

A Plan to Improve Water Quality in Castle Rock and Petenwell Reservoirs

Matt Diebel, Water Resources Modeler
Wisconsin Lakes Convention, April 7, 2017

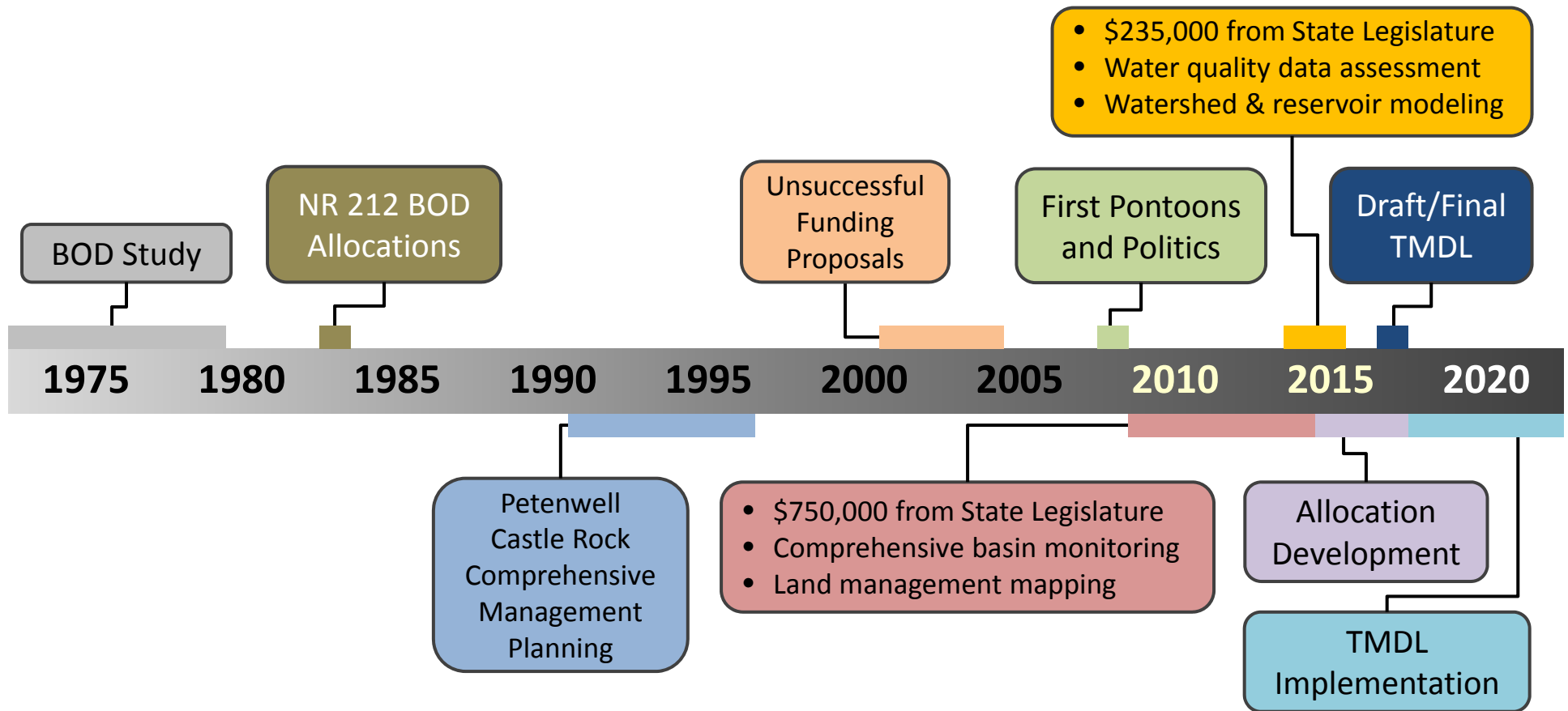


Photo by Rhonda Cain-Carrell

The Wisconsin River Basin Water Quality Improvement Project



Wisconsin River Water Quality Management Timeline

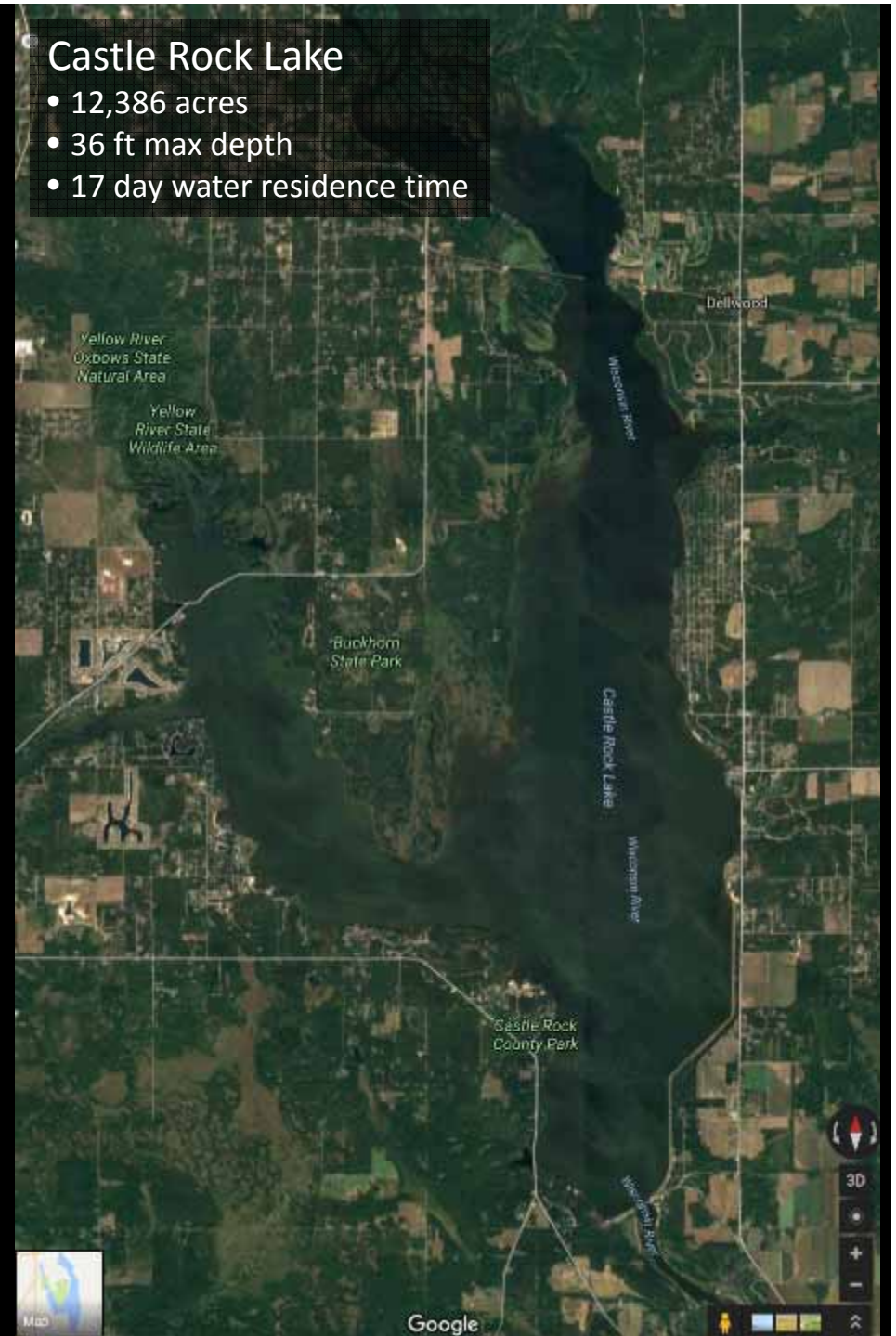
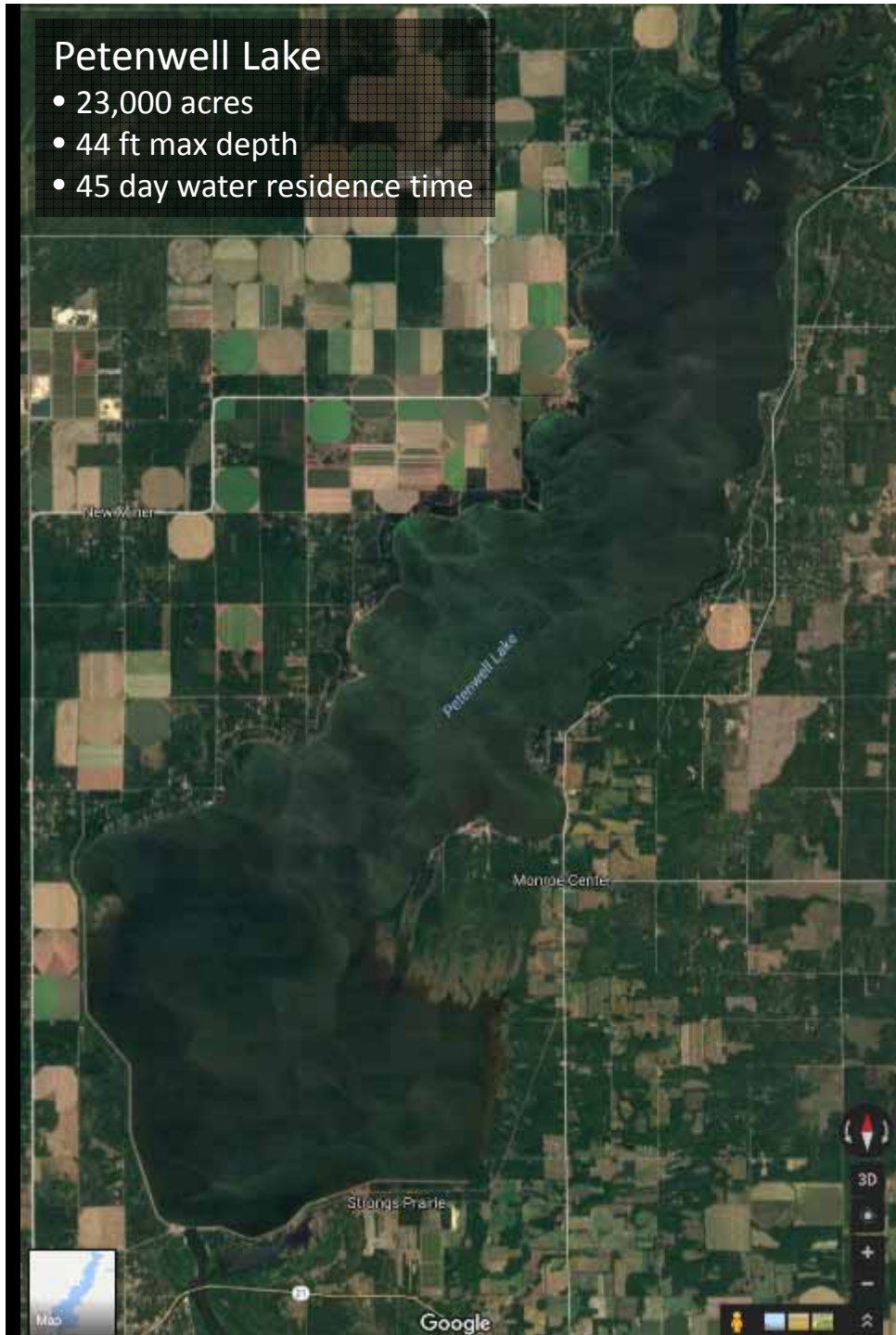


Petenwell Lake

- 23,000 acres
- 44 ft max depth
- 45 day water residence time

Castle Rock Lake

- 12,386 acres
- 36 ft max depth
- 17 day water residence time





**Castle
Rock**



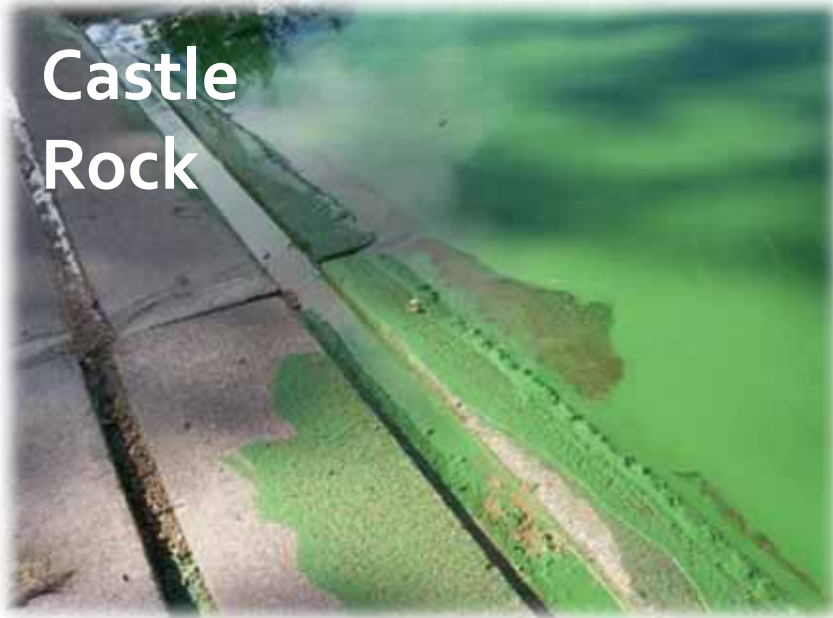
**Lake
Wisconsin**



**Lake
DuBay**



Petenwell



**Castle
Rock**



**Lake
Wisconsin**



**Lake
DuBay**



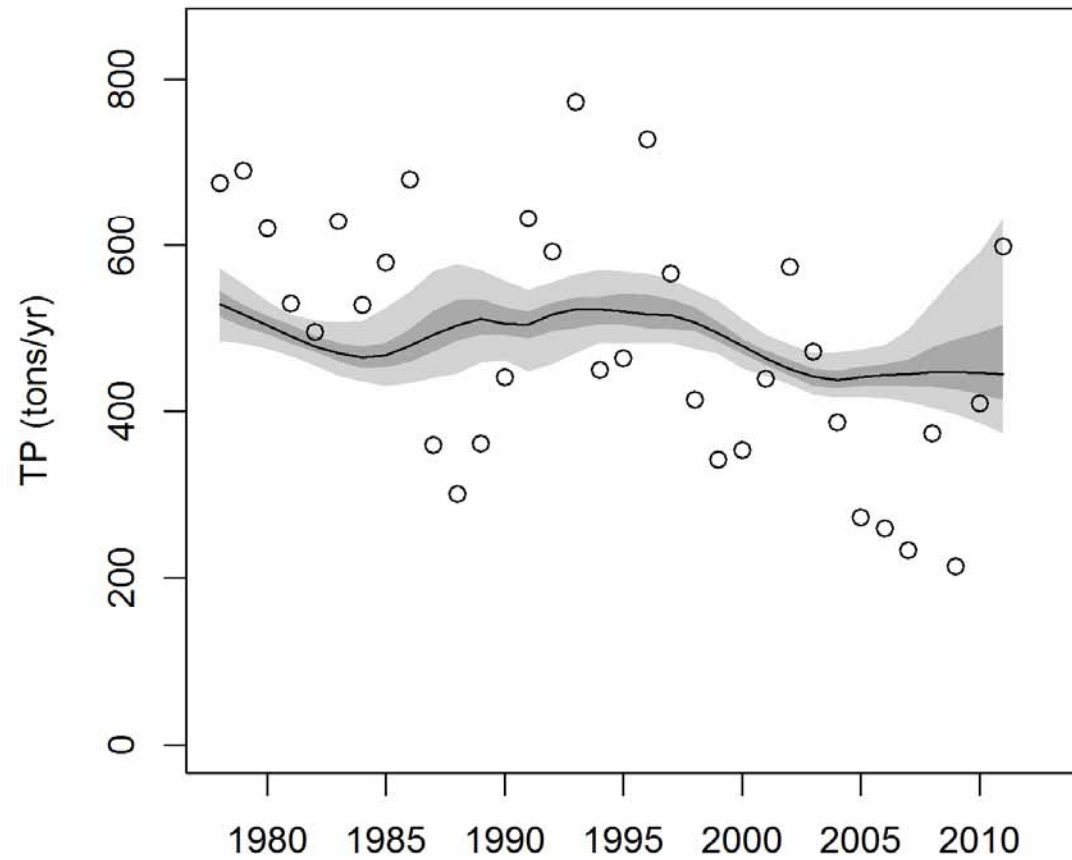
Barnum Bay 2008

Petenwell

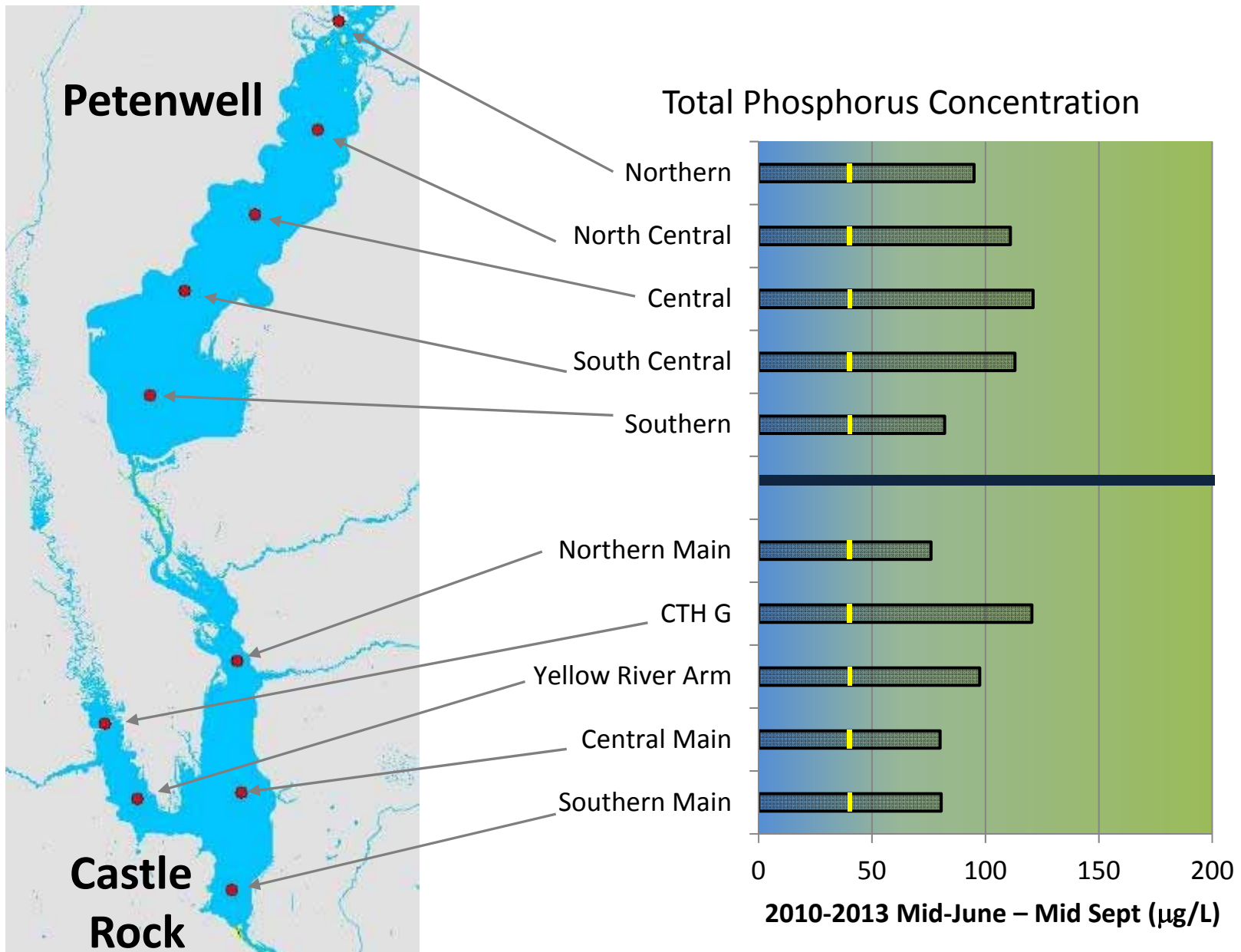
Wisconsin River Water Quality History



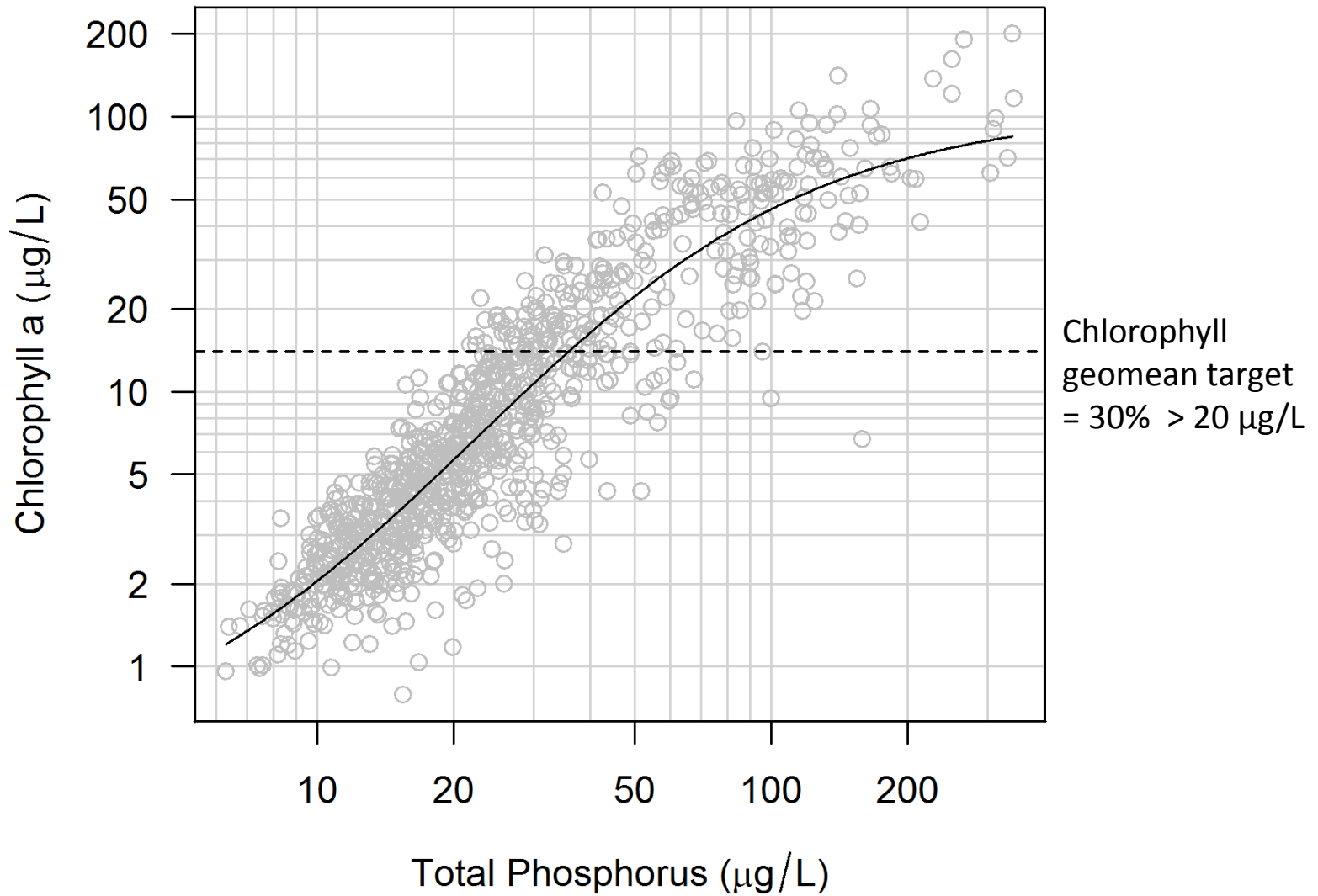
Wisconsin at Biron



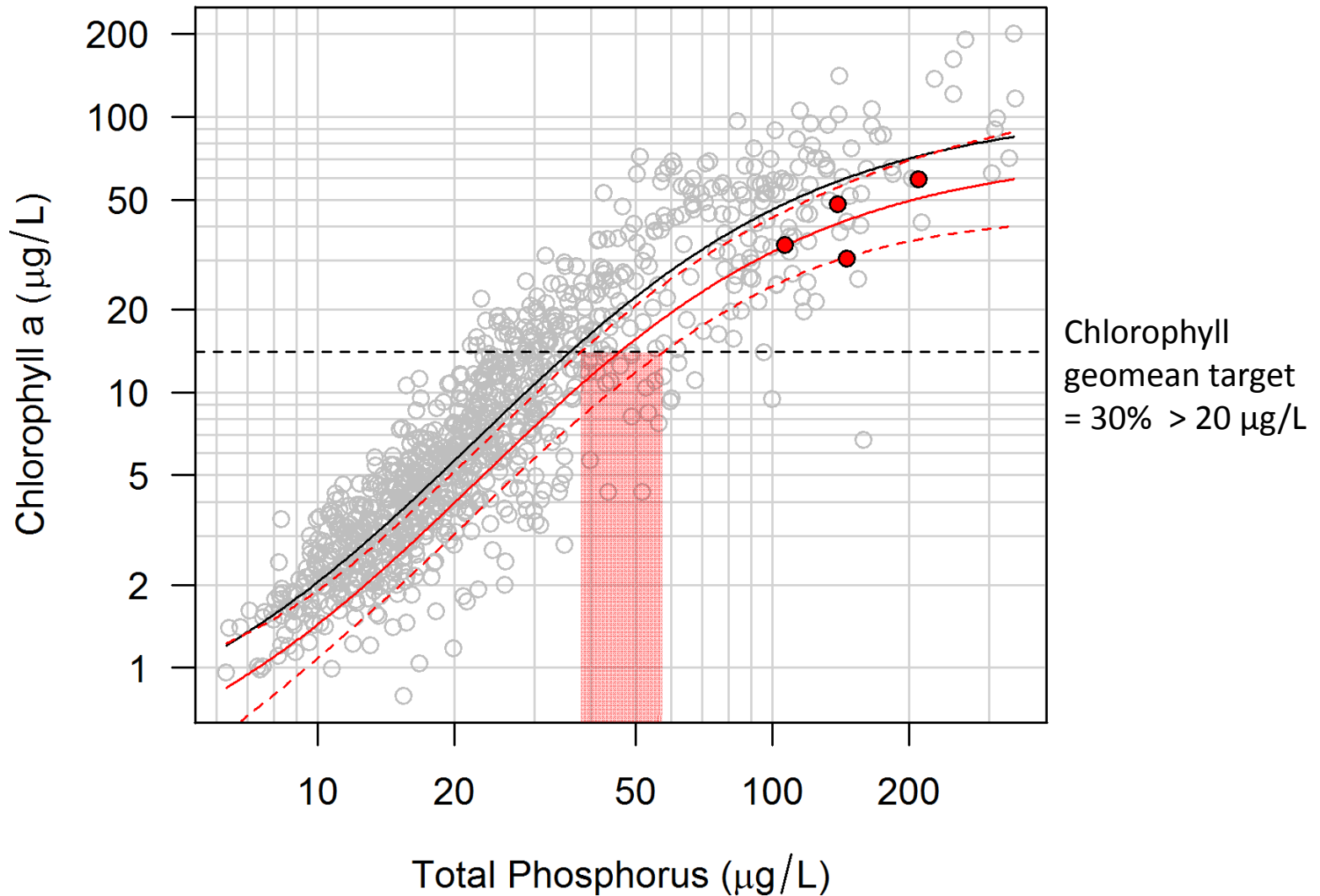
Reservoir Monitoring Results



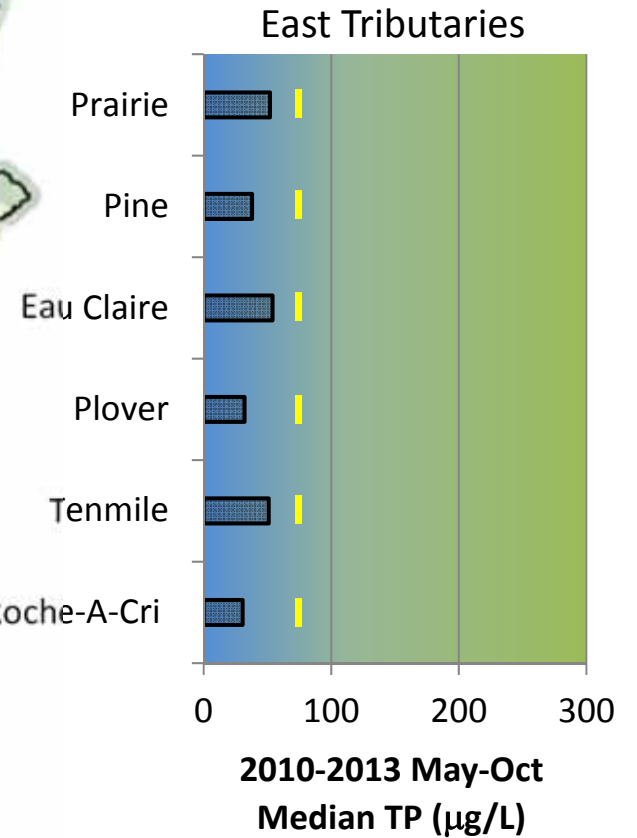
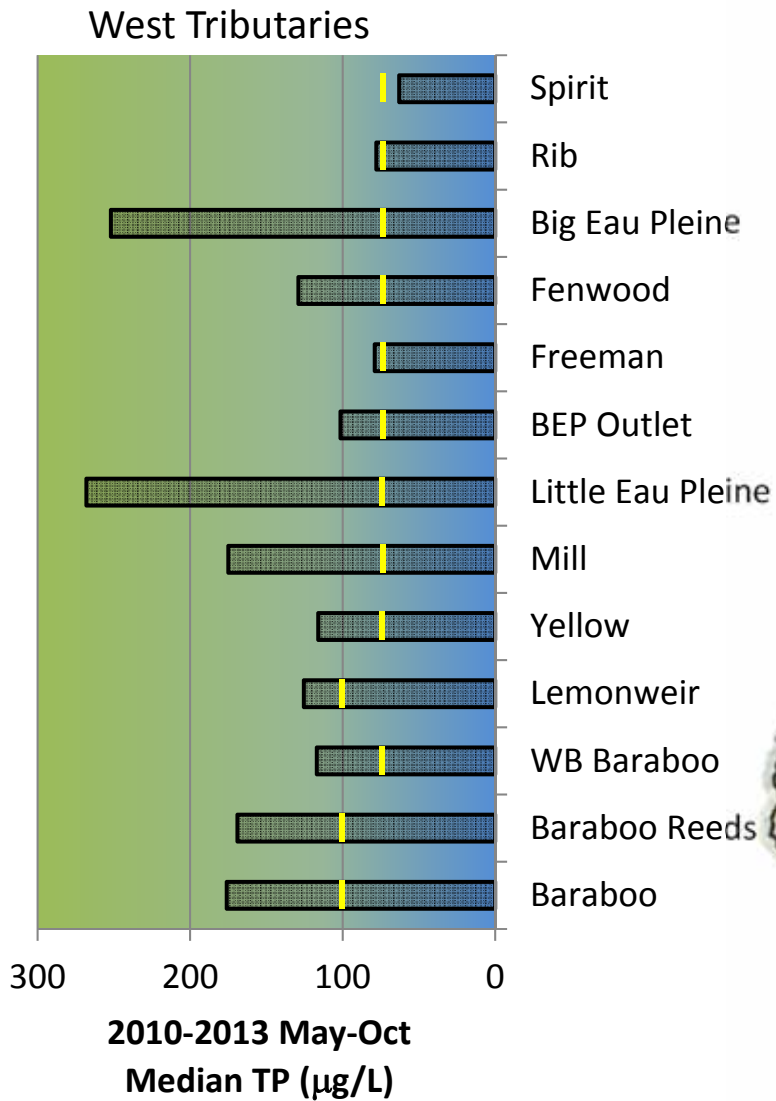
Phosphorus Criteria Justification



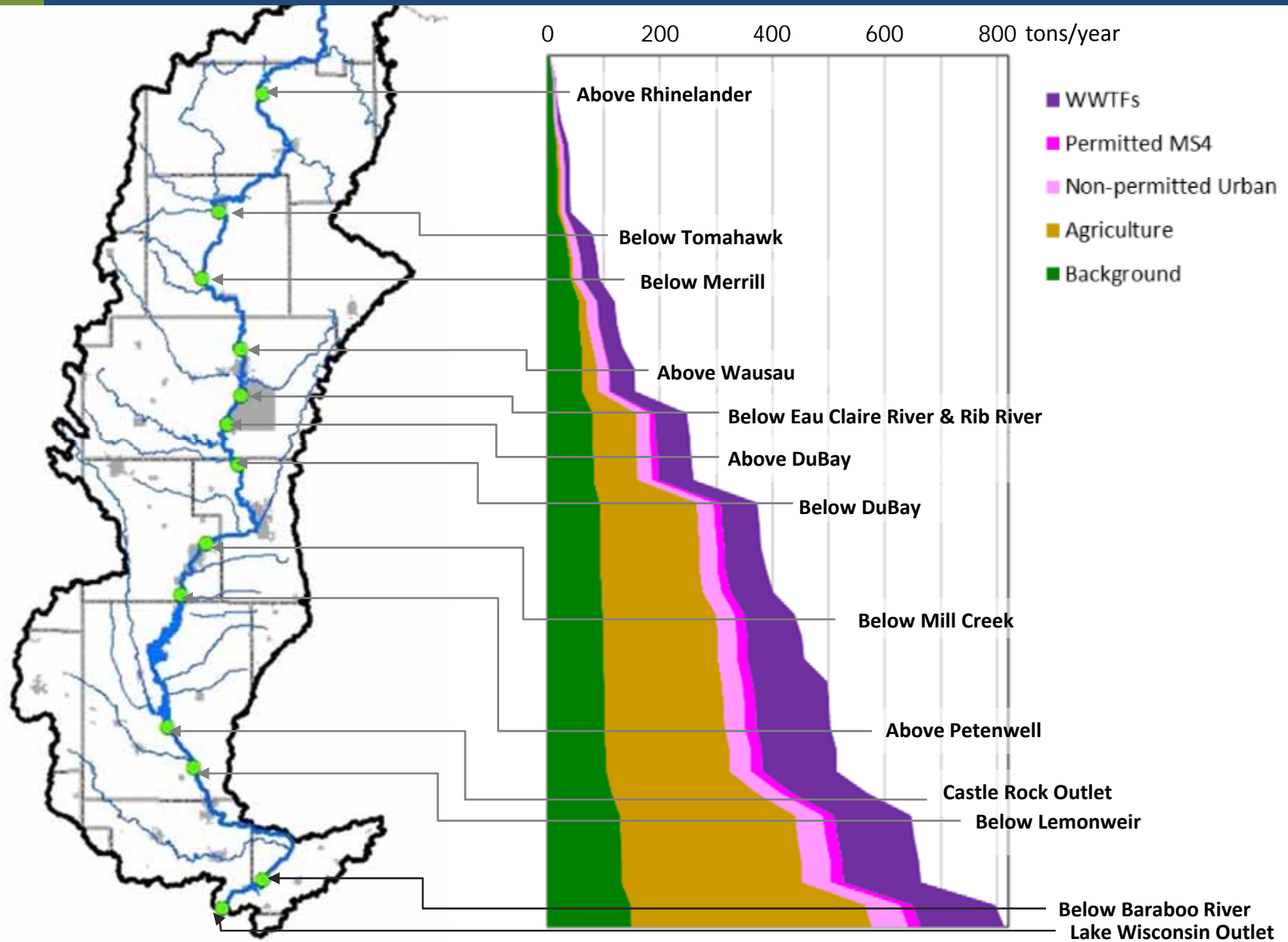
Phosphorus Criteria Justification



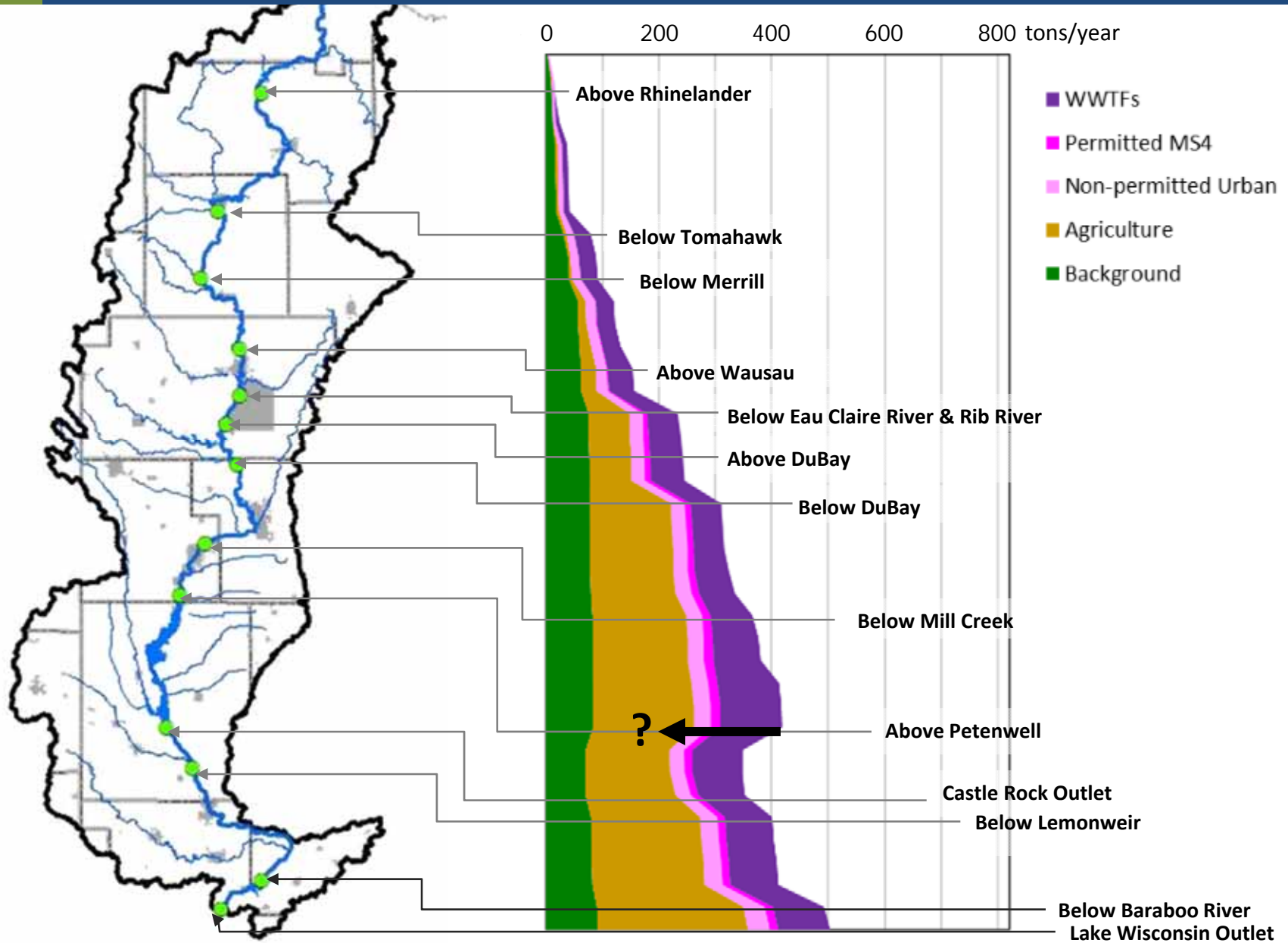
Tributary Monitoring Results



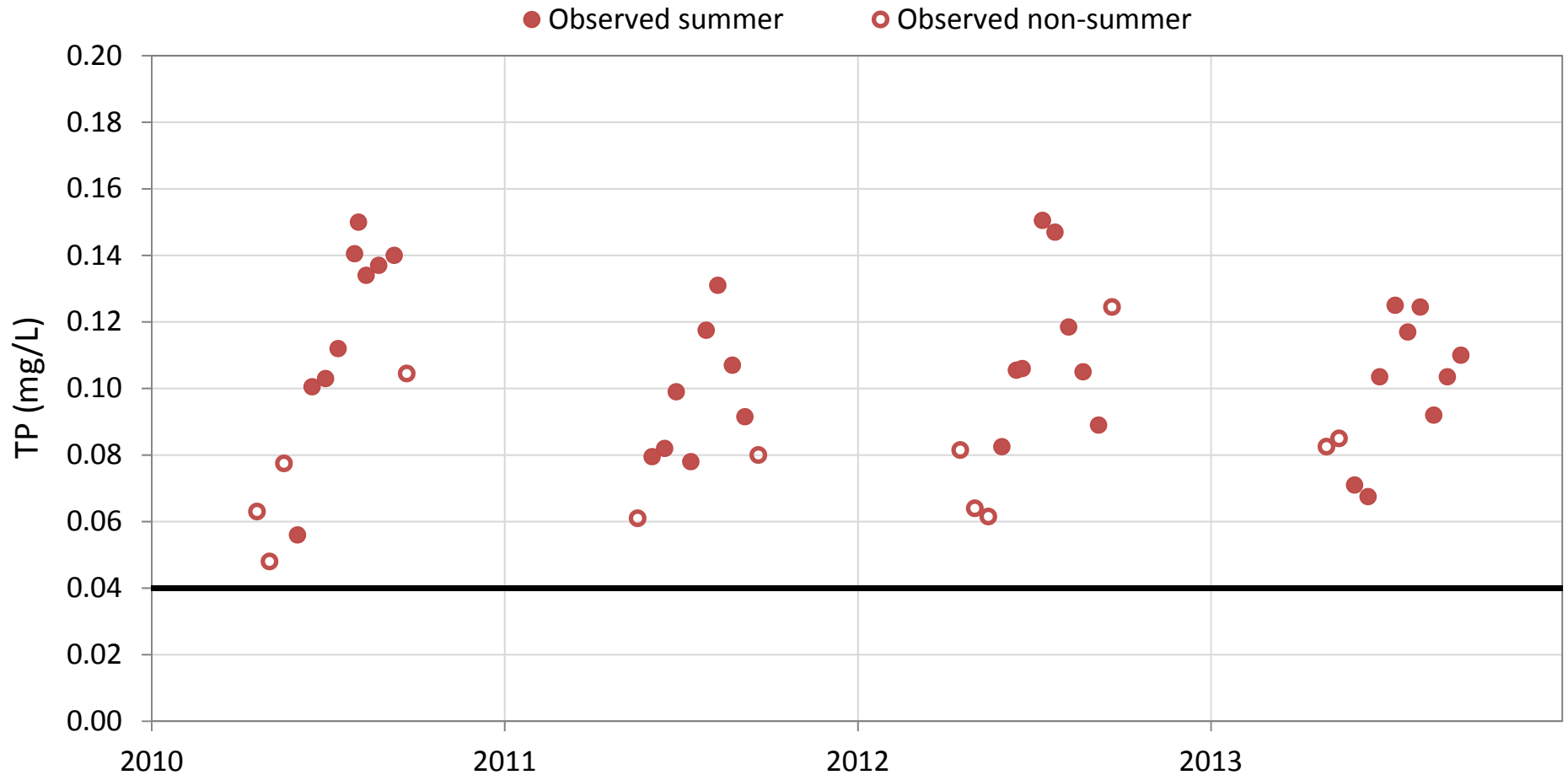
Average Annual Total Phosphorus Load



Average Annual Delivered Total Phosphorus Load

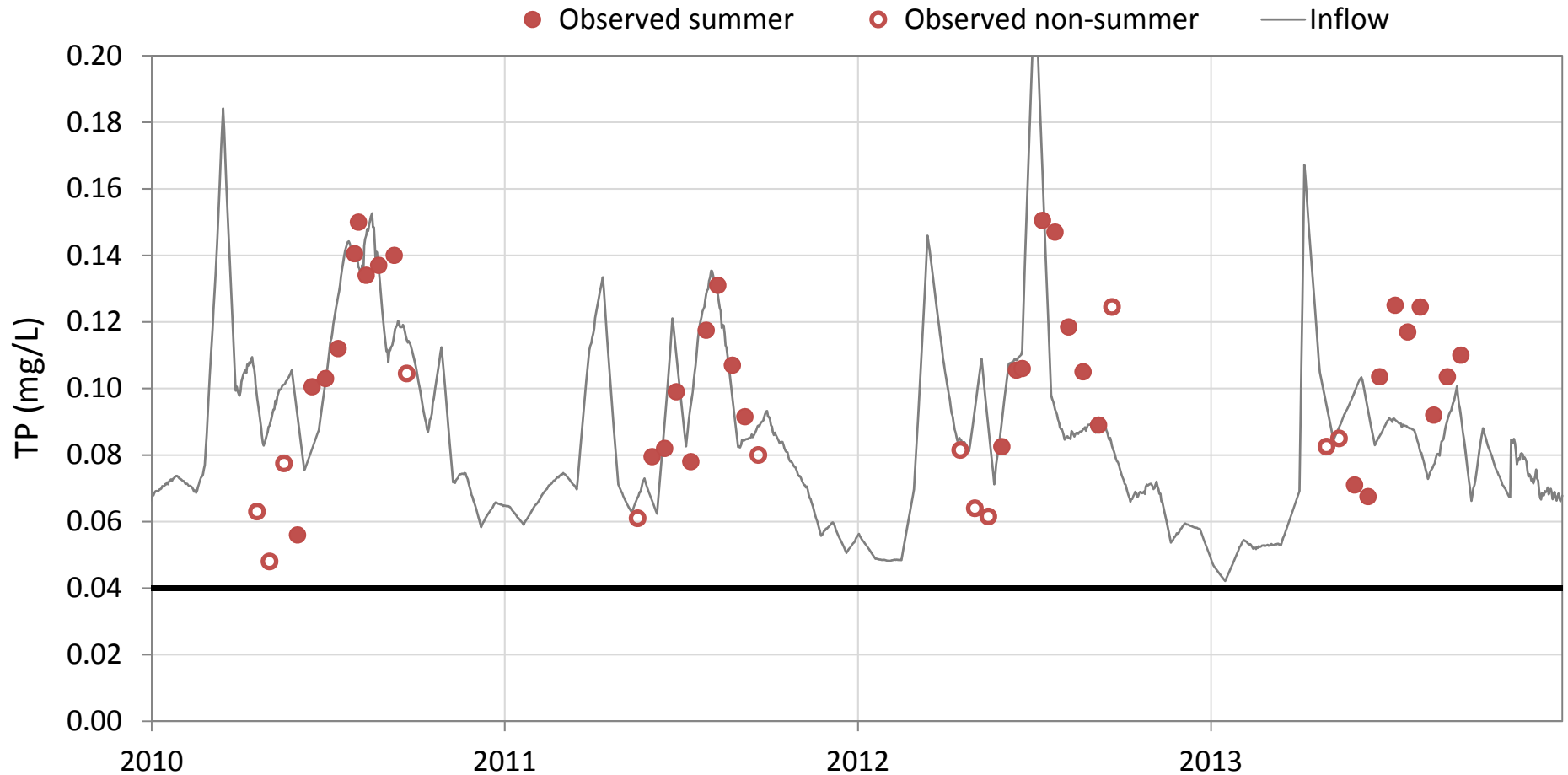


Petenwell Jensen Model



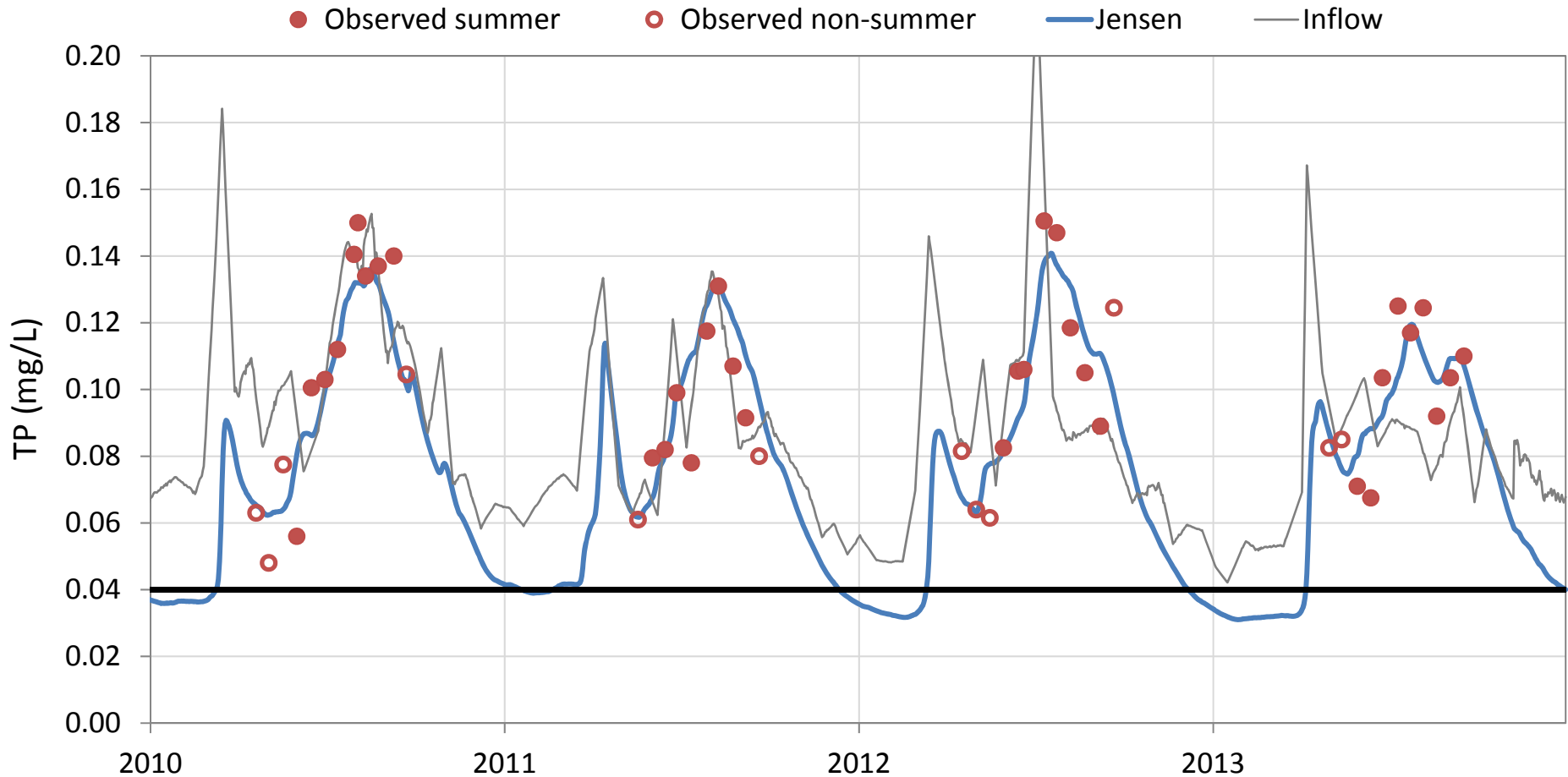
Jensen, J. P., Pedersen, A. R., Jeppesen, E., & Søndergaard, M. 2006. An empirical model describing the seasonal dynamics of phosphorus in 16 shallow eutrophic lakes after external loading reduction. *Limnology and Oceanography* 51 (1) 791-800.

Petenwell Jensen Model



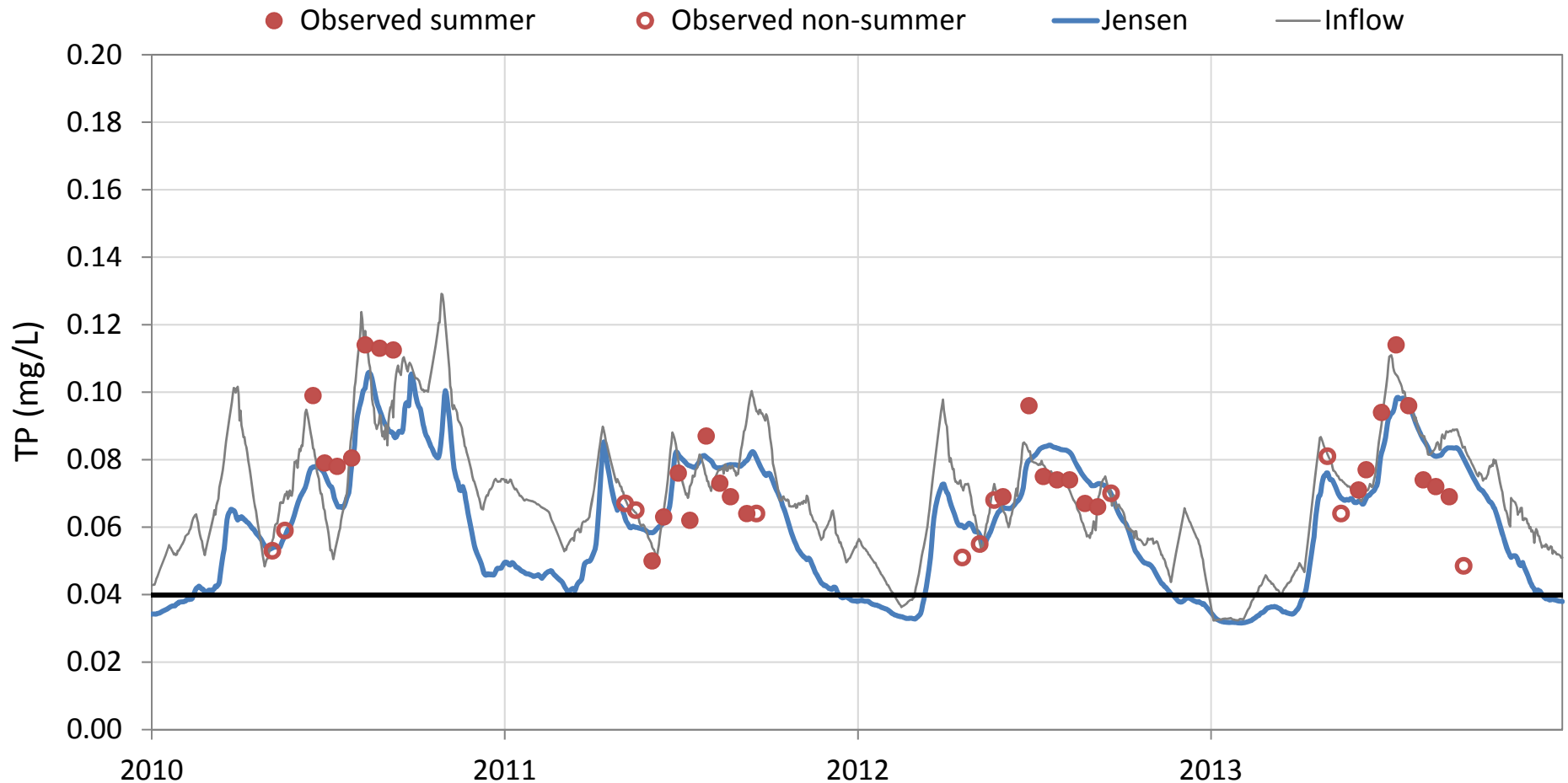
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Petenwell Jensen Model



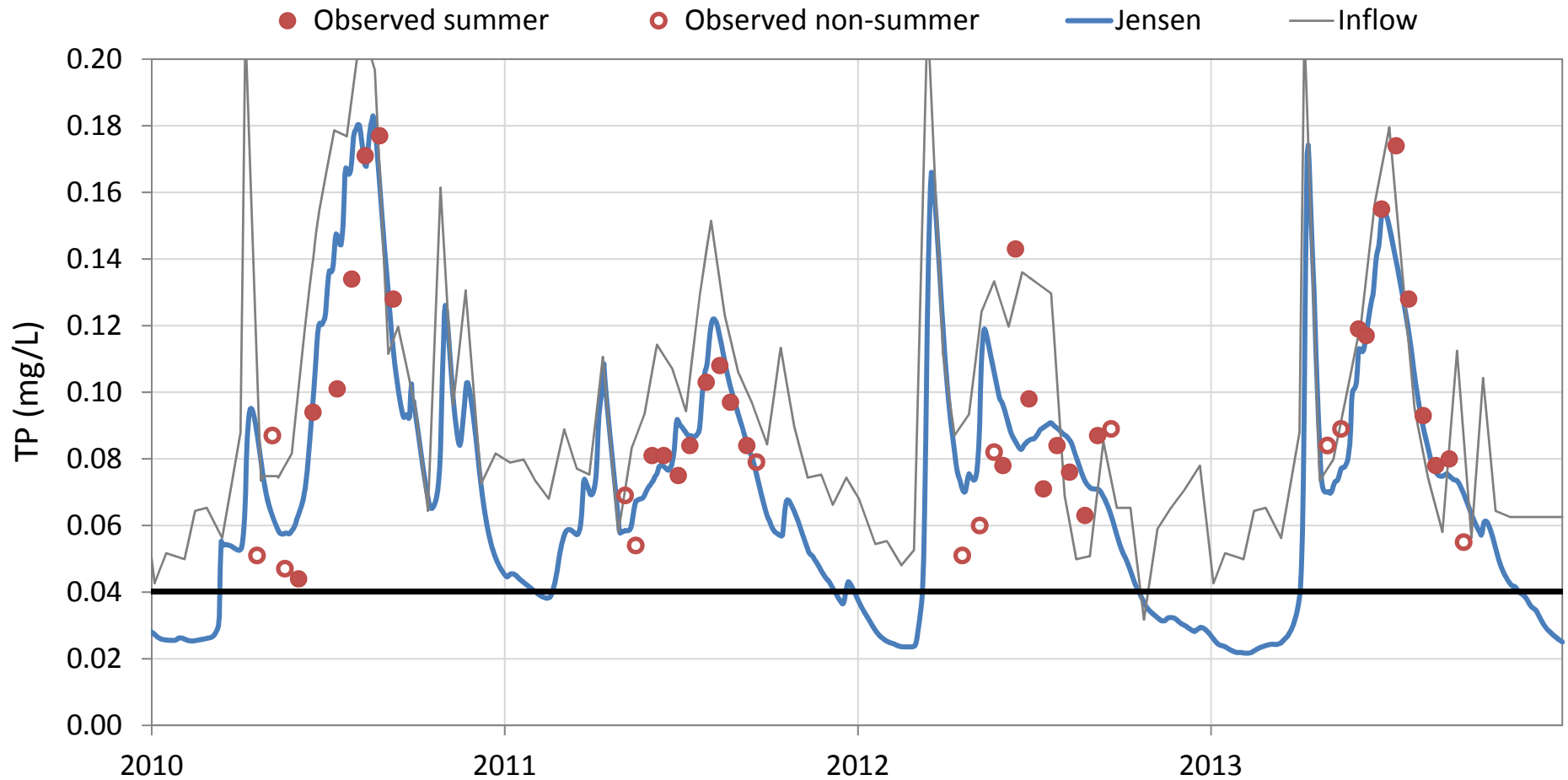
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Castle Rock (Main Body) Jensen Model

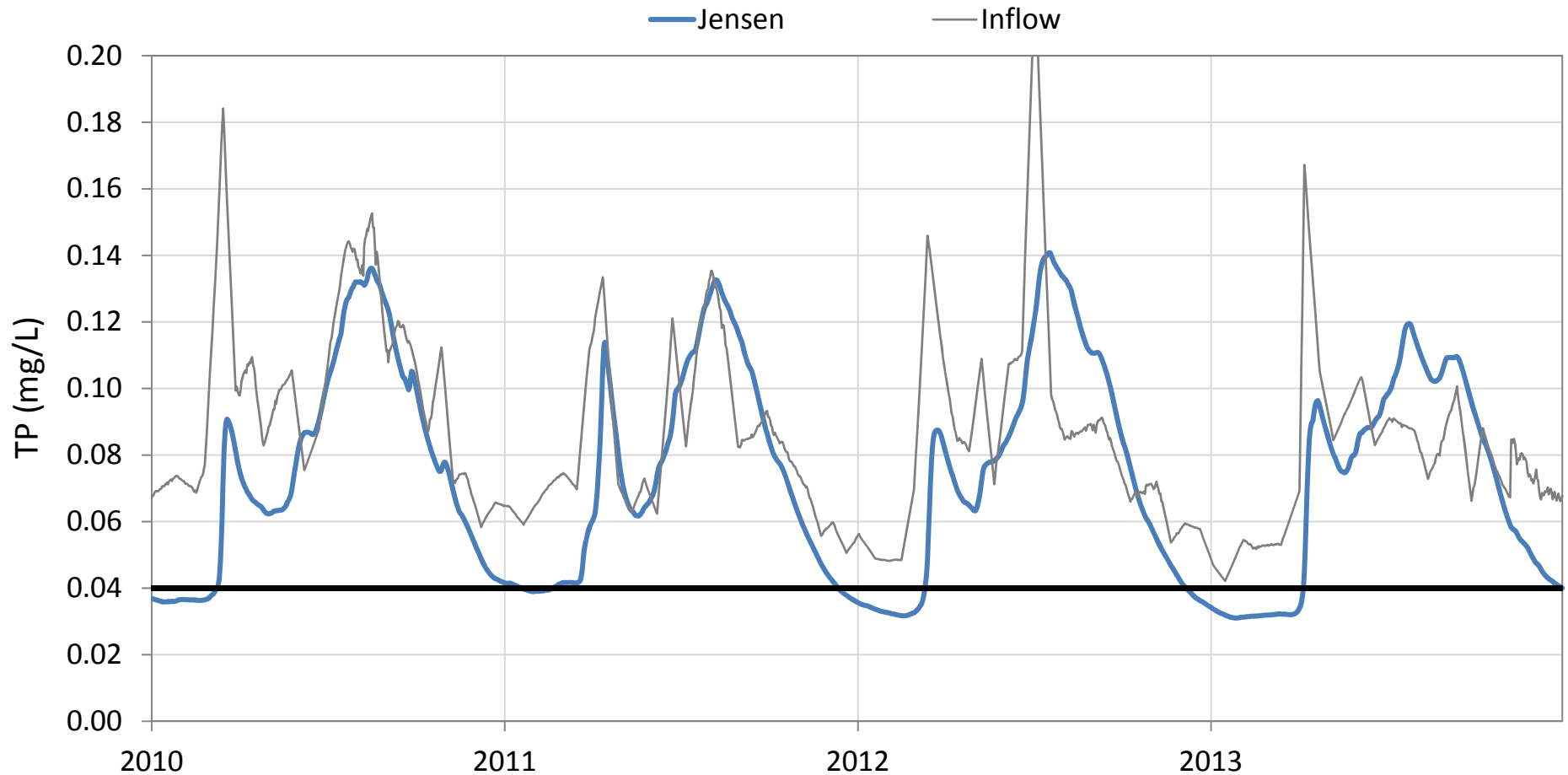


Jensen, J. P., Pedersen, A. R., Jeppesen, E., & Søndergaard, M. 2006. An empirical model describing the seasonal dynamics of phosphorus in 16 shallow eutrophic lakes after external loading reduction. *Limnology and Oceanography* 51 (1) 791-800.

Castle Rock (Yellow River Arm) Jensen Model

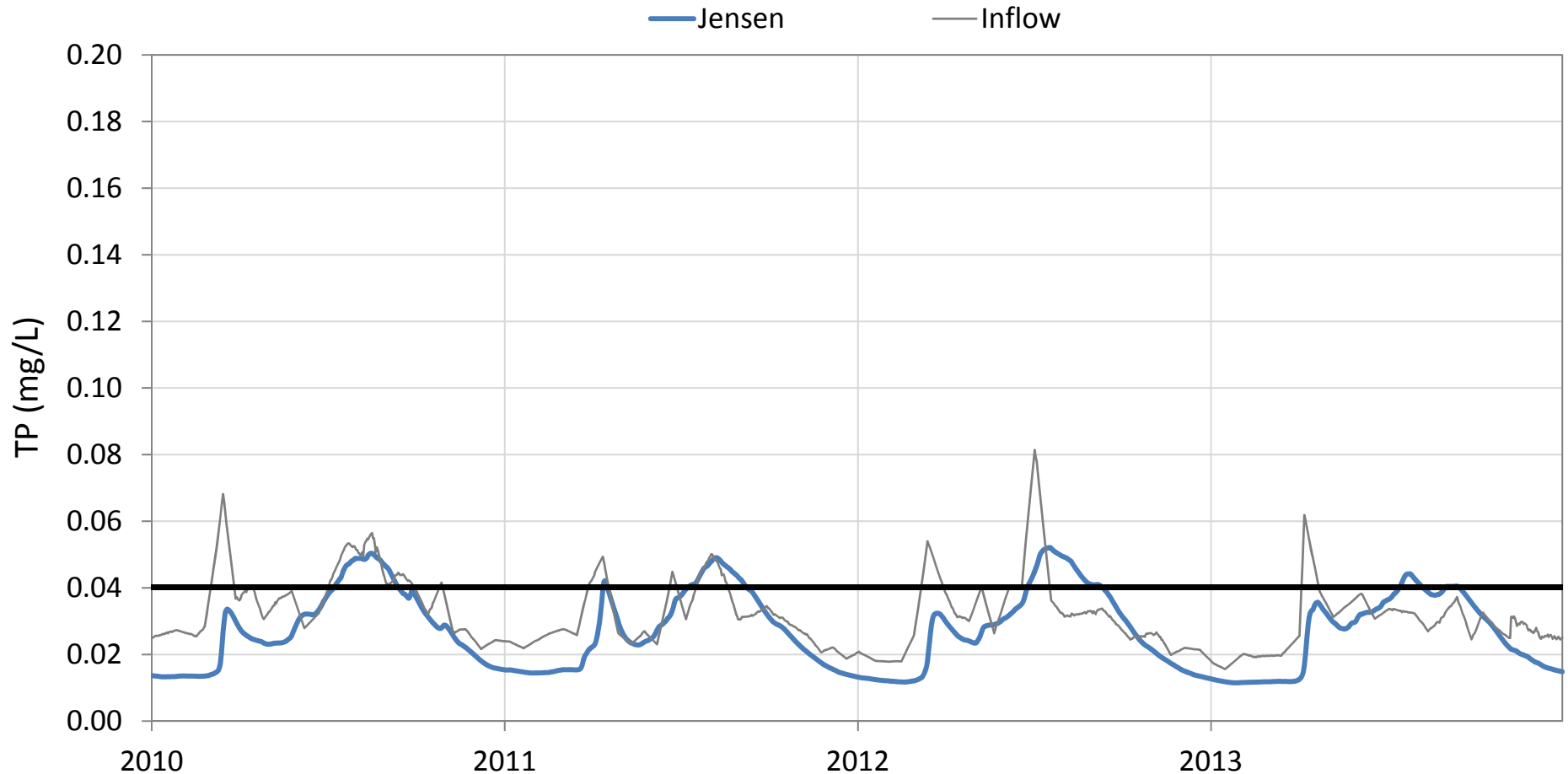


Petenwell Jensen Model



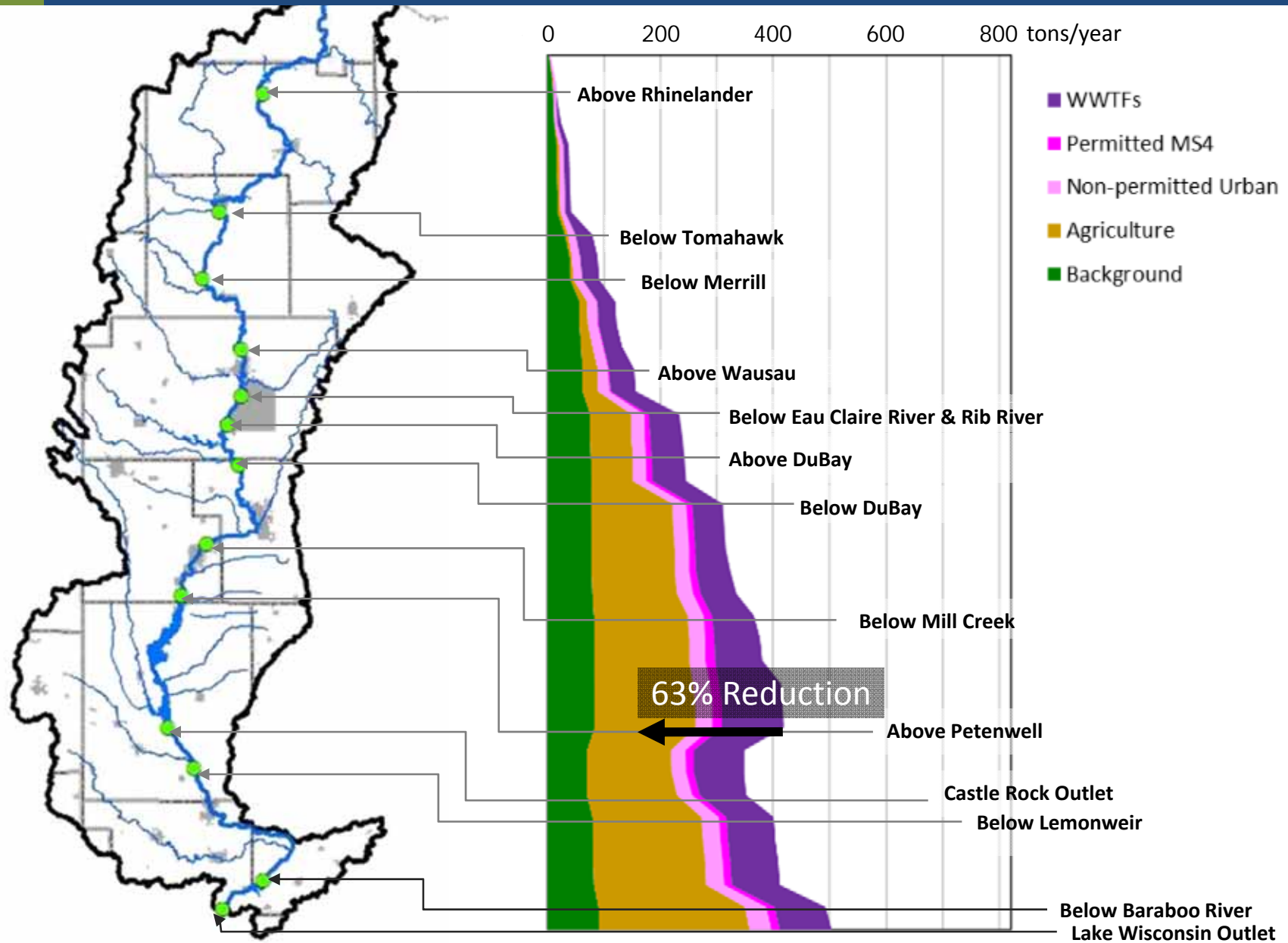
Jensen, J. P., Pedersen, A. R., Jeppesen, E., & Søndergaard, M. 2006. An empirical model describing the seasonal dynamics of phosphorus in 16 shallow eutrophic lakes after external loading reduction. *Limnology and Oceanography* 51 (1) 791-800.

Petenwell Loading Capacity Simulation



Jensen, J. P., Pedersen, A. R., Jeppesen, E., & Søndergaard, M. 2006. An empirical model describing the seasonal dynamics of phosphorus in 16 shallow eutrophic lakes after external loading reduction. *Limnology and Oceanography* 51 (1) 791-800.

Average Annual Delivered Total Phosphorus Load



TMDL Implementation



Industrial & Municipal
Wastewater & Stormwater

Waste Load Allocations

How?

- Incorporated into permits

Who?

- **DNR** sets limits based on allocations
- **Permitted facilities** implement limits



Load Allocations

How? Implement best management practices on the landscape

Who? - Counties, crop consultants, ag producers, ag organizations, conservation/citizen groups, groups, DNR, DATCP, NRCS

TMDL Implementation



Monday, March 6, 2017, 8:30 a.m. - 3:00 p.m.
 Marshfield Agricultural Research Station, 2611 Yellowstone Dr., Marshfield, WI

Workshop Agenda

8:30 a.m. Registration	11:45 a.m. Lunch Break <i>(Hot Meal from Rockman's Catering)</i>
9:00 a.m. Keynote ~ Linking Agricultural Trends to Water Quality Improvement <i>Shane Wucherpfennig & Rick Georgeson</i>	12:45 p.m. Soil Health: Supporting the Transition <i>Mike Maguire (FCS), John Eron, Sam Warp, Doug Szemborski, & Mike Dopp</i>
9:45 a.m. No-Till and Cover Crops: Dispelling The Myths <i>Jason Cavadini, Pat Socha, Joe Schultz & Dave Gallion</i>	3:00 p.m. Optional Equipment Tour

Workshop Panels: The first panel will feature local ag producers speaking on the challenges and rewards of incorporating no-till and cover crops, including yield lags, economics, and incorporating manure. The second panel will address tools to help farmers interested in conservation practices, including farmer-led efforts, lending opportunities, equipment changes, and water quality trading.

General registration opens Feb 1. Space is limited, register now to reserve your spot!
\$25- Register yourself, then ask a neighbor to register. No walk-ins
<http://fyi.uwex.edu/healthysoilwater/>

Workshop Planning Partners and Sponsors



* Special thanks to PACRS and Wisconsin's Farm Bureau Federation for their donations.

Summary

- Wisconsin River reservoirs are impaired by phosphorus
- Challenge of a large watershed
- Thorough monitoring is worth the cost
- Non-point implementation will benefit from new partnerships

