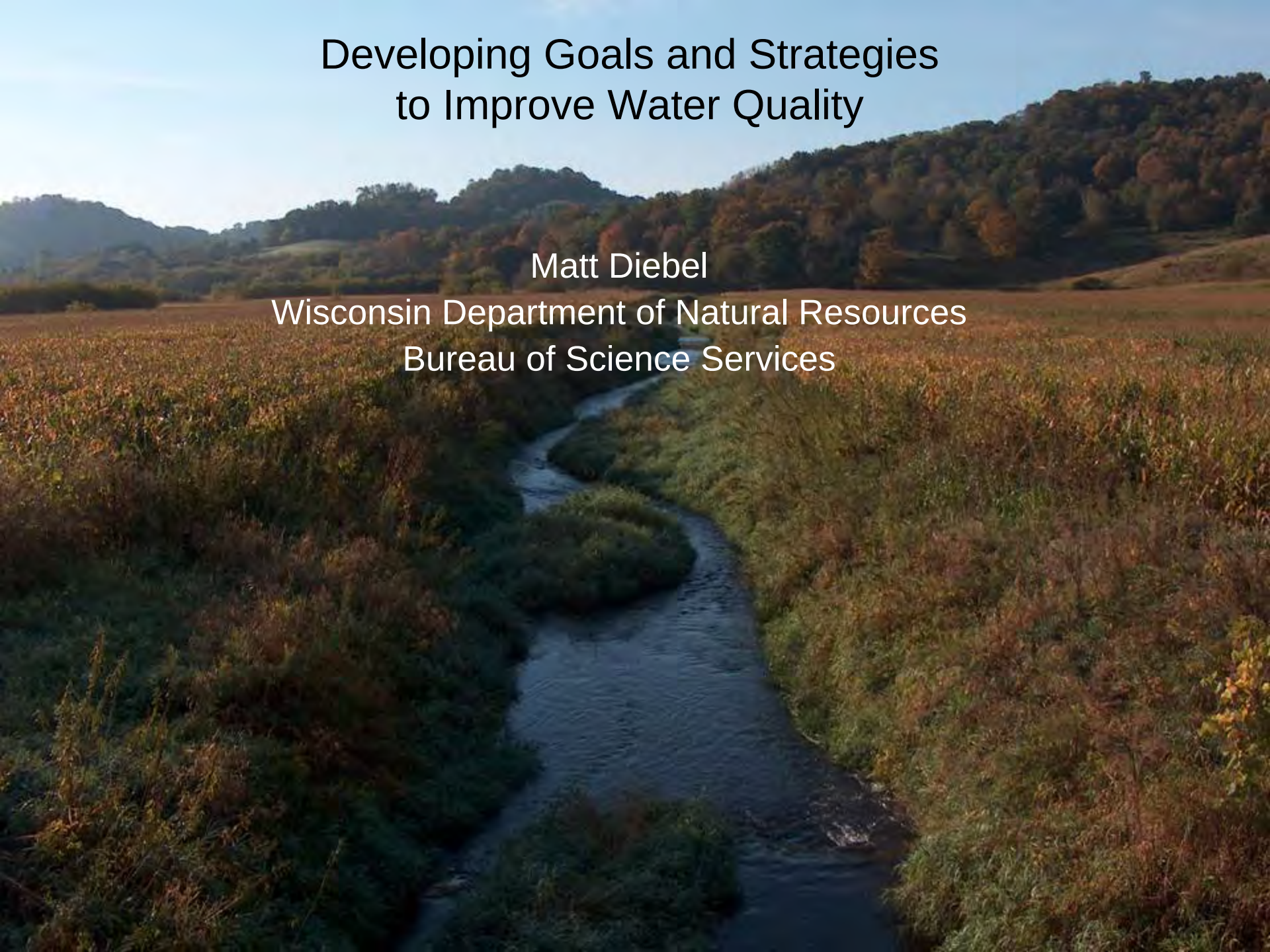
Developing Goals and Strategies to Improve Water Quality



Matt Diebel
Wisconsin Department of Natural Resources
Bureau of Science Services

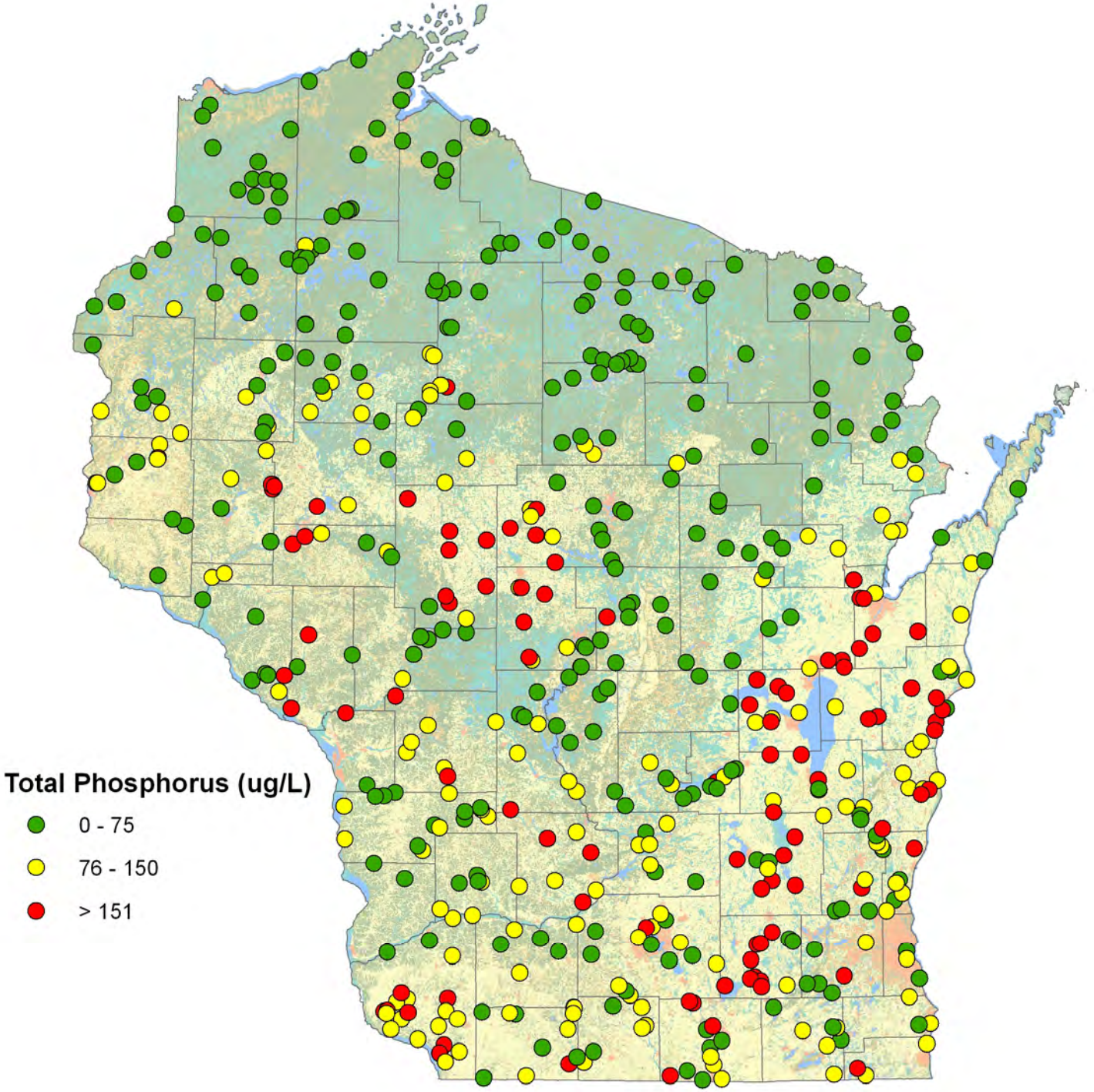
Outline

- How to use state water quality standards to set goals for streams and lakes
- How to identify/deal with factors that may prevent or delay the achievement of water quality goals
- How to prioritize watershed projects

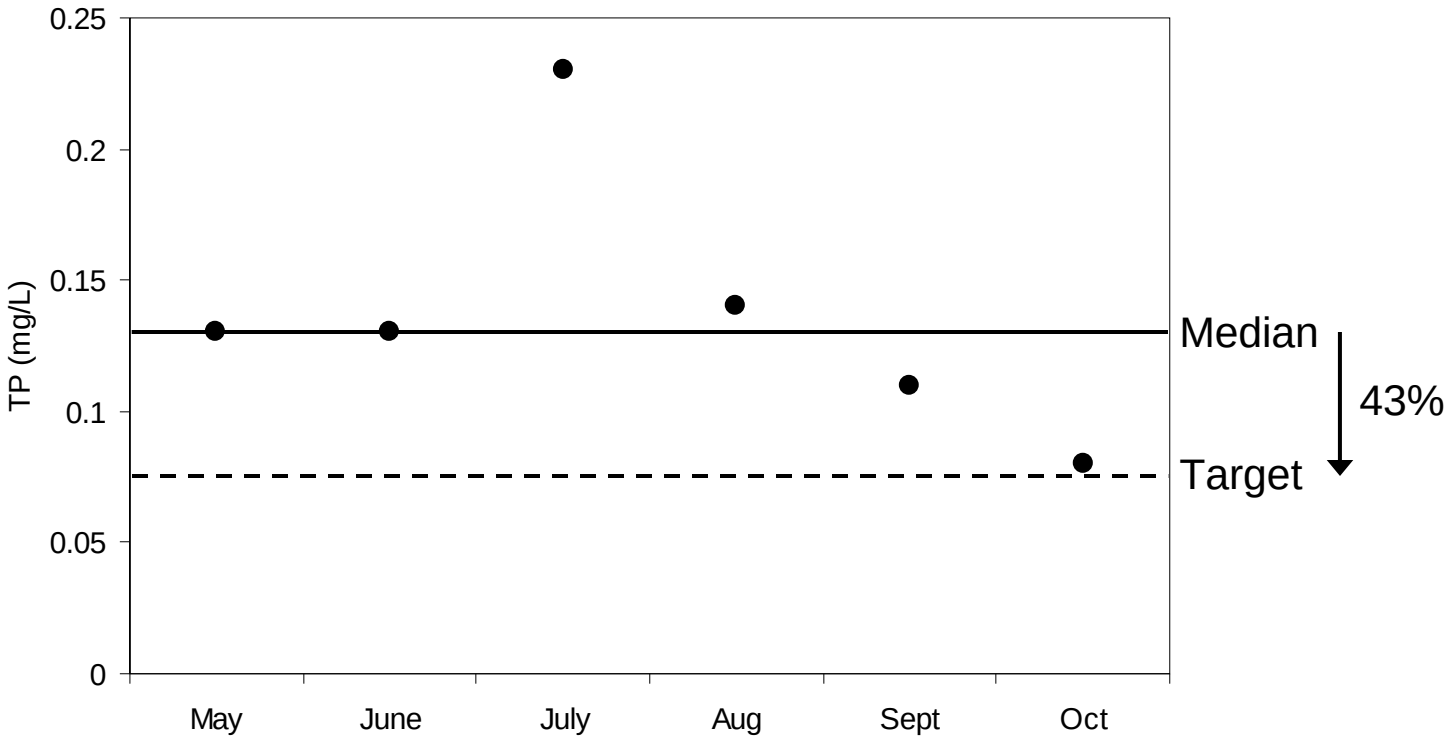
Wisconsin Surface Water Quality Standards

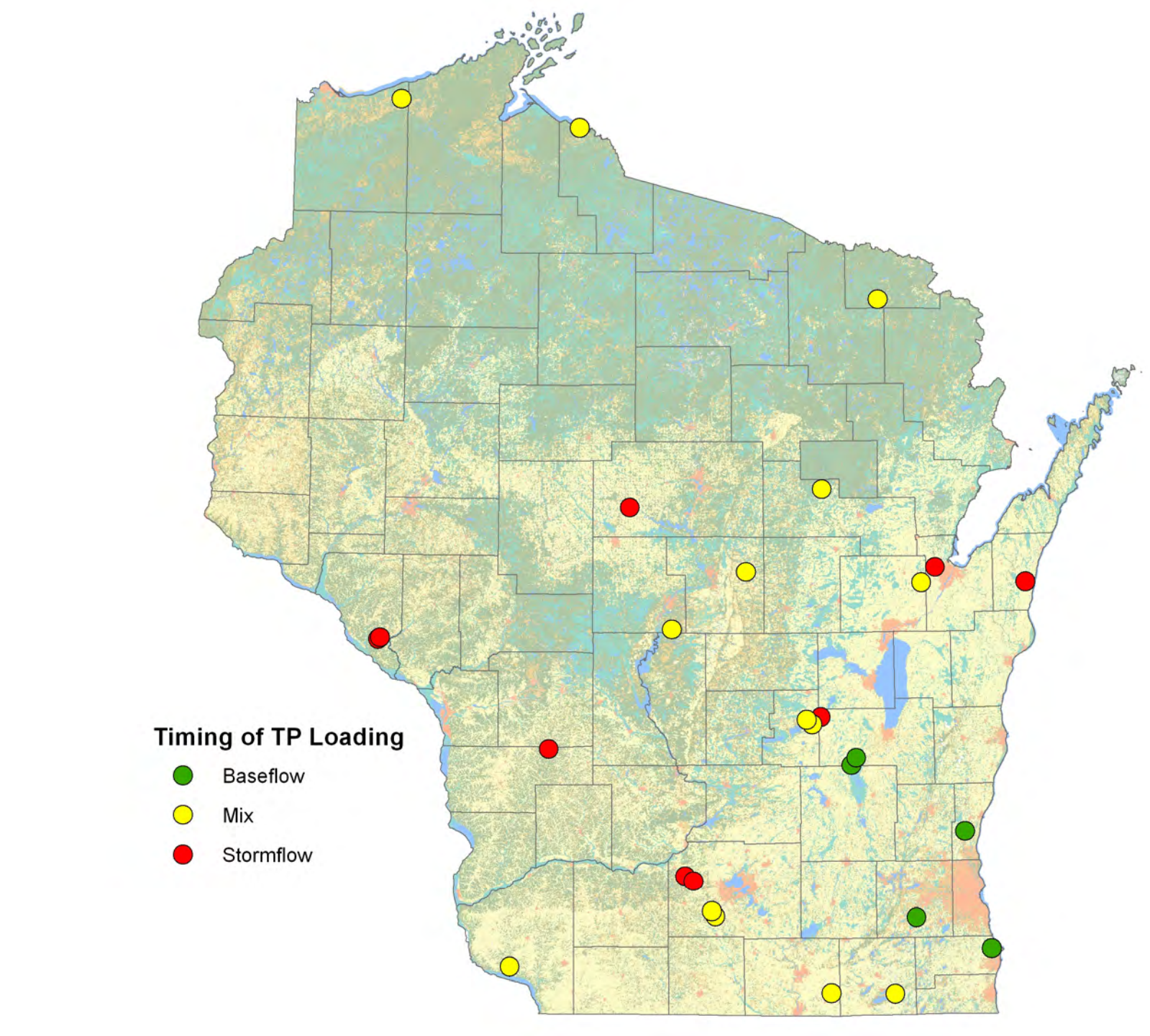
Phosphorus (NR102)

- Streams and Rivers (Median of 6 samples from May – Oct.)
  - 100 µg/L for rivers named in statute
  - 75 µg/L for all other streams and rivers
  - Median of 6 monthly samples (May-Oct)
- Lakes (Average of 6 samples from June 1 – Sept. 15)
  - 40 µg/L for shallow lakes
  - 30 µg/L for deep drainage lakes
  - 20 µg/L for deep drainage lakes
  - 15 µg/L for two-story fishery lakes

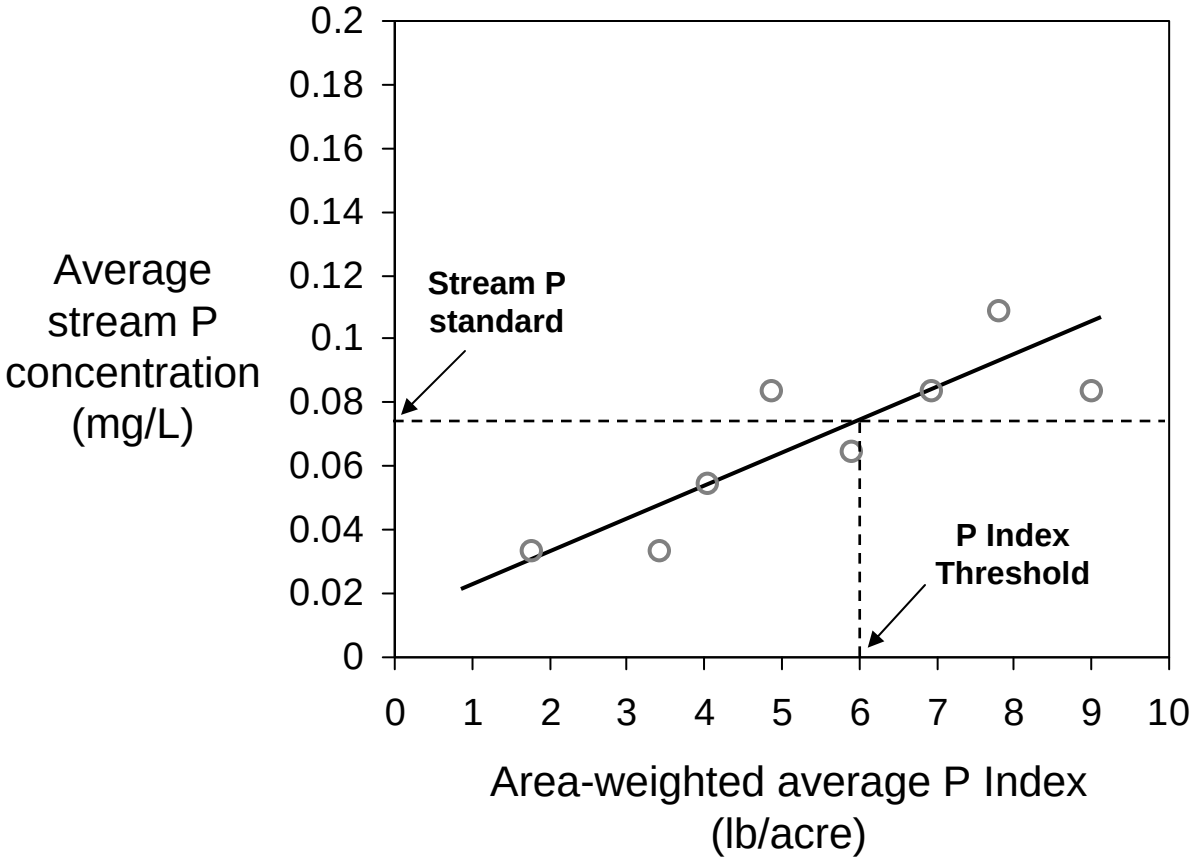

Total Phosphorus (ug/L)
0 - 75
76 - 150
> 151

Silver Spring Creek, Lafayette County

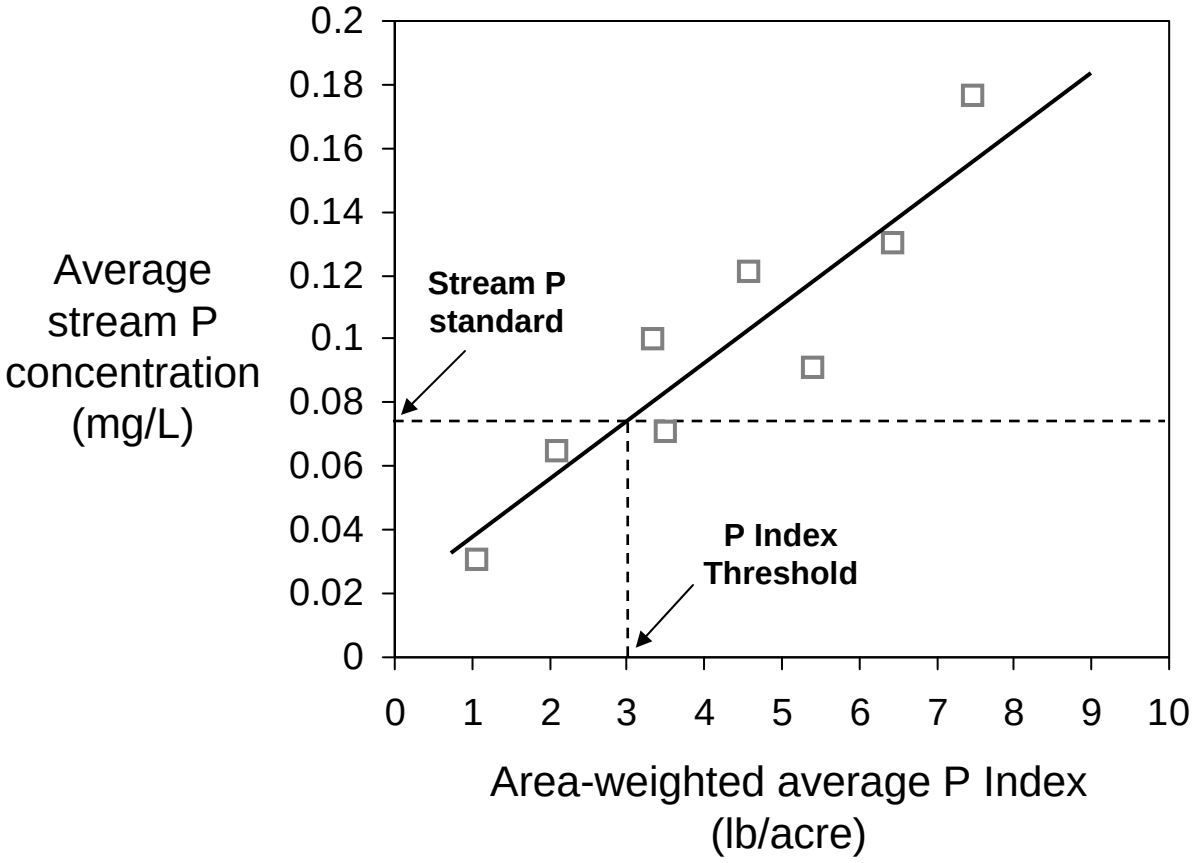



Timing of TP Loading
Baseflow
Mix
Stormflow

What P Index threshold will meet water quality standards?



What P Index threshold will meet water quality standards?

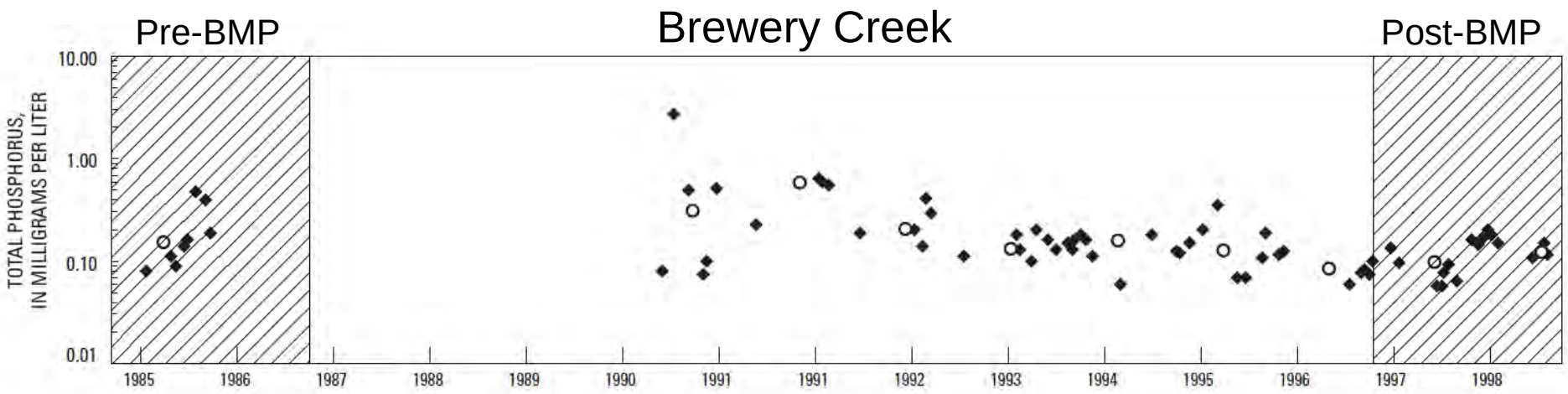


Wisconsin Lake Modeling Suite (WiLMS)
http://www.dnr.state.wi.us/lakes/model/

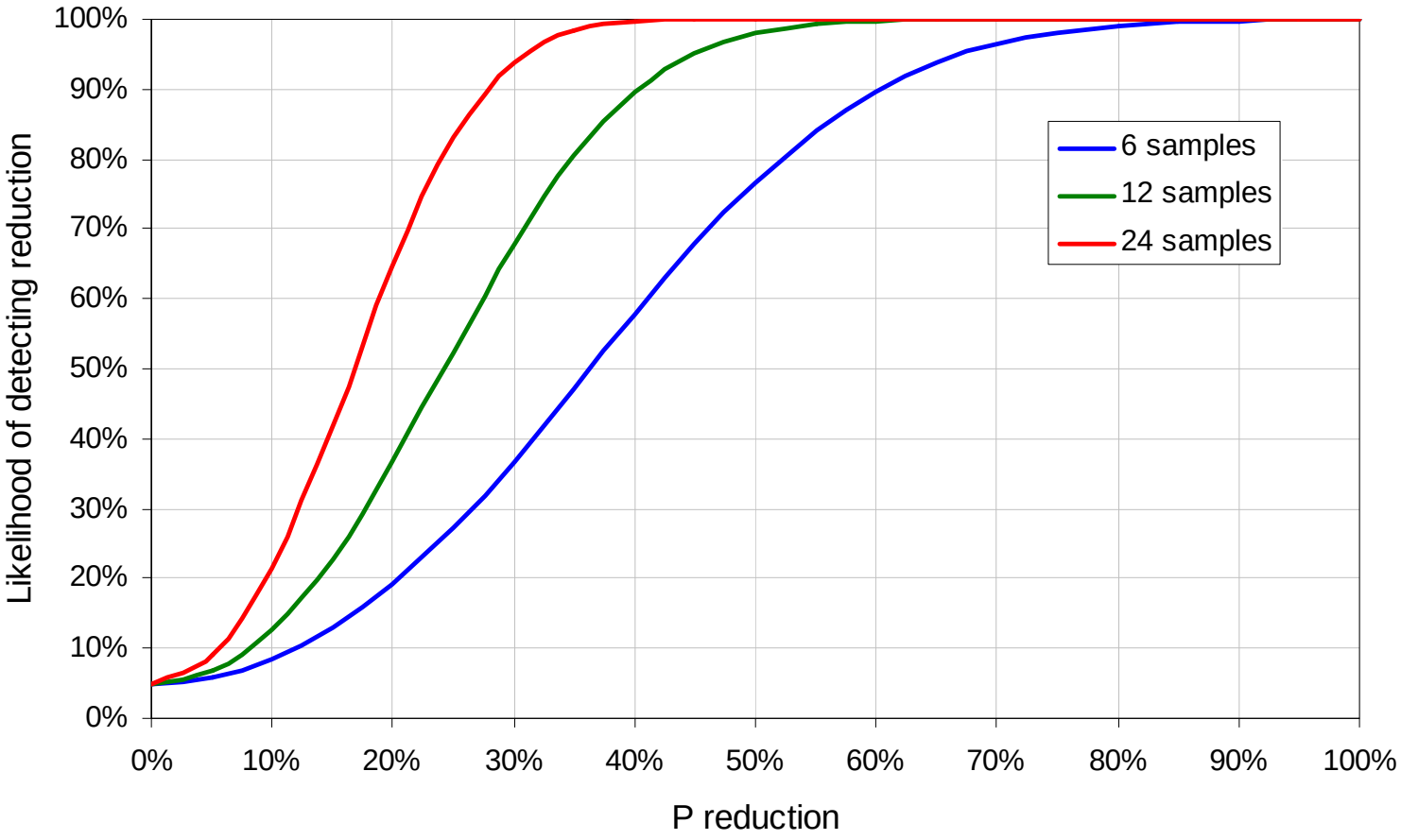
Why does water quality improvement lag behind BMP implementation?

- Natural variability
- Soil P drawdown is slow
- Channel storage
- Baseflow vs. Stormflow

Problem: Natural Variability



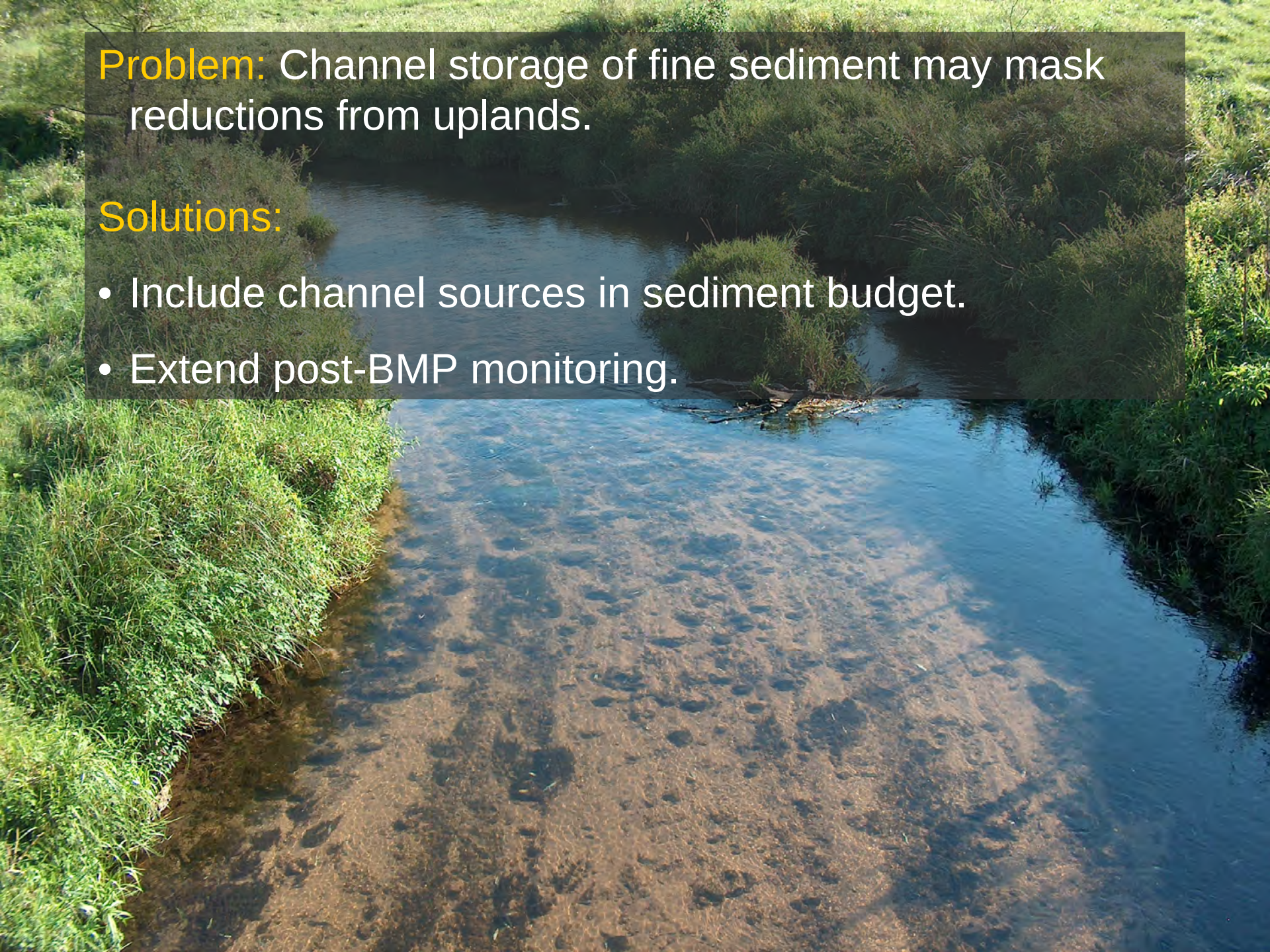
Solution: Power Analysis



Problem: Soil P drawdown is slow.

Solutions:

- Promote practices that limit soil erosion.
- Use stormflow loads to evaluate BMP effectiveness.



Problem: Channel storage of fine sediment may mask reductions from uplands.

Solutions:

- Include channel sources in sediment budget.
- Extend post-BMP monitoring.

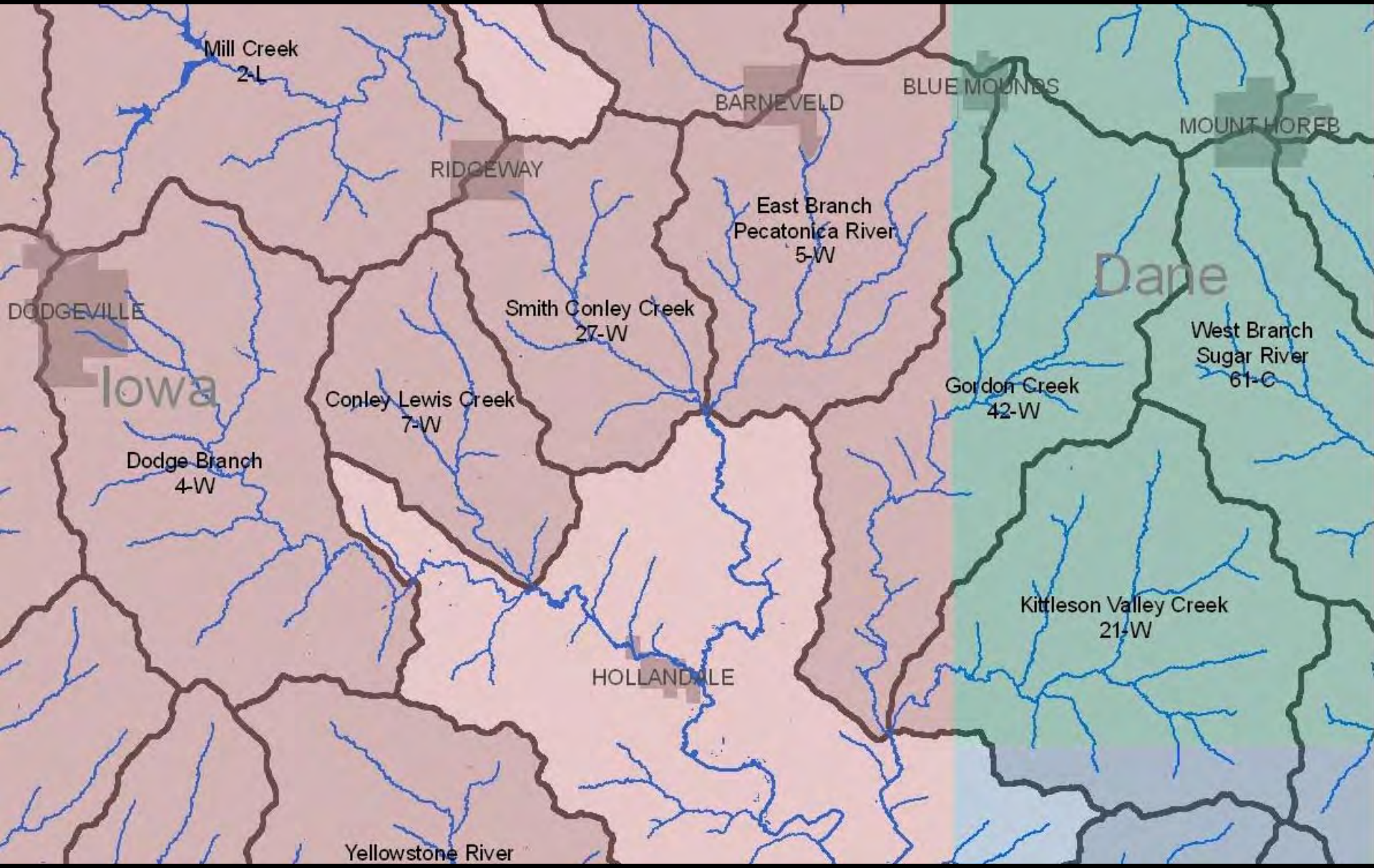
Problem: Baseflow and stormflow loads may respond differently to management practices.

Target	Short-term	Long-term
Baseflow (streams)	Minimize tile drainage Wetland restoration	Reduce soil P
Stormflow (lakes)	Reduce manure P loss Reduce soil erosion	

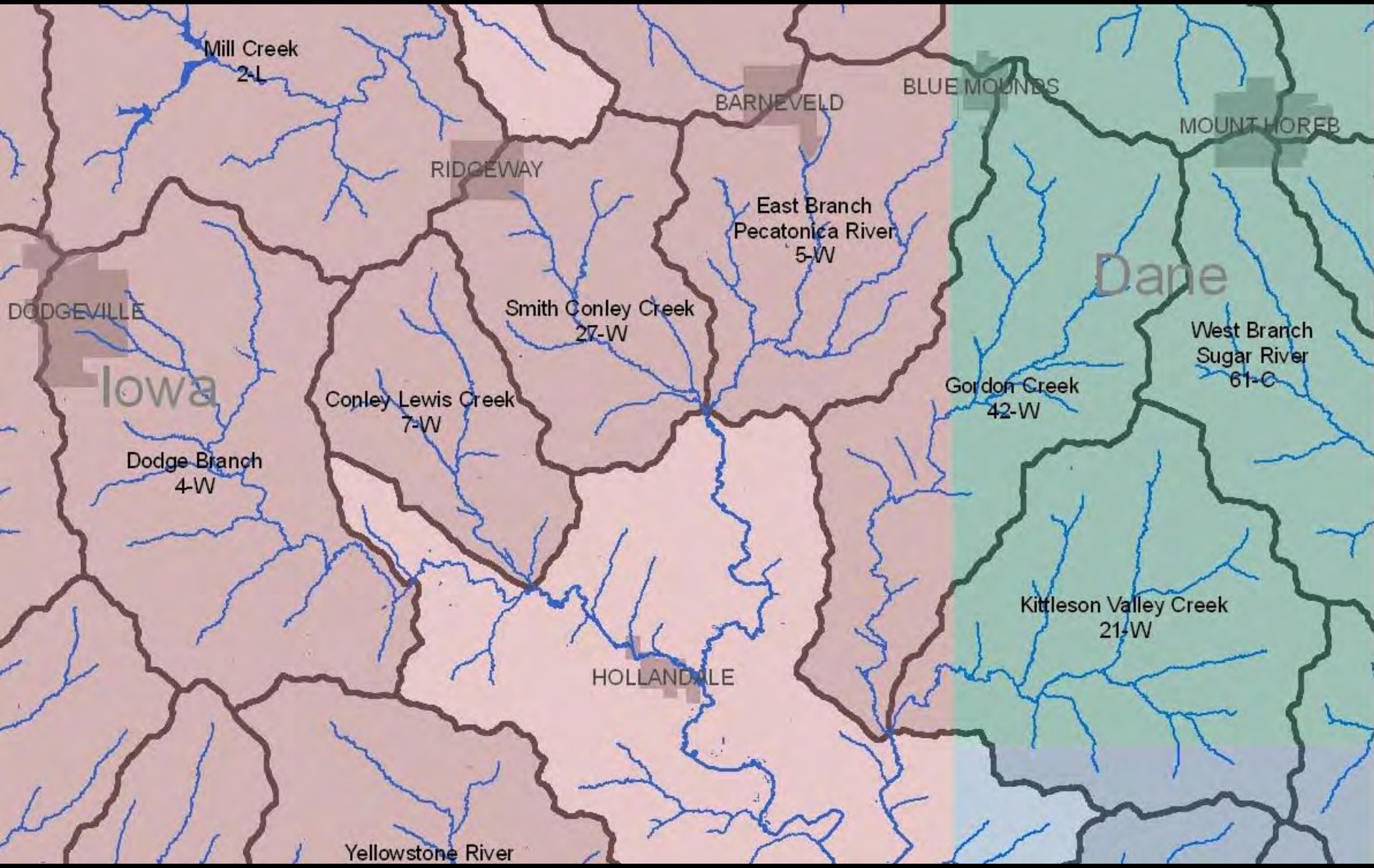
How to prioritize watershed projects

- Watershed size
- Opportunity
- Minimize limiting factors
- Aim for ecological thresholds

Watershed Size

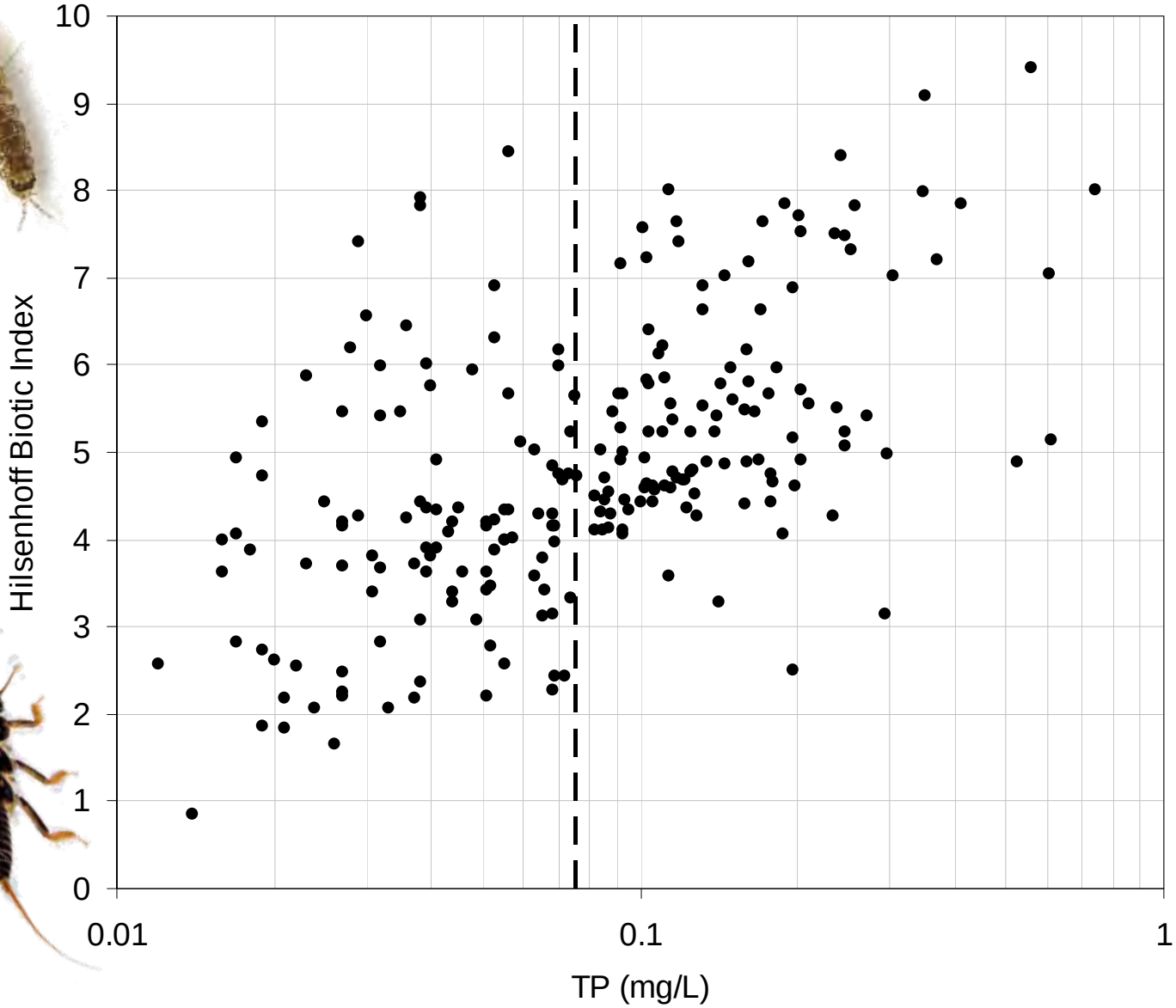


Opportunity



Limiting Factors for Water Quality Improvement

Aim for ecological thresholds.



Summary

- Water quality standards can be used to set goals for watershed projects.
- Promote practices based on water quality goals.
- Account for lag times in monitoring design and practice selection.
- Select watershed projects that are most likely to achieve goals.