

Phosphorus Management in Wisconsin: Big Changes A Comin'

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Green Bay Metropolitan Sewerage District
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



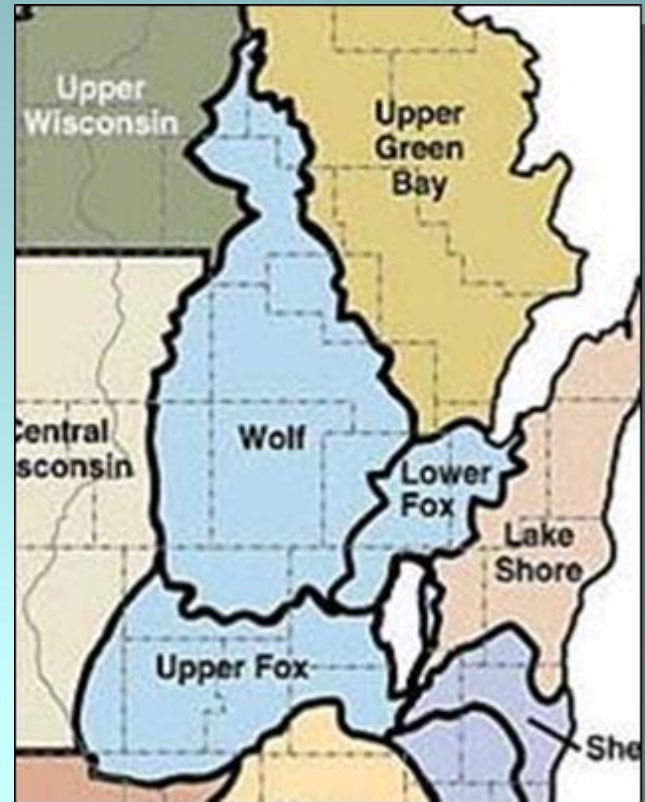
The Lower Fox River at Kimberly, WI

June 2007

Runoff from Agricultural Field;
Tributary Stream to Ashwaubenon Creek

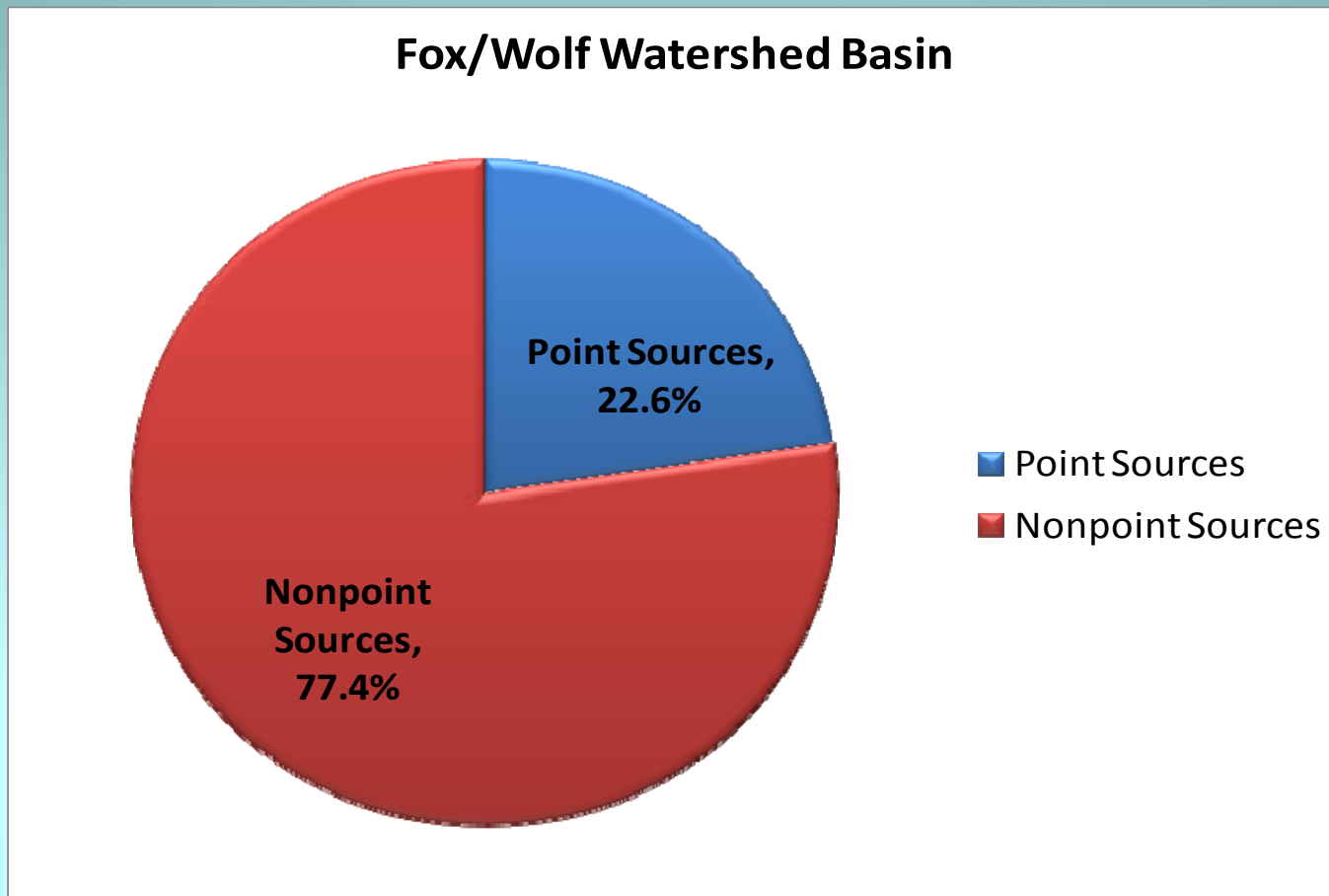
Phosphorus Impaired Waterways

- **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



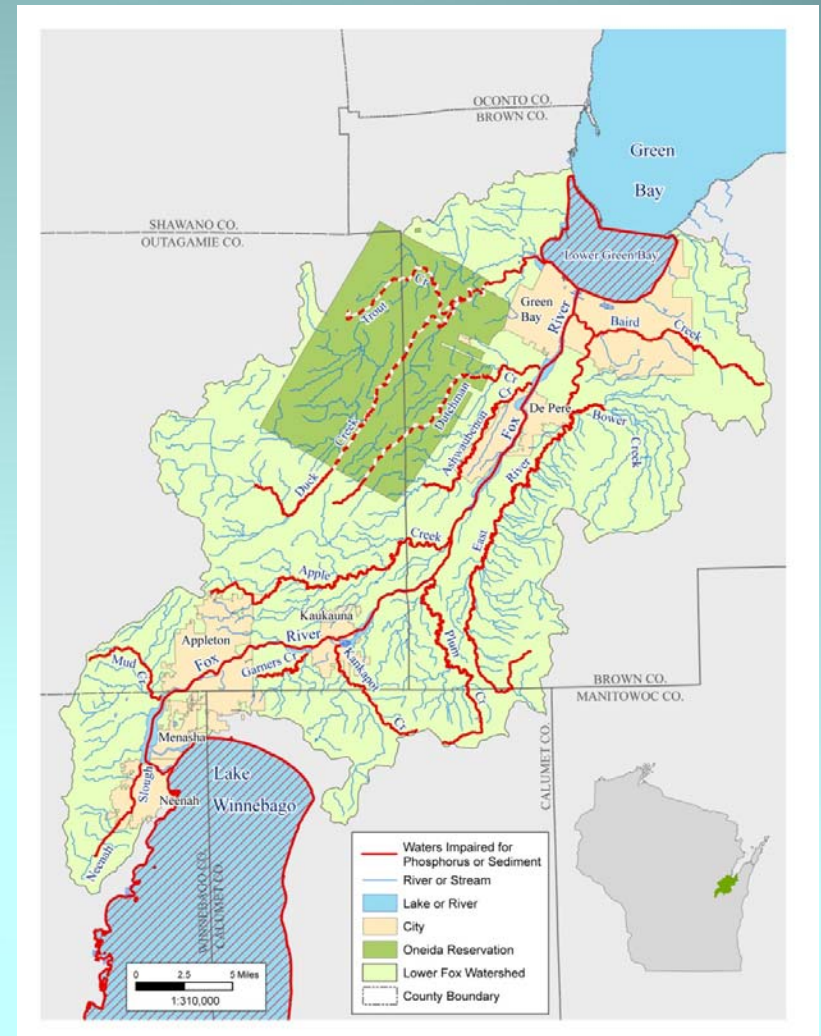
Map prepared by UW-Extension
Environmental Resources Center

Estimated Annual Phosphorus Loading to Lower Green Bay from the Fox/Wolf Watershed Basin



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 permittees 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.*)

- Permittee 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
- Permittee agrees to reporting requirements
- Success demonstrated by water quality improvements

Water Quality Trading Concept

- 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: $TMDL = WLA + LA + MOS$

Where:

TMDL = Total Maximum Daily Load

WLA = Wasteload Allocation (point sources)

LA = Load Allocation (nonpoint sources)

MOS = 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 compd)

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
- Permittee 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
 - <http://dnr.wi.gov/org/water/wm/wqs/phosphorus/index.htm>
- 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>



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