexibility in final rule package
Opportunities For Creative Solutions

- Adaptive Management
  - Develop and implement a plant to reduce phosphorus in the watershed; provide flexibility to WWTP’s
- Trading
  - Work with other sources of phosphorus to reduce loadings at a lower cost
TMDL Impacts

- Permit renewal process will evaluate WQBEL vs TMDL derived P limit
- TMDL limit implemented in accordance with NR 217 (i.e. AM option available) - *assumed*
- Compliance schedule may be affected; in any case will require evaluation of watershed improvements at each permit renewal
Adaptive Management

- Applies in nonpoint source dominated watersheds
- Permittee prepares complex Adaptive Management Plan (= “watershed plan”) document
- Permittee agrees to monitor stream; prepares discharge optimization plan
- Permittee agrees to interim limits (six month averages)
  - First permit cycle: 0.6 mg/L (evaluate)
  - Second permit cycle: 0.5 mg/L (evaluate)
  - Third permit cycle: calculated WQBEL (if necessary)
Adaptive Management (cont.)

• Permitee develops and helps implement plan with partners to control urban storm water and nonpoint sources in watershed

• Compliance Plan developed on case-by-case basis; DNR evaluates each permit cycle

• Permitee agrees to reporting requirements

• Success demonstrated by water quality improvements
An exchange of pollutant reduction credits

A buyer can purchase credits from a willing seller

Can be a cost-effective tool for overall management of water quality in a given watershed, but must result in a net reduction of the pollutant being traded

May provide ancillary benefits such as flood retention, riparian and habitat improvements
The ABCs of Pollutant Trading

- Can theoretically be point – point, point – nonpoint, nonpoint – nonpoint (less likely)

- TMDL Basics:  
  \[ \text{TMDL} = \text{WLA} + \text{LA} + \text{MOS} \]
  Where:
  \[ \text{TMDL} = \text{Total Maximum Daily Load} \]
  \[ \text{WLA} = \text{Wasteload Allocation (point sources)} \]
  \[ \text{LA} = \text{Load Allocation (nonpoint sources)} \]
  \[ \text{MOS} = \text{Margin of Safety} \]
EPA Guidelines

- Has ultimate approval authority for a State’s Trading Program
- Must comply with Clean Water Act
- Will not approve trading to meet a federal technology based limit
- Issues of significance to WI effort:
  - Units of trade
  - Timing of credits
  - Managing uncertainty (i.e. trading ratios)
  - Compliance and enforcement
  - Public notice
  - Program Evaluation
Drivers for Trading

- Early investigations showed absence of drivers:
  - WPDES permit holders typically did not need to buy credits to maintain compliance with WPDES permits
  - Revisions to NR 217 brought new focus to trading
Recent Wisconsin History

- Pilot study for trading previously authorized by legislature for Fox, Rock and Red Cedar basins
- NR Board requested DNR to assemble stakeholder group to develop trading framework and report back to Board by July 1, 2011
- Committee formed and began meeting in October 2010
- Trading Framework presented to NR Board in July 2011
Trading Framework Components

Preliminary Issues:
- Guidance for when and where trading is allowed
- Legal authority and statutory changes
- Quantifying credits and addressing uncertainty
- Compliance and enforcement

Watershed Specific Issues:
- Definition of baseline
- Calculation of trade ratio
- Determination of trade duration
- Pollutants to be included
- Trade administration
Key Considerations

- Trade duration – Five-year limitation
- Location – point sources not comfortable paying for improvements outside their service area
- Baseline determination (i.e. use of PI or TMDL allocation?)
- Interim Trade Concept (good for one permit term only)
- Incorporation of TMDL considerations
  - Trade location broader than NR 217 permit determination process
- Trade Ratio
  - @ 3:1 all economic incentives essentially lost
  - Uncertainty needs to be considered (i.e. different form of cmpd)
More Considerations

- Trade Administration
  - For the watershed (DNR says “not them!”; broker?)
  - For the individual trade – permittee likely to assume all aspects, including liability, contract administration
  - Application process will require significant effort on an ongoing basis
- List of BMPs to be developed by DNR, including approvable practices, lifespan, available credits, appropriate trading ratio
  - Quantification of credits may require site modeling
Trading Realities

- Will trading ever be a panacea for permit compliance?
  - Not likely
- Might trading be an option for some permittees to meet interim or ultimate limits if they are already close?
  - Probably
- Do we still have a lot of details to finalize before the answers to these and many other questions will be determined?
  - Undoubtedly!
- Does it make sense to continue this effort?
  - Absolutely!
Summary of Impacts to WPDES permit holders

- WQBELs – from NR 217 or TMDL
- Compliance Schedules – may be three (or may be even four!) permit cycles in length, but may be modified by DNR at each renewal
- Permitee may have options, but will assume more administrative responsibilities
- Lots more work associated with permit renewals
- Lots more work to administer permit conditions and comply with reporting requirements
Next Steps

- Learn as much about these issues as you can!
- Plan out the required steps for your next WPDES permit renewal process
- Learn more about your watershed; who are your potential partners?
- Think about who might be best situated to serve as a “Trade Broker” in your watershed
- Learn who has receiving water quality data for your area. If nobody, think about how you can start the process
Additional Resources

- FAQs for Phosphorus Regulations

- Trading stakeholder meeting information & Framework Report:
  - http://fyi.uwex.edu/wqtrading

- DNR trading update webinar presentation (2/10/11)
  - http://fyi.uwex.edu/wqtrading/resources