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# Statewide Total Maximum Daily Load (TMDL) Update

**Government Affairs Seminar, February 26, 2015**

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Strand Associates, Inc.®**

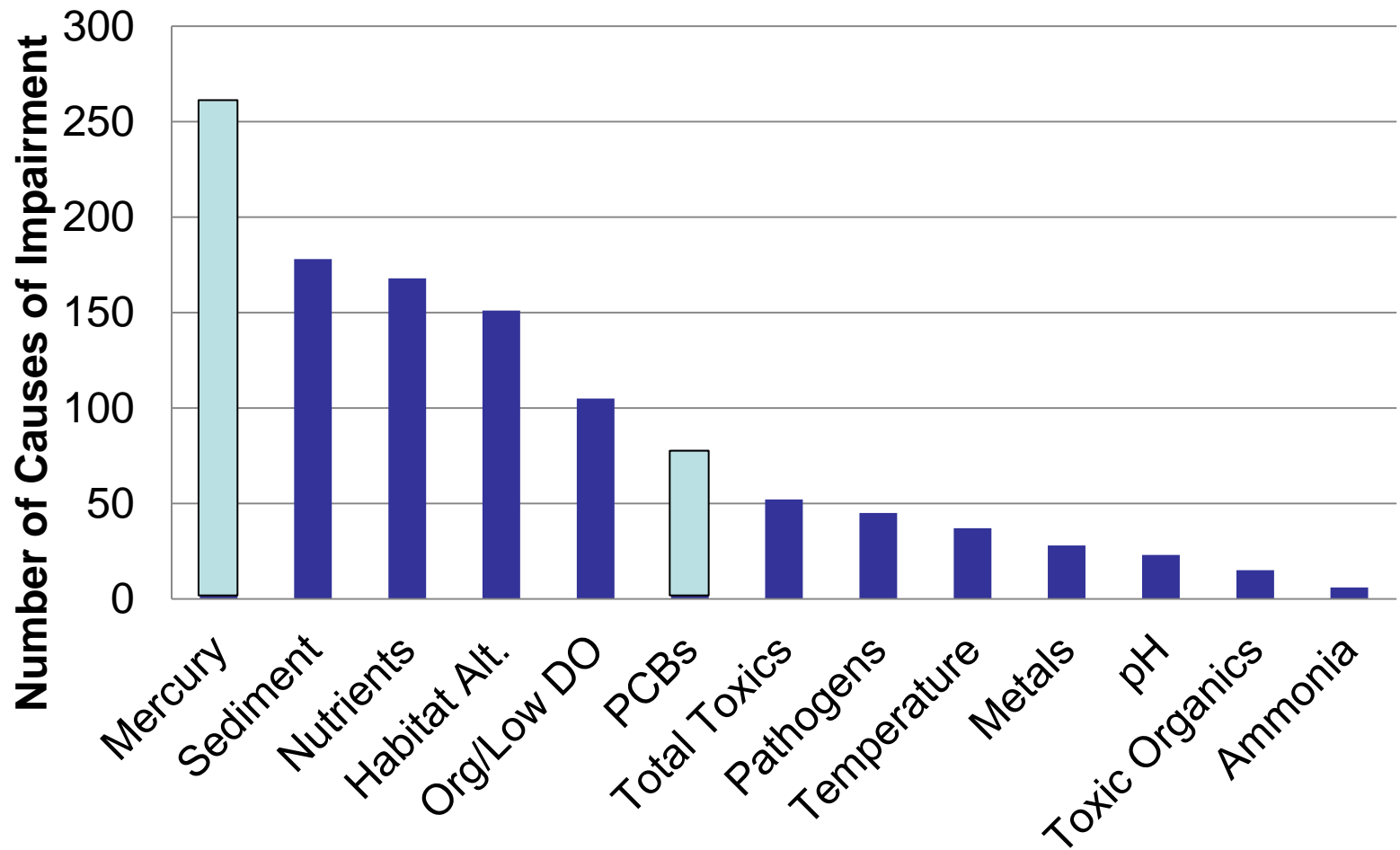
**Co-Author: James E. Kleinschmidt, P.E., ENV SP  
Baxter & Woodman**



# Focus of Presentation

- Background: Wisconsin's impaired waters and Total Maximum Daily Loads (TMDL)
- Approved TMDLs and implementation
  - Wastewater and stormwater permit impacts
- TMDLs currently in development
- Ideas for improvements
- Recommendations for dischargers

# Primary Causes of Impairments in Wisconsin



# What is a Total Maximum Daily Load (TMDL)?

- A TMDL (or similar) is required for impaired waters
- TMDL = the amount of pollutant that a waterway can receive and still meet water quality standards
- TMDL = load allocations (nonpoint sources) + waste load allocations (point sources) + margin of safety
- Point sources include wastewater and WPDES-permitted stormwater
  - United States TMDLs completed: 68,336
  - Wisconsin TMDLs completed: 247 (0.4%)  
primarily for sediment/TSS and TP

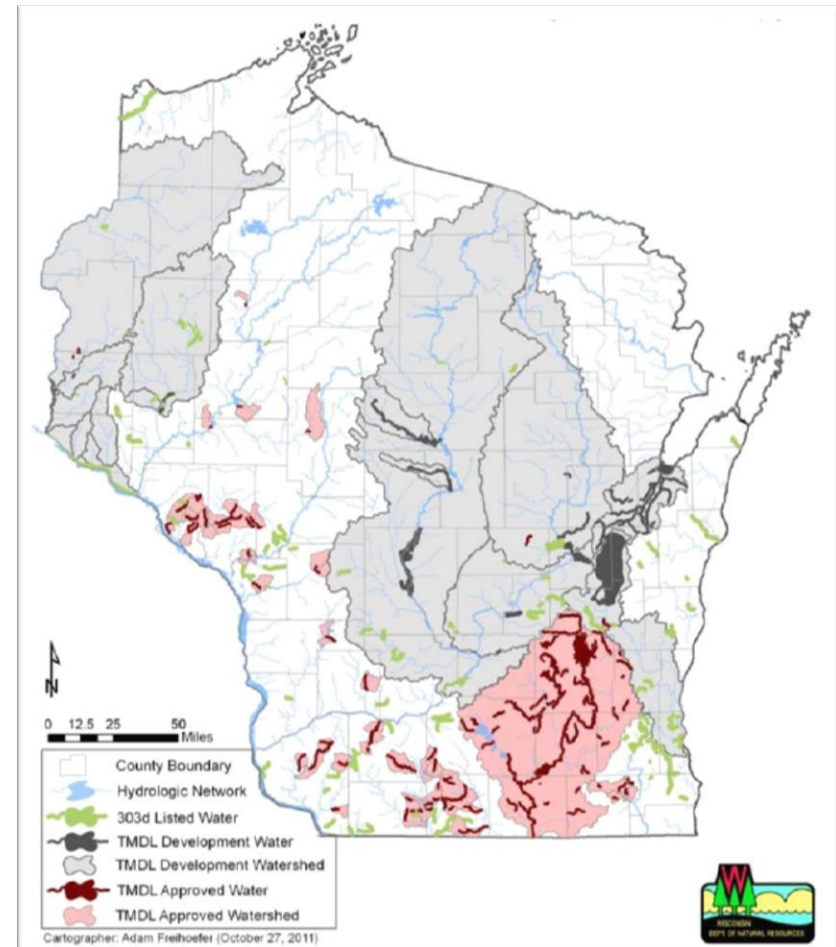
# Wisconsin TMDLs

## Approved:

- Rock River Basin (2011 - *Mark Riedel*)
- **Lower Fox River/Green Bay (2012)**
- **Red Cedar River (2012)**
- **Lake St. Croix (2012)**
- Many others, mostly for sediment

## In Development:

- Wisconsin River (2016 ? - *Rich Boden*)
- **Milwaukee River Basin (2015?)**
- **Upper Fox/Wolf (2016?)**
- Lake Mallalieu/Willow River near Hudson

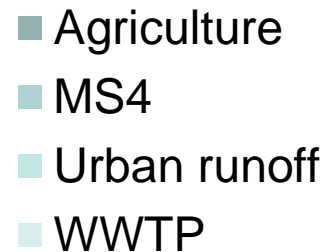


Source: WDNR

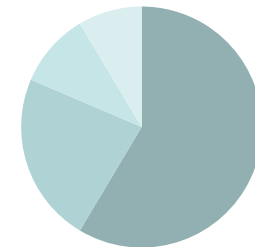
# Allocations in TMDLs

- 19 allocation methods described in USEPA Guidance
- “Lowest Total Cost” method would be ideal
- “Proportional” allocation method is common in WI:

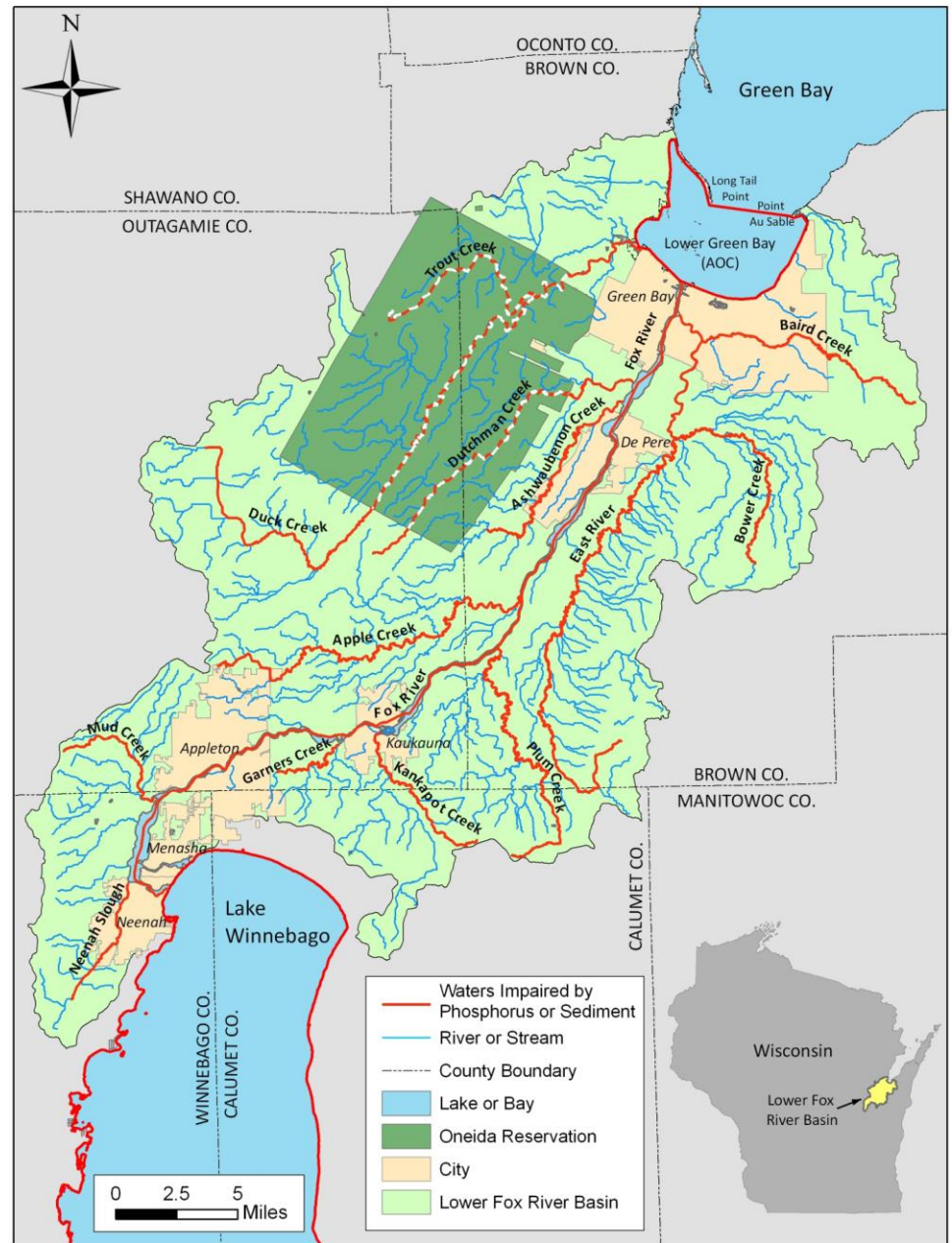
## Baseline



## TMDL

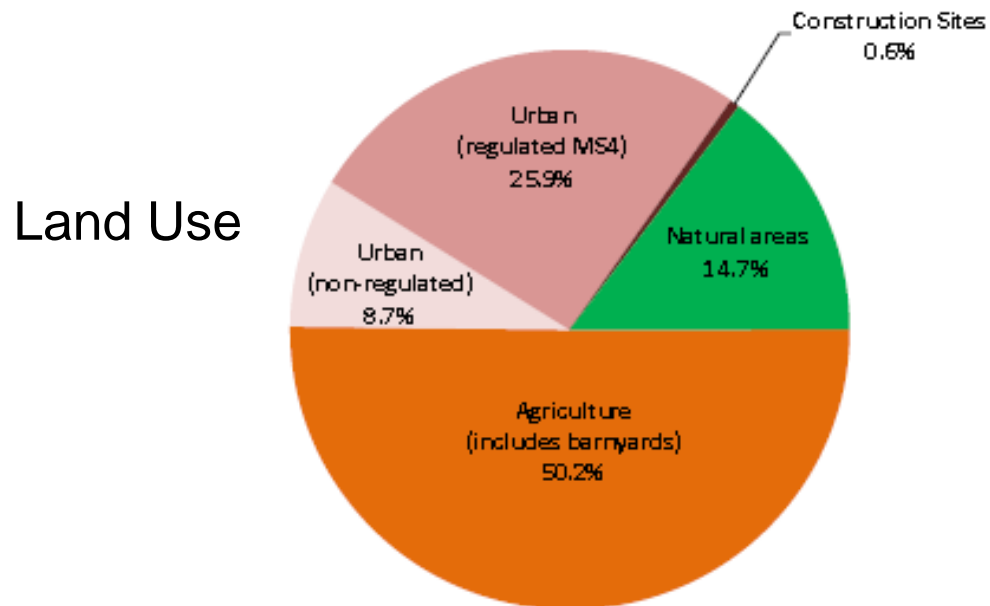


# Lower Fox River and Lower Green Bay Total Phosphorus (TP) and Total Suspended Solids (TSS) TMDL

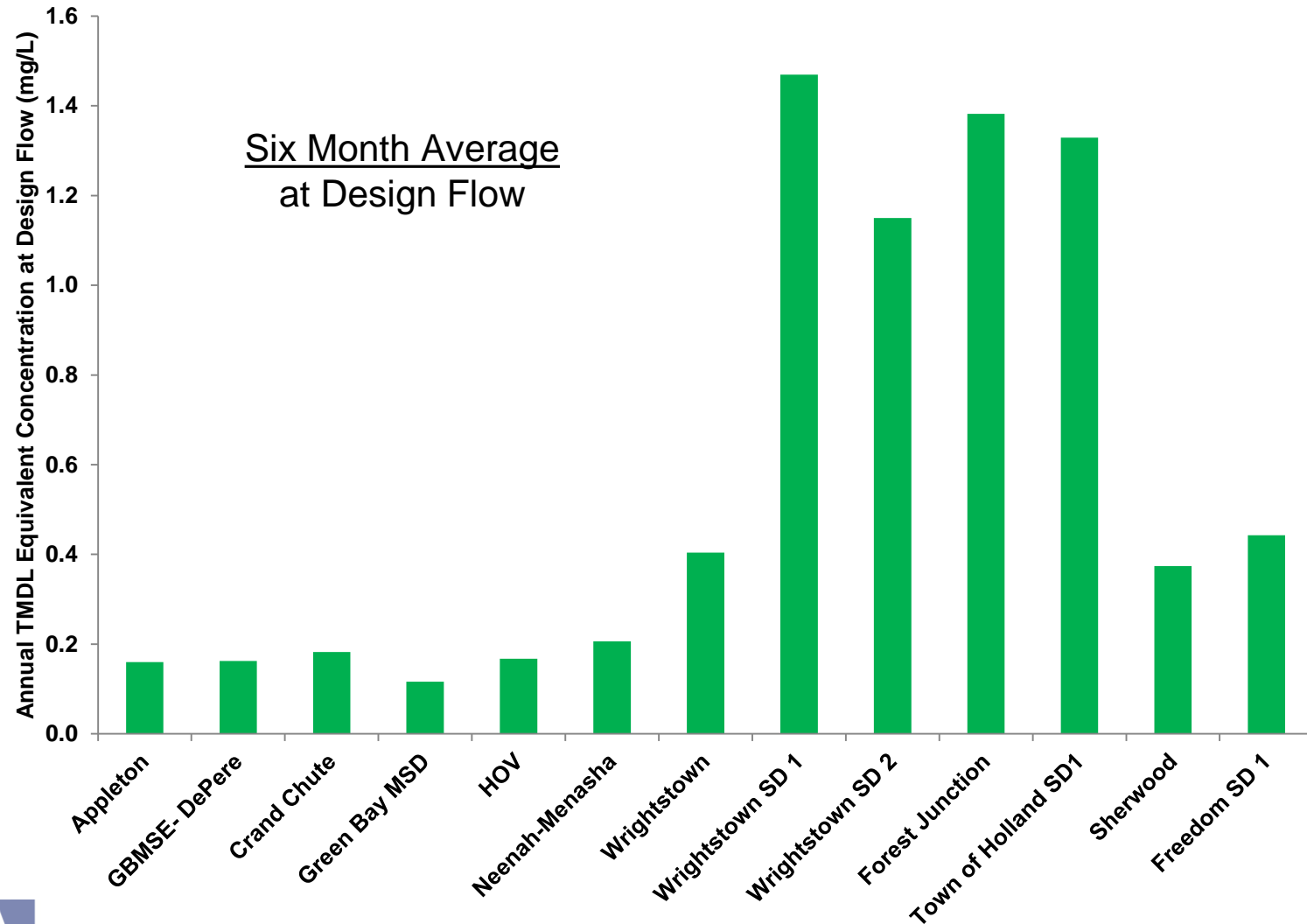


# Lower Fox River Basin TMDL Characteristics

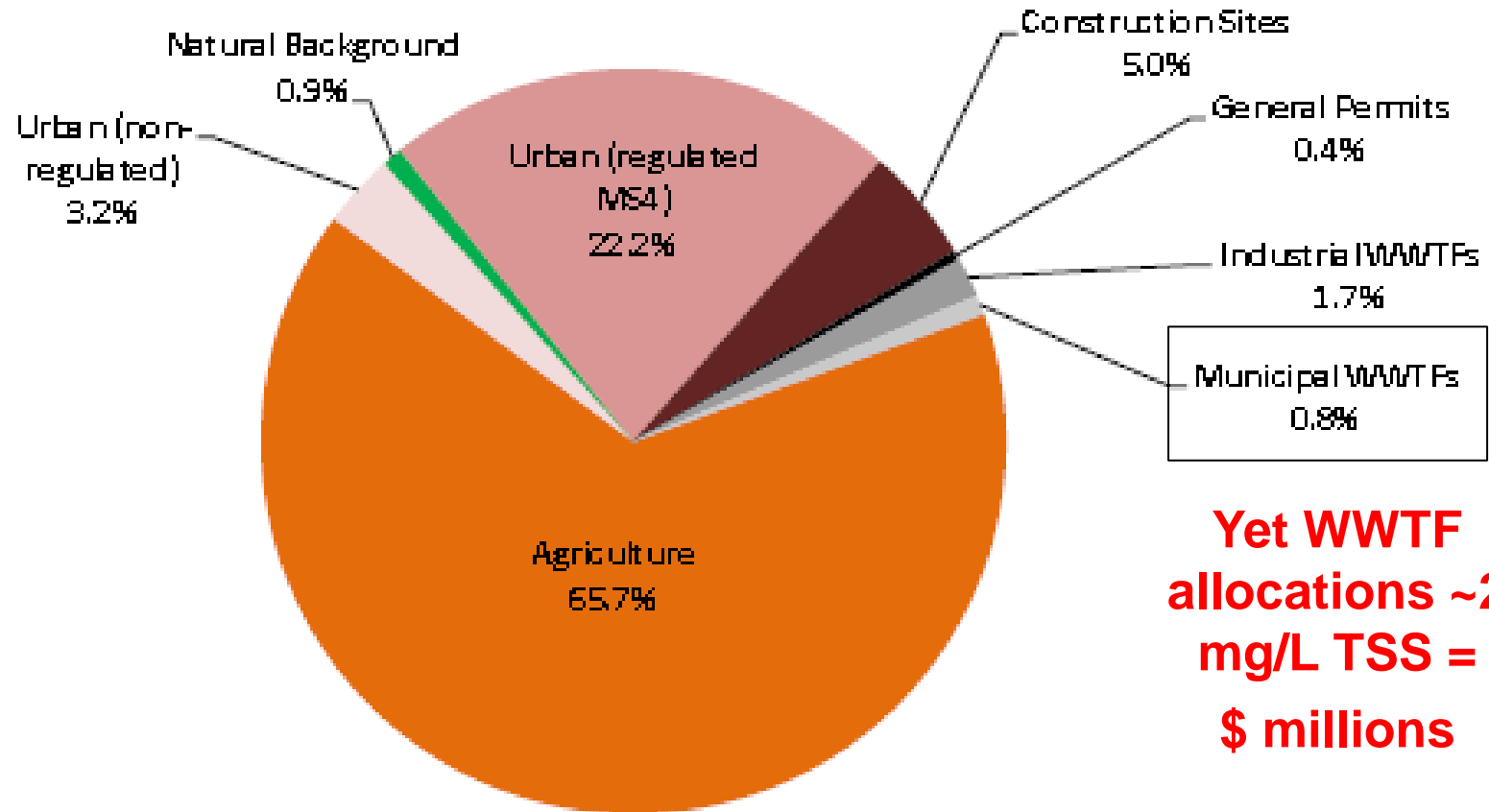
- Number of TP and TSS impaired segments addressed = 27
- Total number of individual TMDLs = 45
- TP targets = stream and river water quality criteria (0.075 and 0.1 mg/L)
- TSS target = 18 mg/L (includes margin of safety)
- Annual allocations, proportional reduction from baseline
- Assumed Upper Fox and Wolf Basins = 40% TP Percent Reduction



# Lower Fox Equivalent Wastewater Treatment Plan TP Concentrations at Design Flows



# Things that Make You Go Hmmmm...

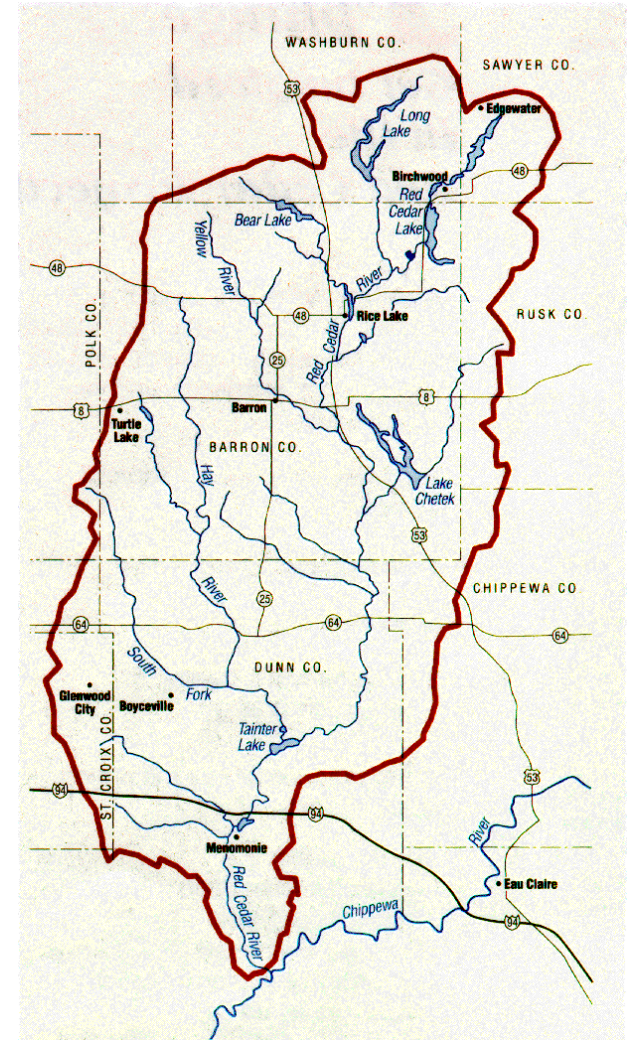
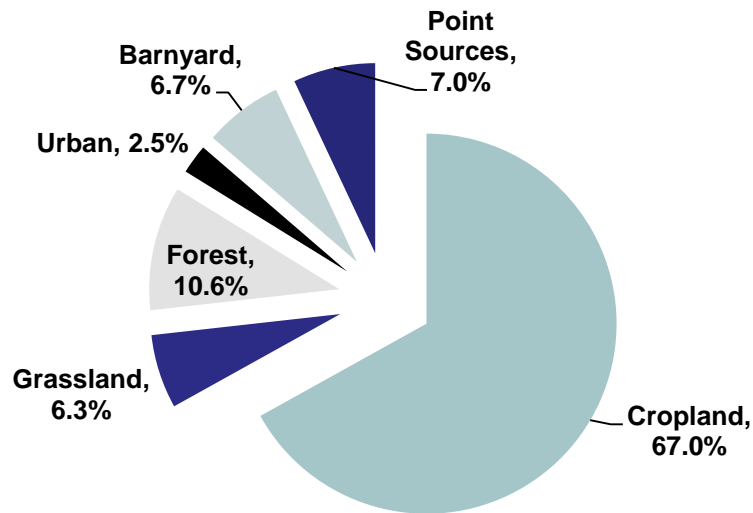


## Baseline Sources of TSS in Lower Fox

Source: Fox River TMDL

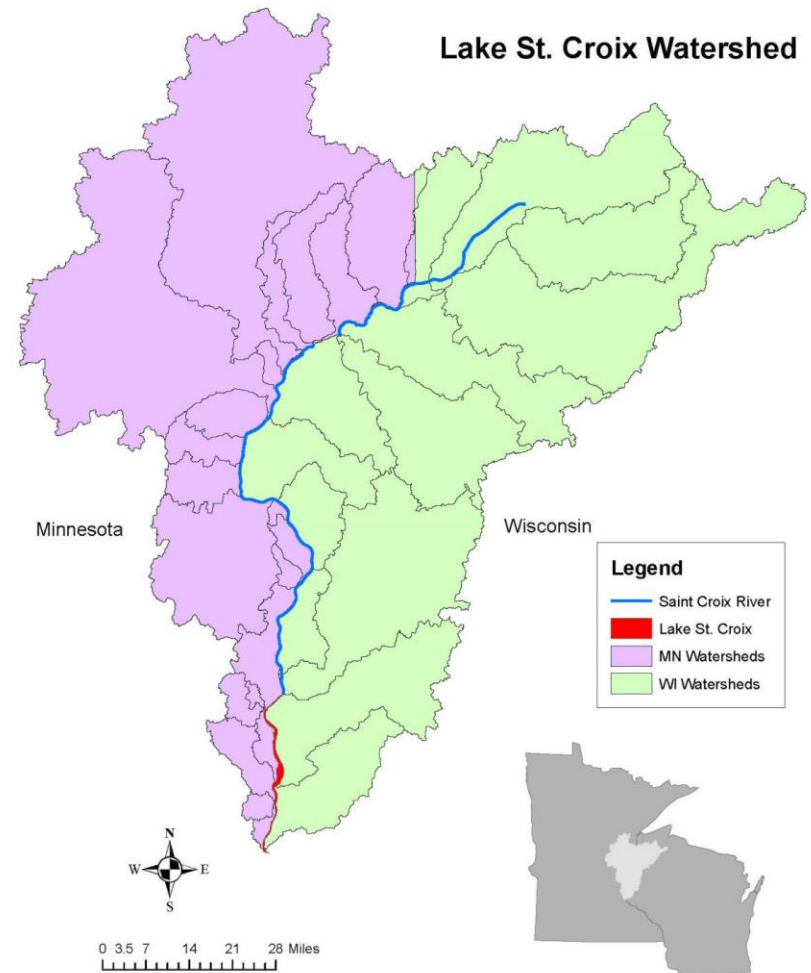
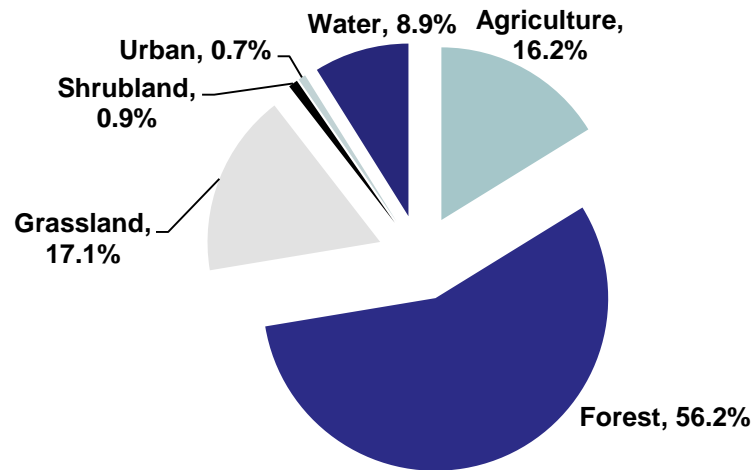
# Red Cedar River Phosphorus TMDL

- 65 % reduction in total phosphorus
- TMDL targets-Tainter Lake 59 ug/L, Lake Menomin 57 ug/L
- River meets criteria- 0.1 mg/L TP
- Annual allocations
- WWTP allocations by concentration - 1 mg/L TP

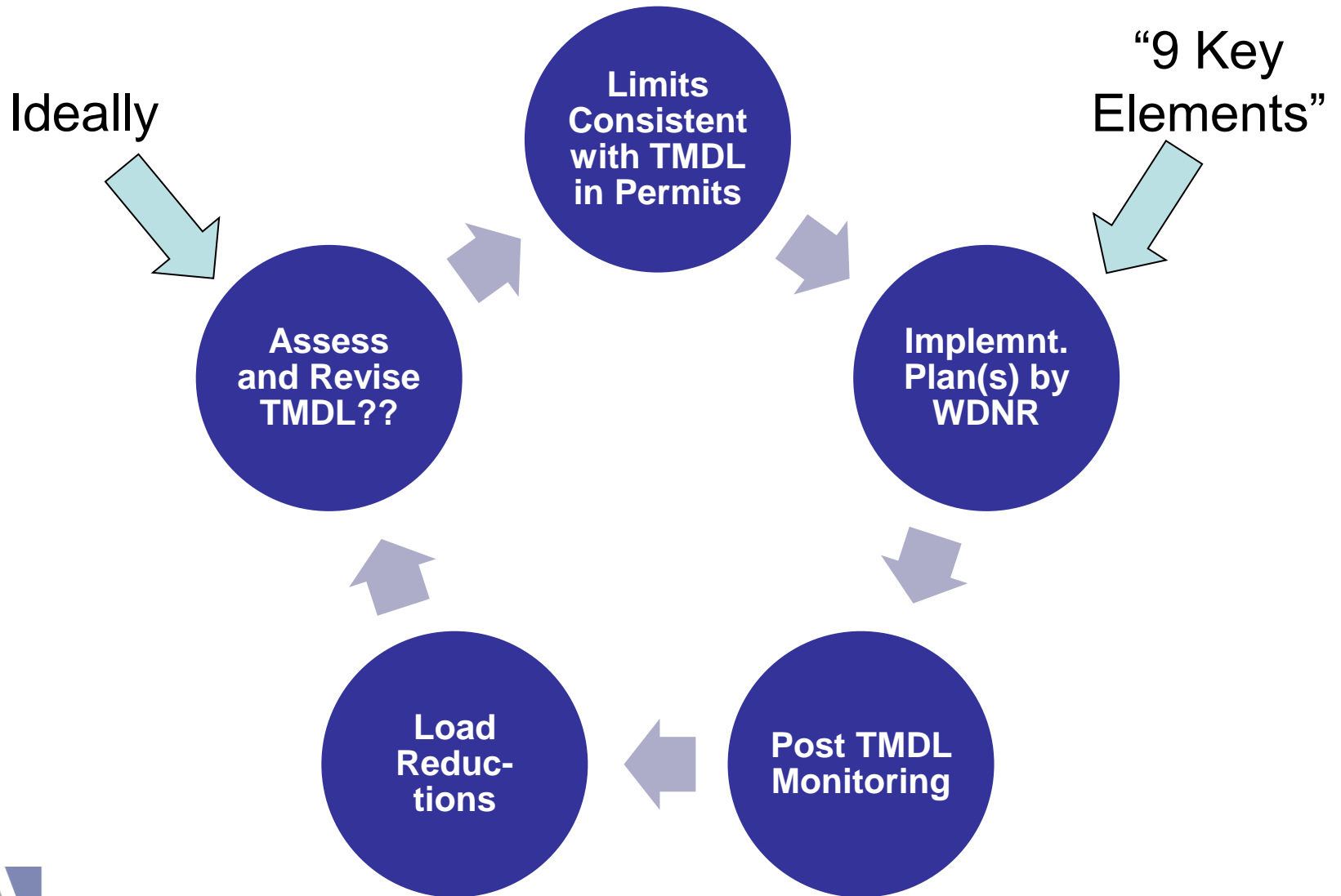


# Lake St. Croix Phosphorus TMDL

- Two states
- TMDL target-Lake St. Croix 40 ug/L TP
- Annual allocations
- WWTP allocations by concentration



# TMDL Implementation

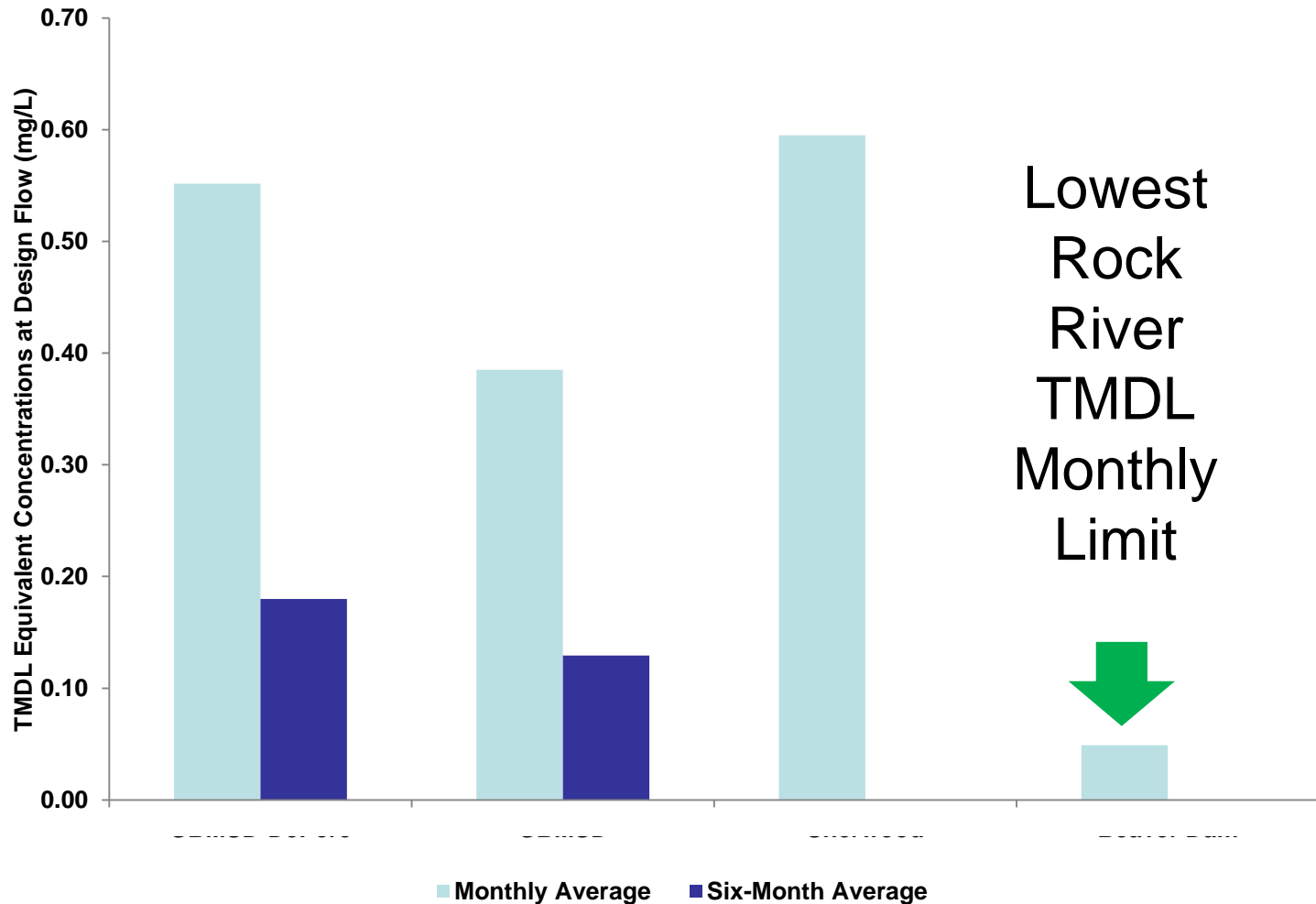


# Impacts on Municipal Stormwater Permittees

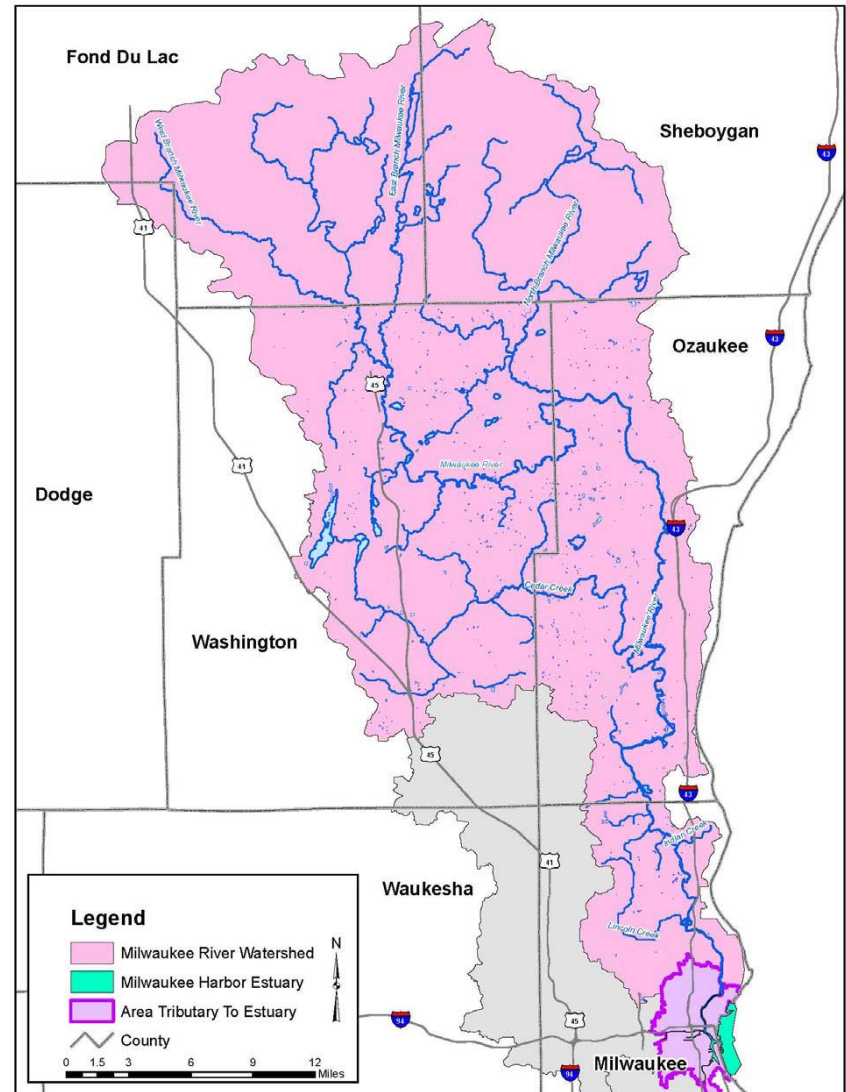
- New WDNR guidance
- Wasteload allocations expressed as percent reduction of phosphorus, TSS
- Stormwater plans due 4 years after permit reissuance or TMDL approval
  - Existing conditions
  - Plan for meeting wasteload allocations



# Impacts on Wastewater Treatment Plants - Lower Fox WWTP Limits (Annual Allocations) Compared to Rock River Limits (Monthly Allocations)



# Milwaukee River Basin Total Phosphorus, Sediment/TSS, and Fecal Coliform TMDLs



# Milwaukee River Basin TMDLs

- “Third Party” TMDL led by Milwaukee MSD
- Menomonee, Kinnickinnic, and Milwaukee River Watersheds; Milwaukee Harbor Estuary
- Requires WDNR and USEPA approval
- Proportional Reduction from Baseline



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Downspout Disconnection  
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- WATER QUALITY
- INDUSTRIAL WASTE PRETREATMENT
- INDUSTRIAL HONOR ROLL
- TOTAL MAXIMUM DAILY LOADS
- WATER QUALITY RESEARCH
- 2020 WATER QUALITY INITIATIVE
- MMSD CENTRAL LAB
- PATHOGENS AND BACTERIA REPORTS
- WQ MONITORING DATA



## TOTAL MAXIMUM DAILY LOADS (TMDL)

### WHAT IS A TMDL?

A Total Maximum Daily Load (TMDL) is the maximum amount of a pollutant a water body can receive and still meet water quality standards. A TMDL analysis is required by the U. S. Environmental Protection Agency for all impaired water bodies. The result of a TMDL is the load and wasteload allocations by pollutant source that must be met to achieve water quality standards and targets for a pollutant. That is, TMDLs establish the pollutant reductions needed from each pollutant source to meet water quality goals. MMSD is developing TMDLs as a third party on behalf of the Wisconsin Department of Natural Resources for the Menomonee River, Kinnickinnic River, and Milwaukee River Watersheds, and for the Milwaukee Harbor Estuary. The pollutants of interest are fecal coliform bacteria, phosphorous, and sediment.

#### General Information

[Map of Impaired Water Bodies](#)

[Map of Permitted Point Sources](#)

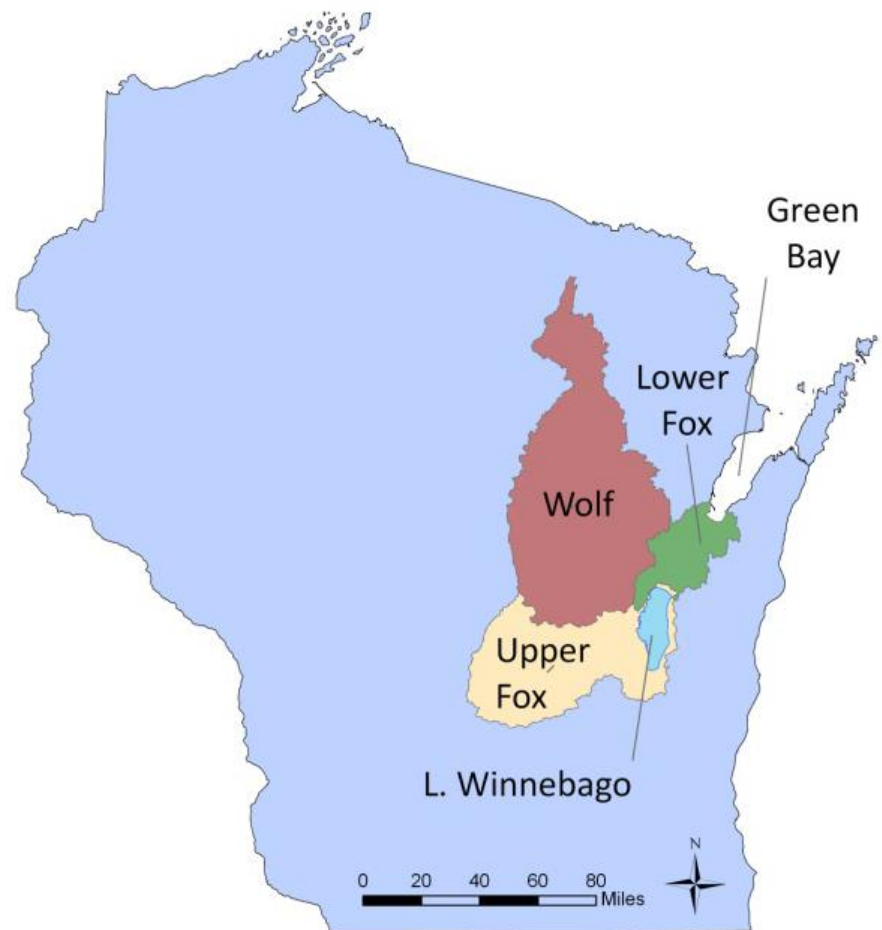
[Abbreviations](#)

[Update Meeting](#)

# Milwaukee River Basin TMDL Status Summary

- Refining flow portion of modeling
- Preparing draft load and wasteload allocations for WDNR review
- Next steps
  - Stakeholder workshop tentatively May 2015
  - Focused stakeholder meetings
  - Draft report and public notice/meeting
  - Final report to USEPA for approval
  - Implementation plan development

# Upper Fox River and Wolf River Total Phosphorus and Total Suspended Solids Total Maximum Daily Load (Including Lake Winnebago)



# Upper Fox/Wolf TMDL Characteristics and Challenges

- Upper Fox and Wolf rivers generally meet phosphorus criteria
- Water quality based effluent limits upstream of pool lakes ~ 1 mg/L
- Water quality based effluent limits at Lake Winnebago = 0.04 mg/L
- Point sources = minor contributors (<~5% in Lake Winnebago)
- Lake Winnebago and upstream pool lakes have significant “legacy” phosphorus in sediments
- TMDL target 40 ug/L – appropriate for these shallow pool lakes?
  - Similar MN lakes have 60 – 90 ug/L criteria
  - Similar Rock River Basin impoundments have 100 ug/L criteria
  - Lakes were historically wetlands
  - Fishery is good
  - Site specific criteria?



## Ideas For Improvements: Annual Allocations

- NR 217 provides relief when a limit determined by the mass balance calculation is stringent ( $<0.3$  mg/L)
  - Example: calculated NR 217.13 limit = 0.075 mg/L
    - Monthly average limit =  $0.075 \text{ mg/L} \times 3 = \mathbf{0.225 \text{ mg/L}}$
    - 6-month average or annual average limit = 0.075 mg/L
- Rock River Basin TMDL does not provide such relief
  - Example: monthly allocation = 0.5 lb/day, design flow = 1 mgd
    - Monthly average limit at design flow =  $\mathbf{0.06 \text{ mg/L}}$ , period.
- Agencies should consider annual or even seasonal allocations instead of monthly allocations, particularly where a lake or estuary TMDL target controls

# Ideas for Improvement: Better Modeling of/Accounting for Internal Sources

- Examples: SWAT model does not explicitly address streambank erosion; legacy phosphorus (i.e., built up in lake sediments) is not always addressed
- Better modeling/accounting would allow:
  - Easier credit for subsequent streambank stabilization and dam and sediment removal projects
  - Better management of stakeholder expectations regarding restoration time
- If better modeling is not possible, set allocations at reasonable levels initially, implement lowest cost projects, and ratchet allocations down if needed in future (adaptive implementation)

## Recommendations for Dischargers

- Review and provide comments on TMDLs as they are developed and **before** the draft TMDL goes to public comment
  - Baseline at design/permit levels?
  - Allocation method fair?
  - Appropriate targets used (i.e., TSS)?
- Confirm design average flow, permitted stormwater areas and non-permitted urban areas, etc. are correct
- Submit comments during official comment period, too



# Questions and Answers

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