

# Lower Fox River Total Maximum Daily Load (TMDL) Northeast Wisconsin

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NACWA Presentation  
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Some Slides Courtesy of the  
Wisconsin Department of Natural Resources



# GBMSD Green Bay Facility





# GBMSD De Pere Facility



# A TMDL is:

The amount of a pollutant a stream, river, or lake can receive before exceeding water quality standards.



Runoff from agricultural field;  
Tributary Stream to Ashwaubenon Creek



The Lower Fox River at Kimberly, WI  
June 2007





TMDL =

LA  
(load allocation)

+

WLA  
(waste load allocation)

+

MOS  
(margin of safety)

# Why a TMDL for the Lower Fox River Basin and Green Bay?

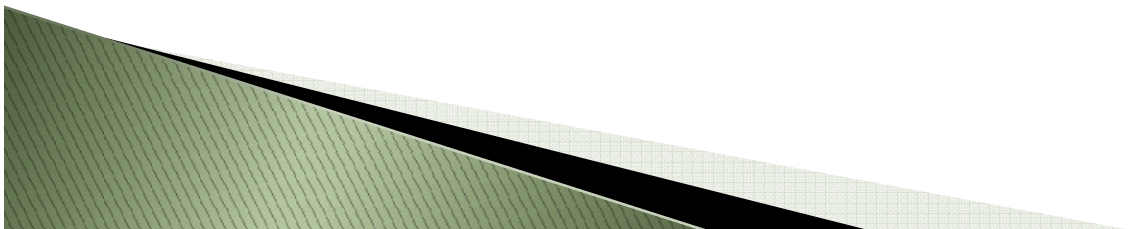
- ▶ This basin has been studied for over 25 years
- ▶ Complex watershed
- ▶ Drains to Lake Michigan (potential for more grant \$)



Example of 100 feet vegetated buffer, WI

# Proposed Ambient Phosphorus Standards for Wisconsin Waters

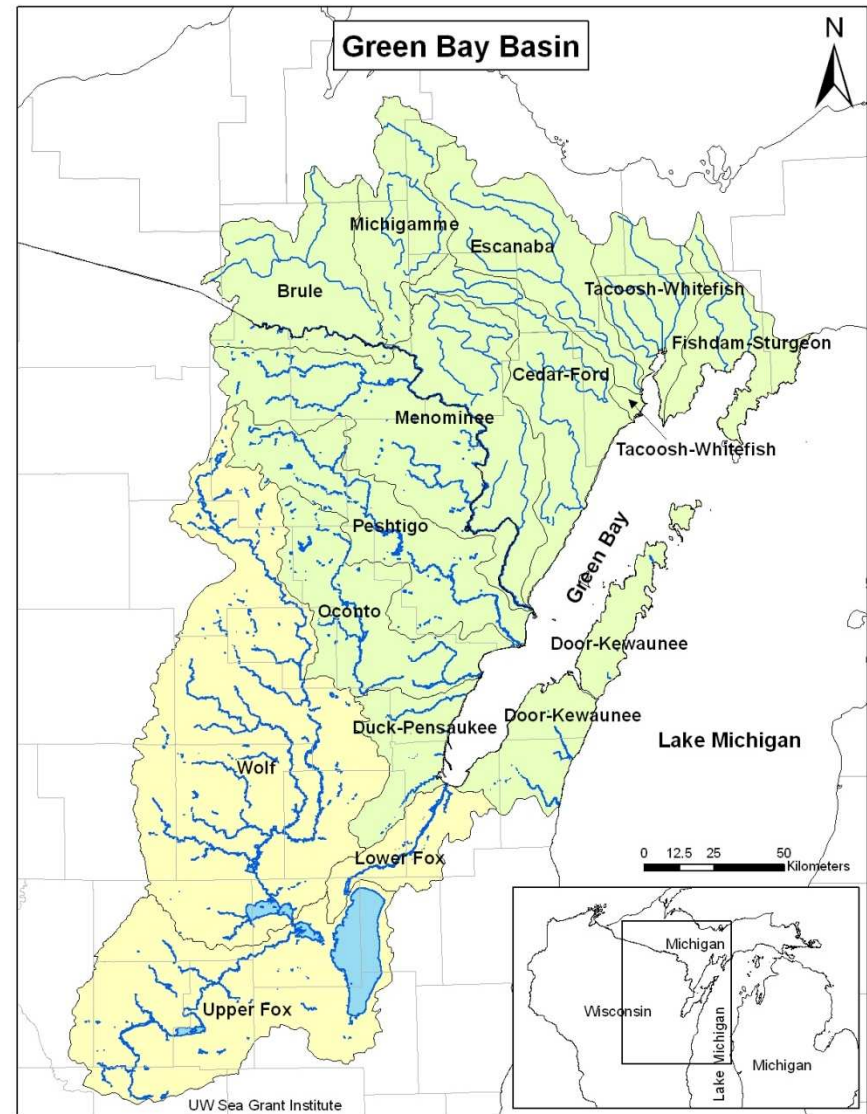
- ▶ 100 ug/l (0.1 mg/l) for rivers
- ▶ 75 ug/l (0.075 mg/l) for streams
  - Everything with unidirectional flow, that is not a river
- ▶ Just over half of all Wisconsin streams would not meet these standards.





# Green Bay Basin

- ▶ 1 / 3 of entire Lake Michigan drainage basin
- ▶ 11 major tributaries – Fox River is most significant
- ▶ Fox–Wolf River basin exerts tremendous influence and contributes the largest proportion of pollutants to Lake Michigan
  - 26% of TP tributary load
  - 57% of PCB tributary load
  - 44% of total Hg tributary load

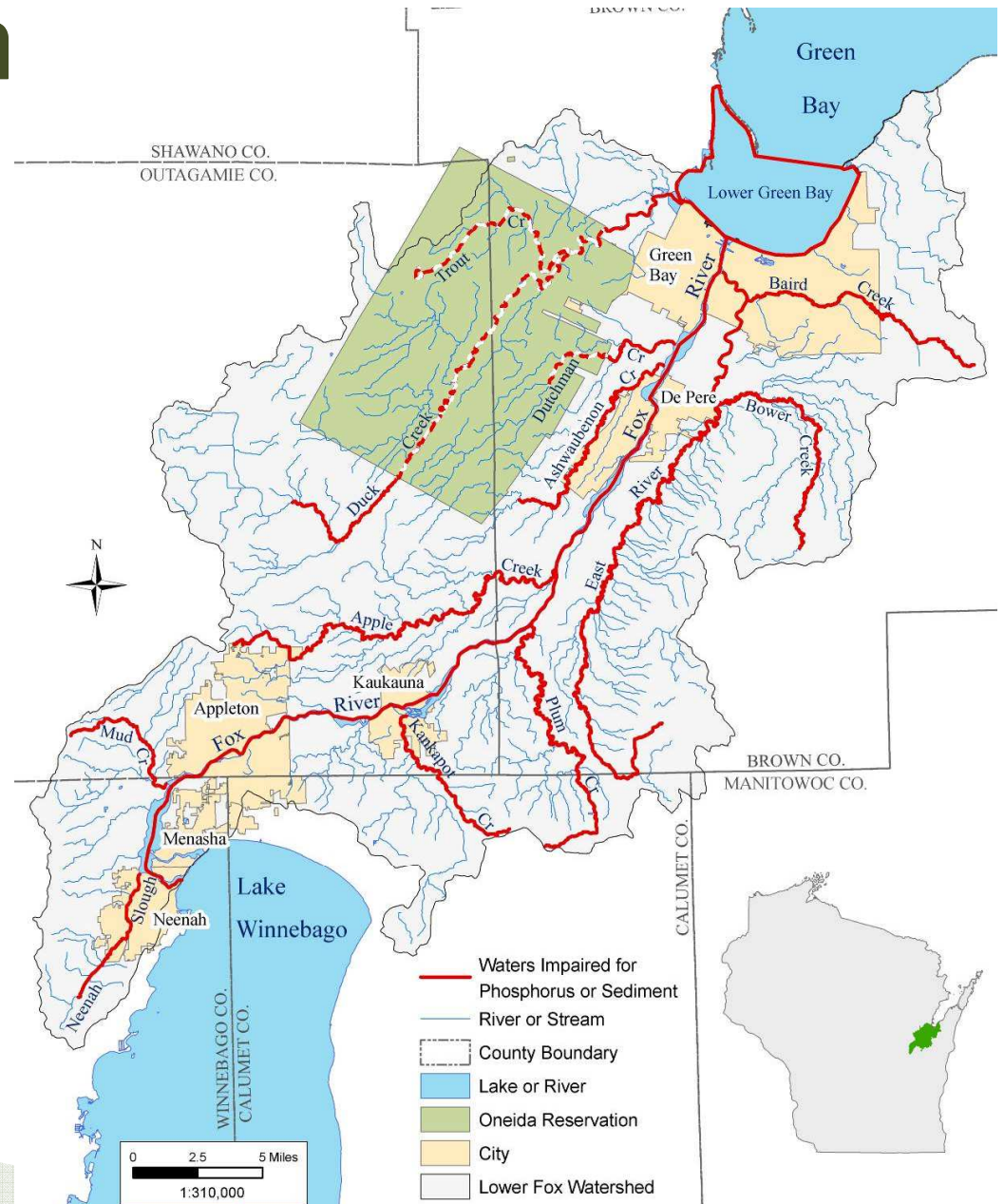




# Impaired Waters in the Lower Fox River Basin

## Pollutants of Concern:

- ▶ Phosphorus (P)
- ▶ Total Suspended Solids (TSS)



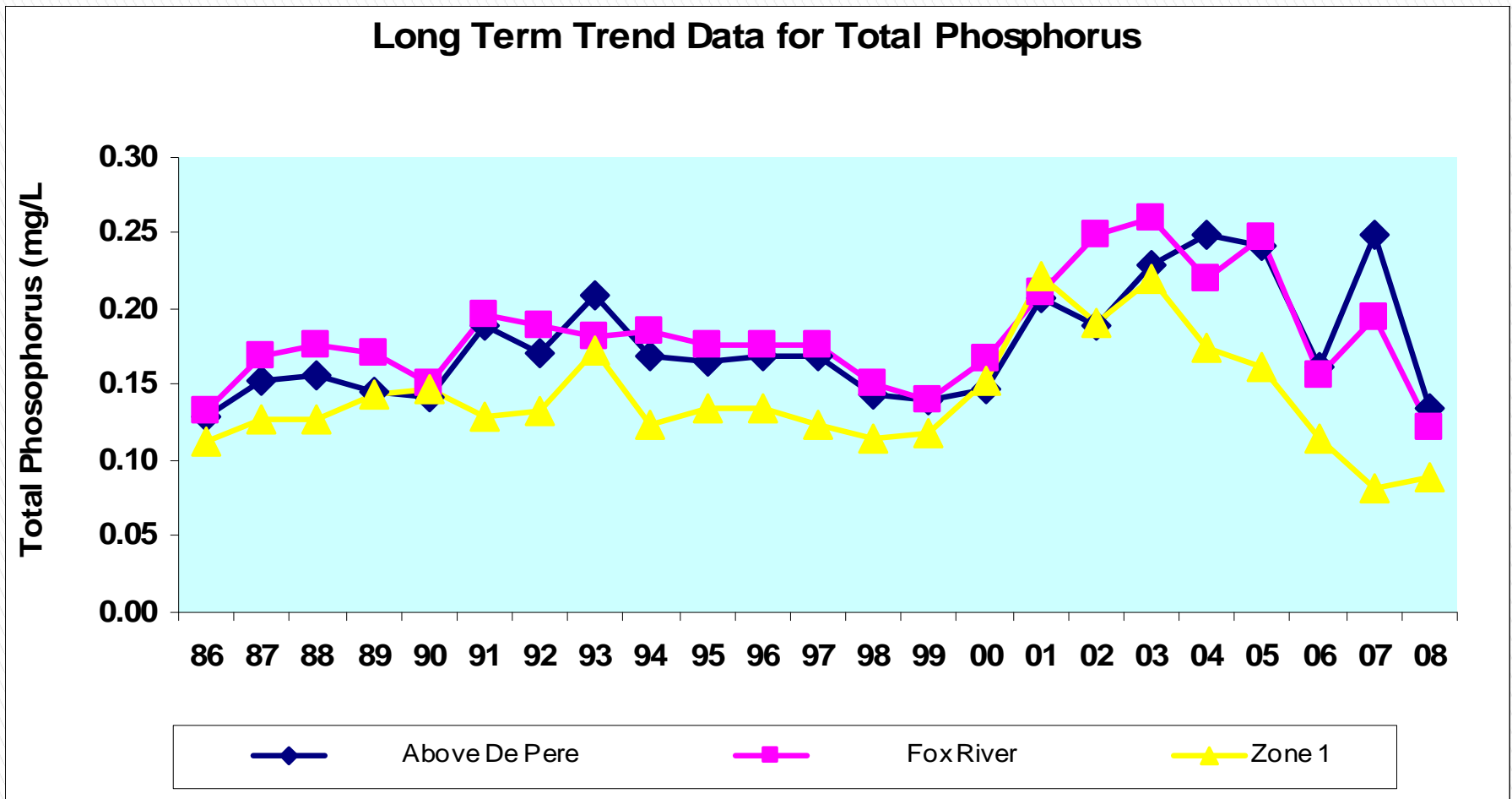
# Impaired Waters in the Lower Fox River Watershed

Apple Creek	Lower Green Bay
Ashwaubenon Creek*	Lower Fox River
Baird Creek	Kankapot Creek
Bower Creek*	Mud Creek
Duck Creek	Neenah Slough
Dutchman Creek	Plum Creek
East River	

\*Waters proposed for the 2008 Impaired Waters List

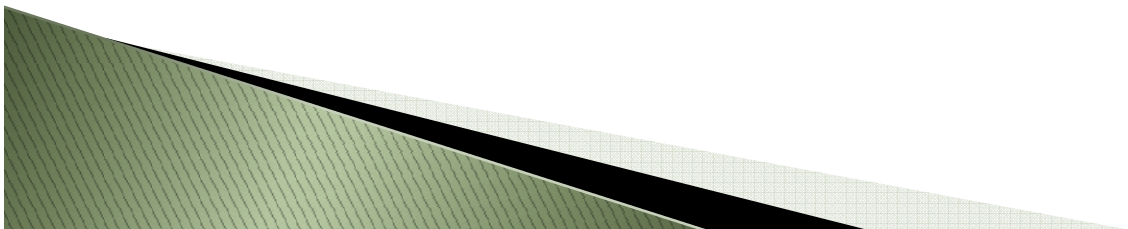


# GBMSD Program Monitoring Data



# The LFR Basin and GB TMDL: A Phased Approach

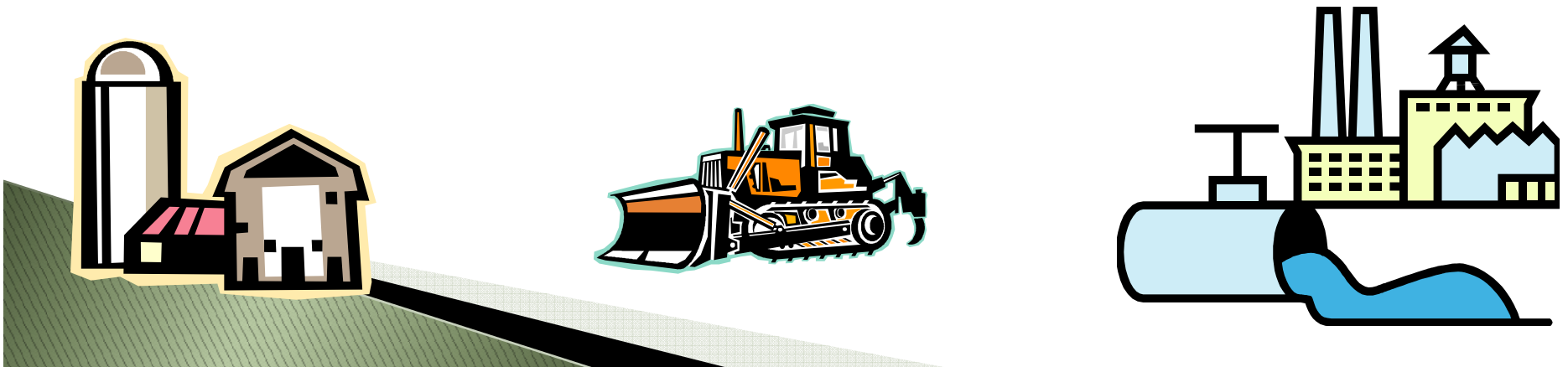
- ▶ Phase I: Cost Effectiveness Preliminary Study
- ▶ Phase II: Engaging Stakeholders & the Scope of Work
- ▶ Phase III: TMDL Development
- ▶ Phase IV: TMDL Implementation





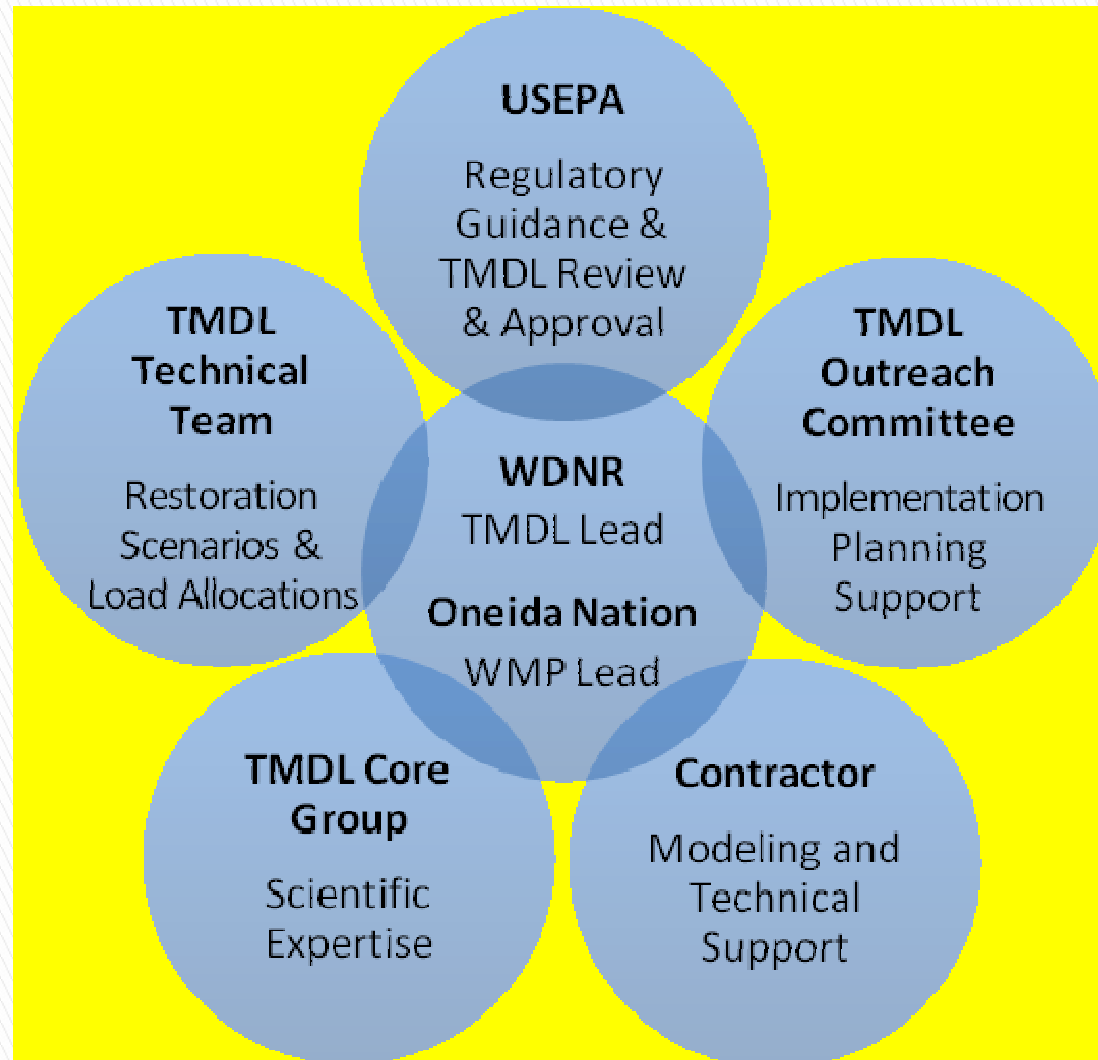
# Phase I: Cost Effectiveness Study Preliminary Report Results

- ▶ More cost-effective to focus on nonpoint implementation (i.e. agricultural BMPs)
- ▶ Update point source data
- ▶ Attempt to incorporate urban stormwater and construction site BMPs into model



# Phase II: TMDL Development

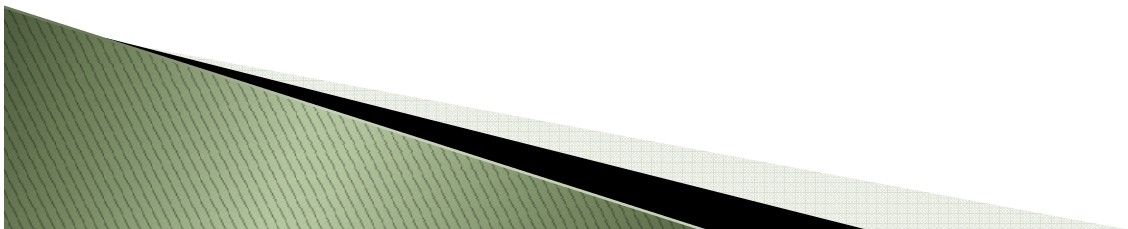
## Key Players



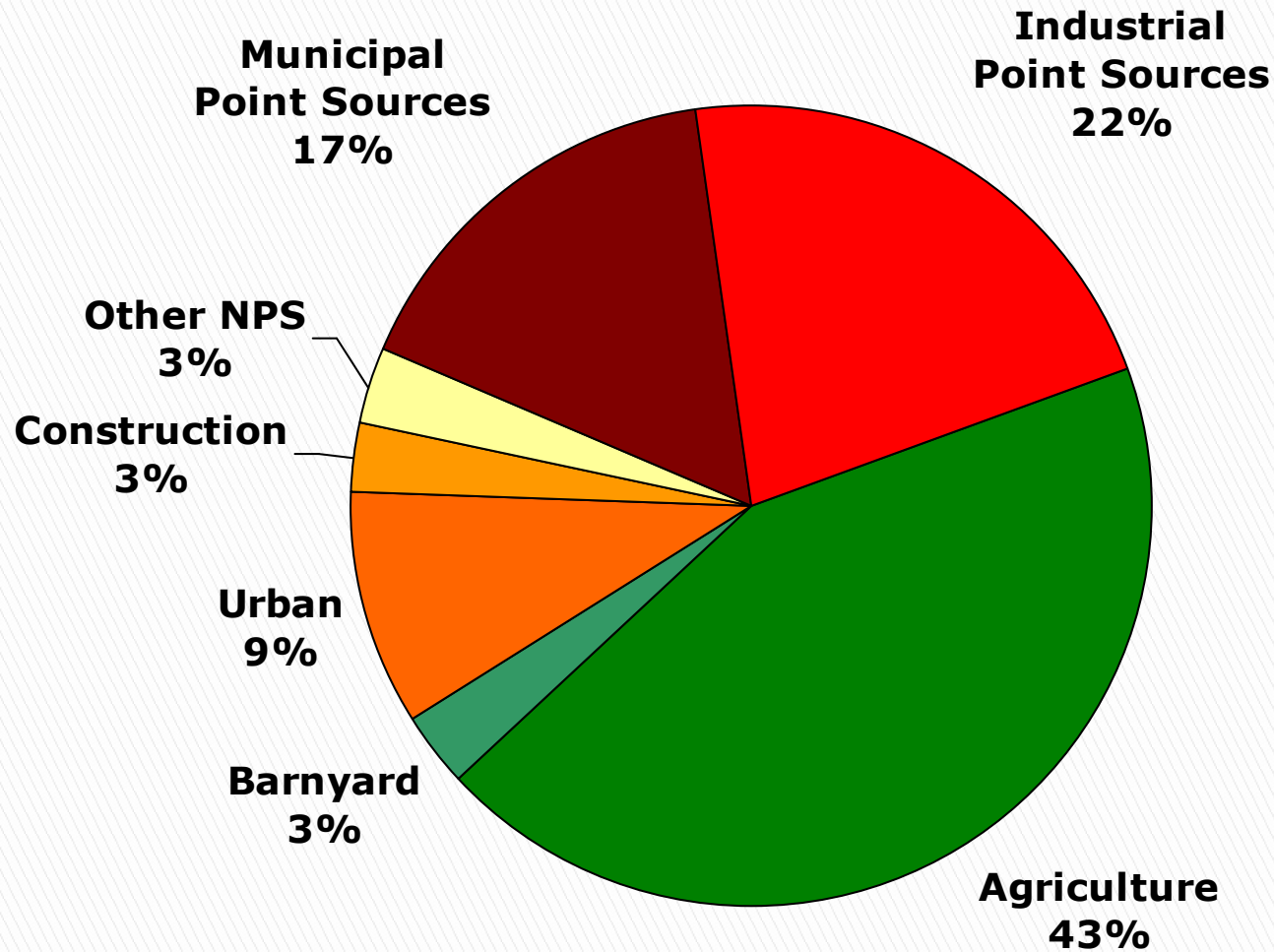


# Phase III: TMDL Development

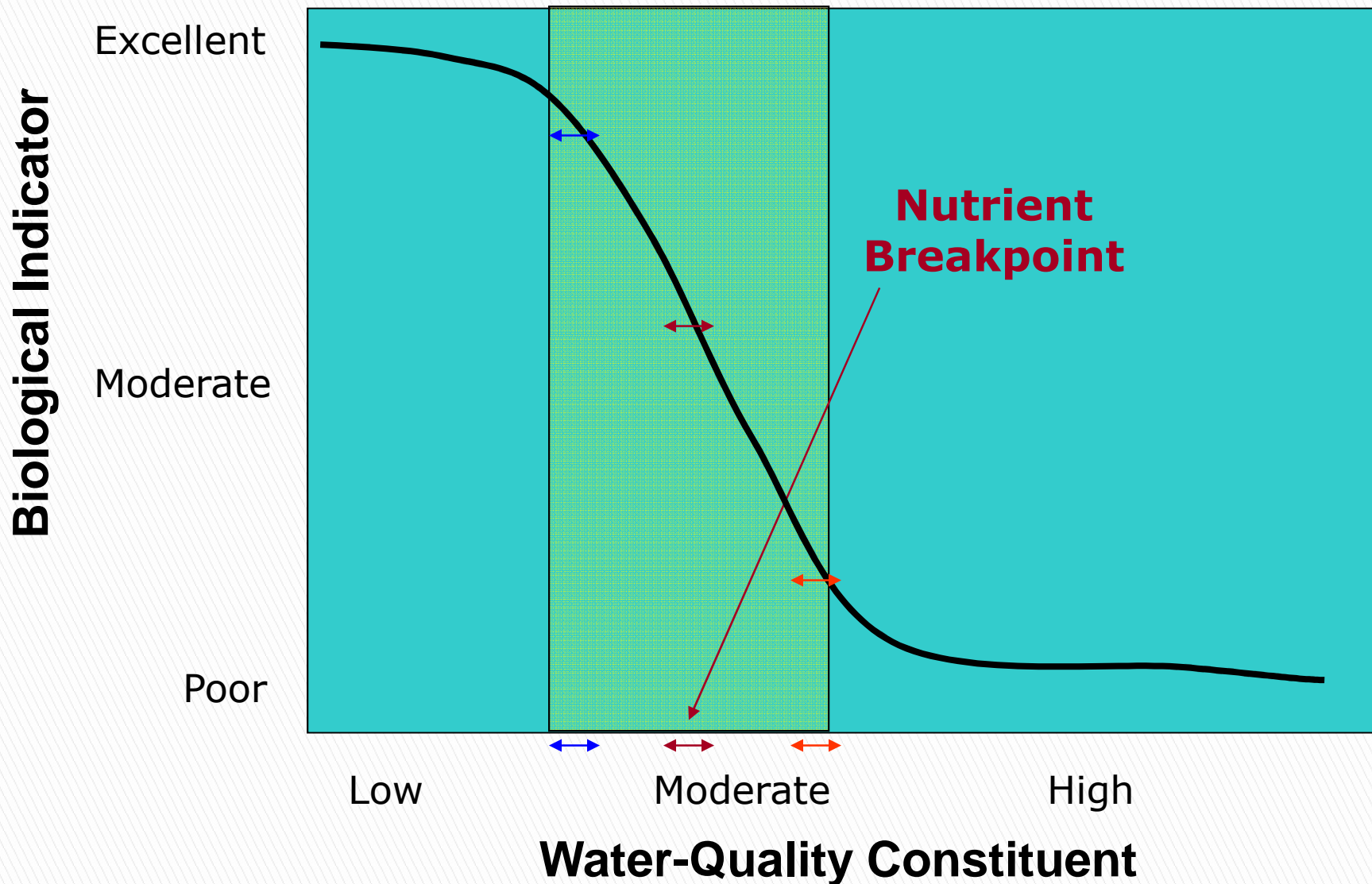
- ▶ Defining Water Quality Targets
- ▶ Exploring different restoration scenarios
- ▶ Determining reductions needed for all sources – (allocations)
- ▶ Draft Report
- ▶ Final Public Meeting



# Estimated Annual Phosphorus Loading to Lower Fox River



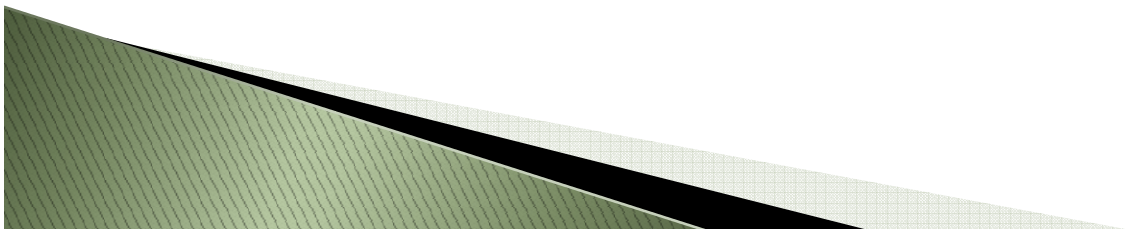
# Theoretical Biological Response to Increases in Nutrient Concentrations - Threshold/Breakpoint Approach





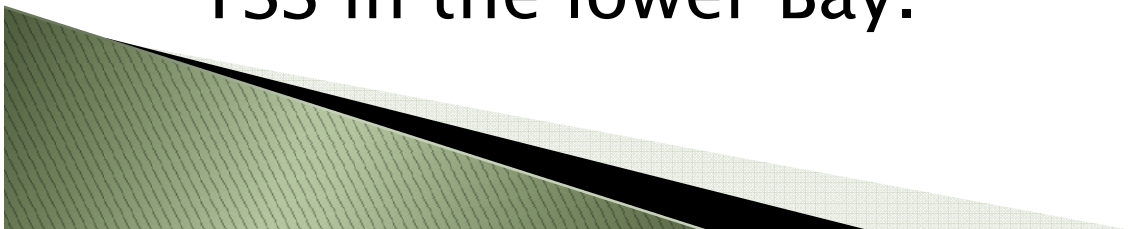
# Status of Allocation Process

- ▶ Targets committee used SWAT model to evaluate total loadings of P and TSS for the Lower Fox basin.
- ▶ Determined that half of the P entering Green Bay from the basin comes from Lake Winnebago.
- ▶ Of the P loadings within the LFR basin itself, 52% come from nonpoint and 39% from point sources.



# Status of Allocation Process

- ▶ Targets report presented allocation scenario beginning with 50% reduction of both TP and TSS from Lake Winnebago.
- ▶ Further reduction of 50% P from all LFR sources to achieve the TMDL/statewide goal of 100 ug/L TP in the lower Bay.
- ▶ Further reduction of 65% TSS from all LFR sources to achieve the TMDL goal of 16 mg/L TSS in the lower Bay.

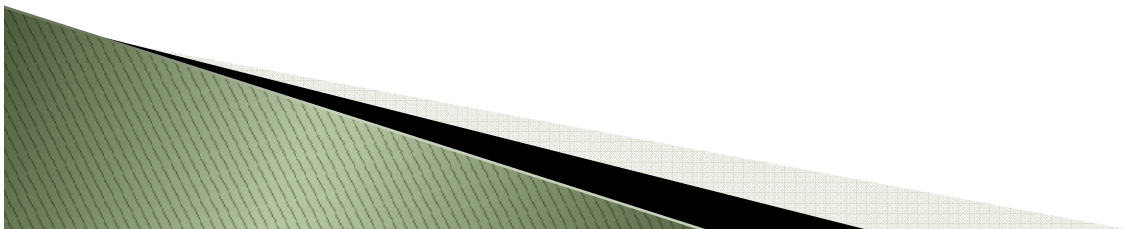
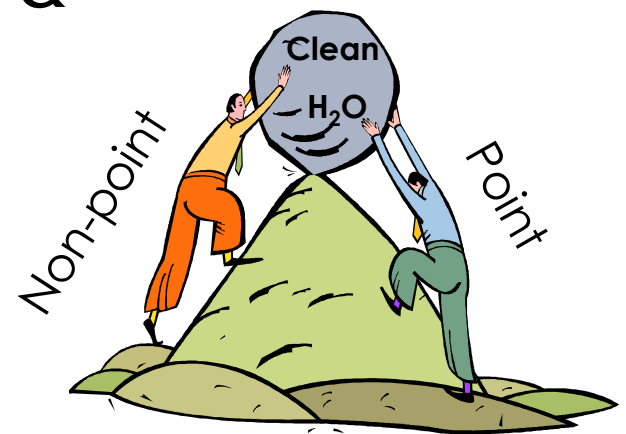


# Allocation Process

How much reduction is needed?

How much can each source still contribute?

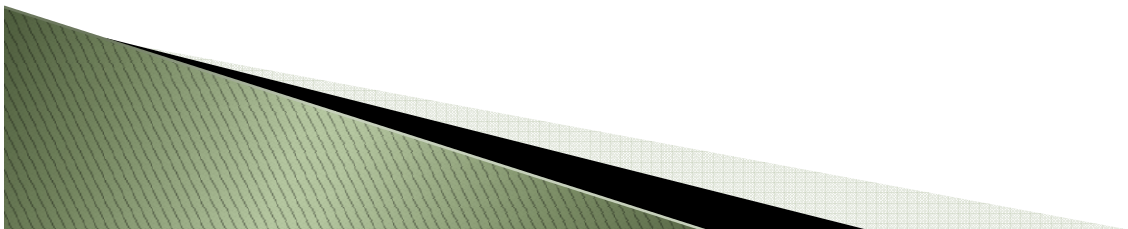
- ▶ Determines point source loads & nonpoint source loads
  - Includes a Margin of Safety
  - Considers growth
  - Considers seasonal changes
  - Expressed as a daily maximum amount





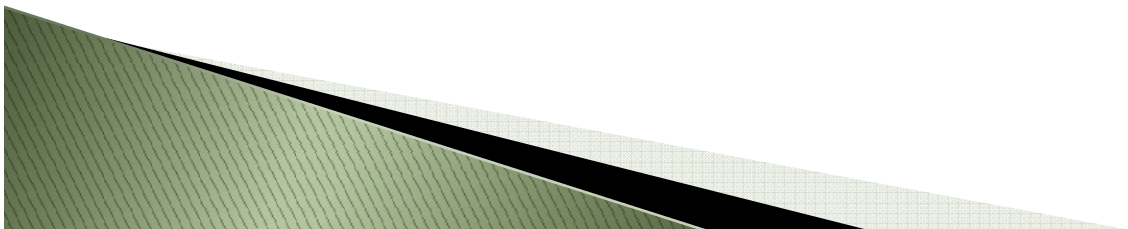
# Phase III: Development

- ▶ Modeling and reporting will be completed by contractor
- ▶ Will hold two more public meetings: one for restoration scenarios, one final meeting once draft is completed
- ▶ Draft completed by Fall 2009
- ▶ Final to be approved by EPA



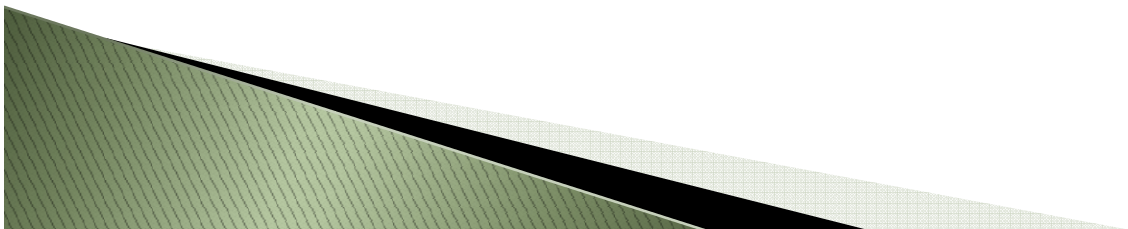
# Phase IV: Implementation

- ▶ Implementation Plan will be included in final TMDL report
- ▶ Required for permitted entities
  - WPDES (municipal, stormwater, industrial dischargers)
- ▶ Required for nonpoint sources when cost-share resources available
- ▶ The ultimate goal is to de-list waters



# What would comprise our best measure of success?

- ▶ Stakeholder participation
- ▶ Allocation scenario accepted by both sides
- ▶ Optimization model outputs believable and achievable
- ▶ Measured progress towards load reductions
- ▶ Ultimate improvement in ambient water quality





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