

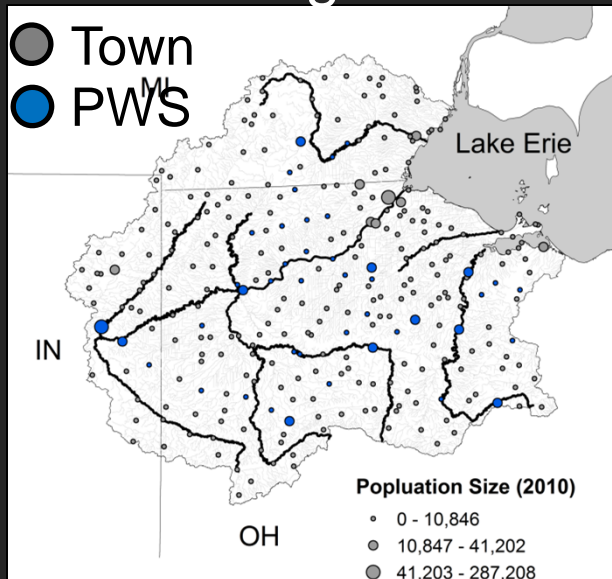
Western Lake Erie Conservation Effects Assessment Project – Wildlife Component



Presented by S. Conor Keitzer

Culturally, Economically, and Ecologically Important Watershed

Drinking water



Recreational opportunities & cultural significance



Biodiversity



Project Team



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The Ohio State University and Ohio Sea Grant
Stuart Ludsin, Conor Keitzer, Maura O'Brien,
Chris Winslow & Jeff Reutter



Our Approach: Overview

1) Used a hydrologic model (SWAT) to simulate in-stream water quality (Flow, TP, TN, and SS) during 1990-2010



2) Developed predictive biological models

- Index of biotic integrity
- Relative abundance of piscivorous species



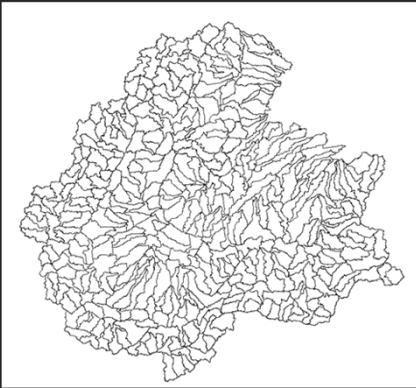
3) Management Scenarios



Our Approach: Watershed Model

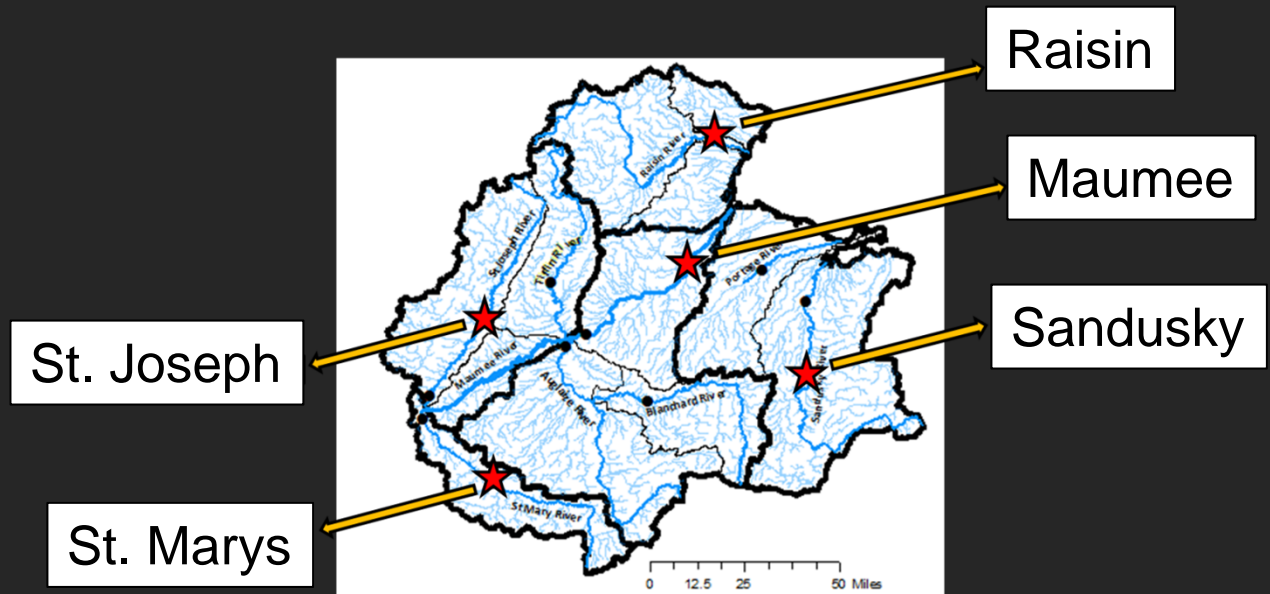
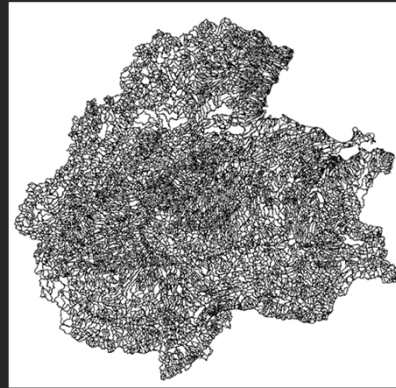
HUC12 scale

391 subwatersheds



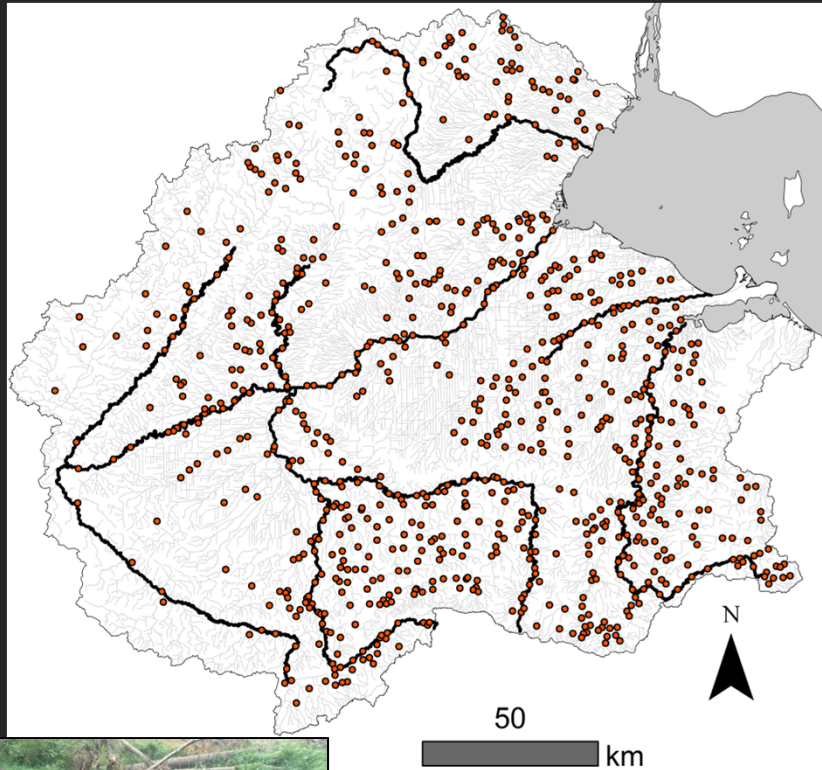
NHD+ scale

11,335 subwatersheds



Details in Daggupati et al. 2015 & Yen et al. 2016

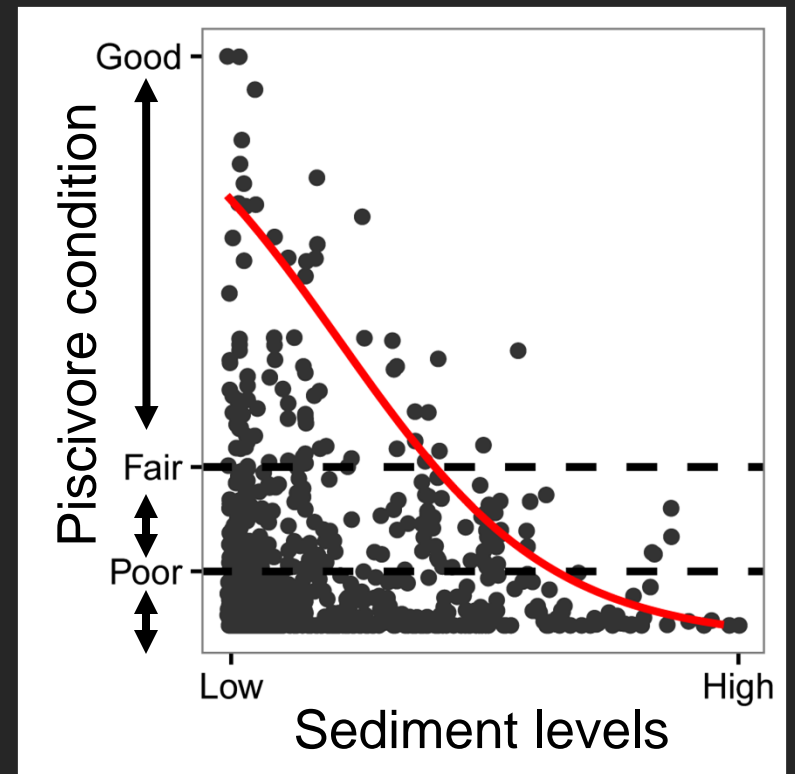
Our Approach: Biological Models



Fish data (n = 841 unique sites)
provided by IN DEM, MI DEQ, MI
DNR, & OH EPA



Details in Keitzer et al. 2016



Our Approach: Management Scenarios

Practice Types Implemented	Treatment Need*		
	High	Moderate	Low
Erosion Control practices		-	-
Erosion Control practices			-
Erosion Control practices			
Erosion Control & Nutrient Management		-	-
Erosion Control & Nutrient Management			-
Erosion Control & Nutrient Management			

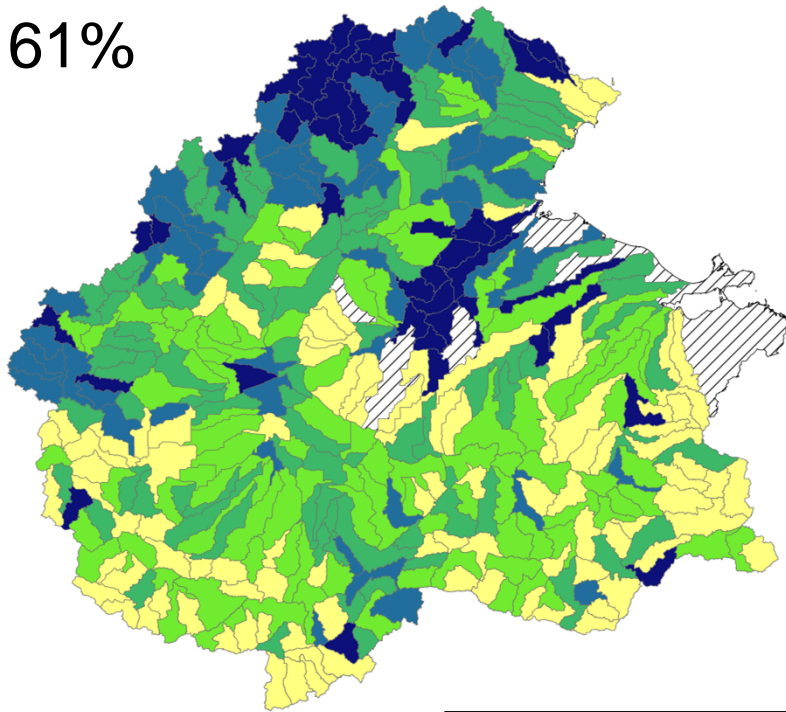
*based on run-off risk and/or level of treatment (2003-2006)

Baseline conditions suggest water quality limitation is *widespread*

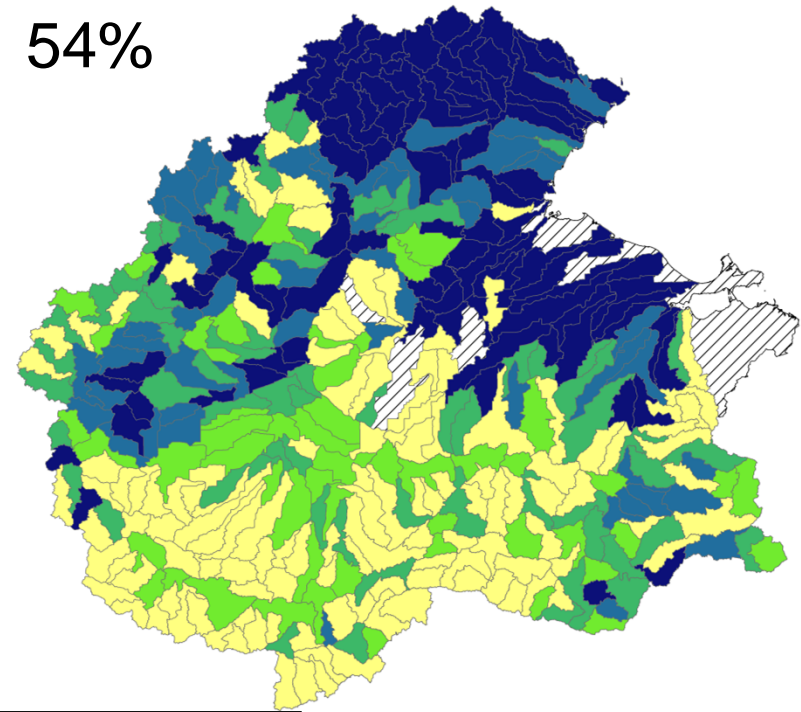
Index of biotic integrity

Piscivorous species

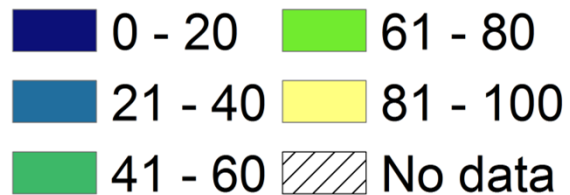
61%



54%

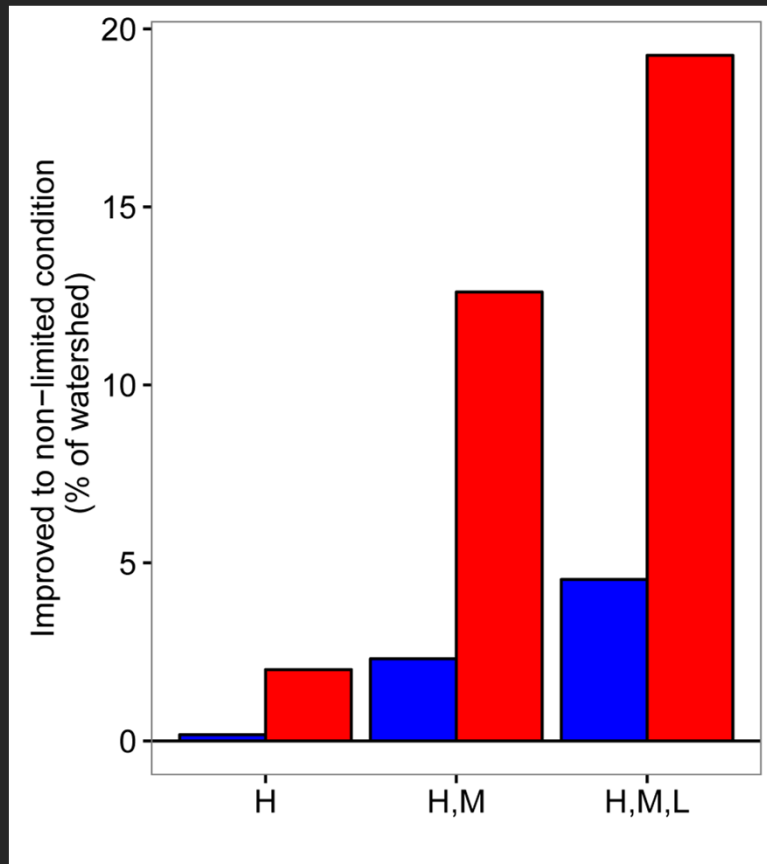


**% of subwatershed
limited by water quality**

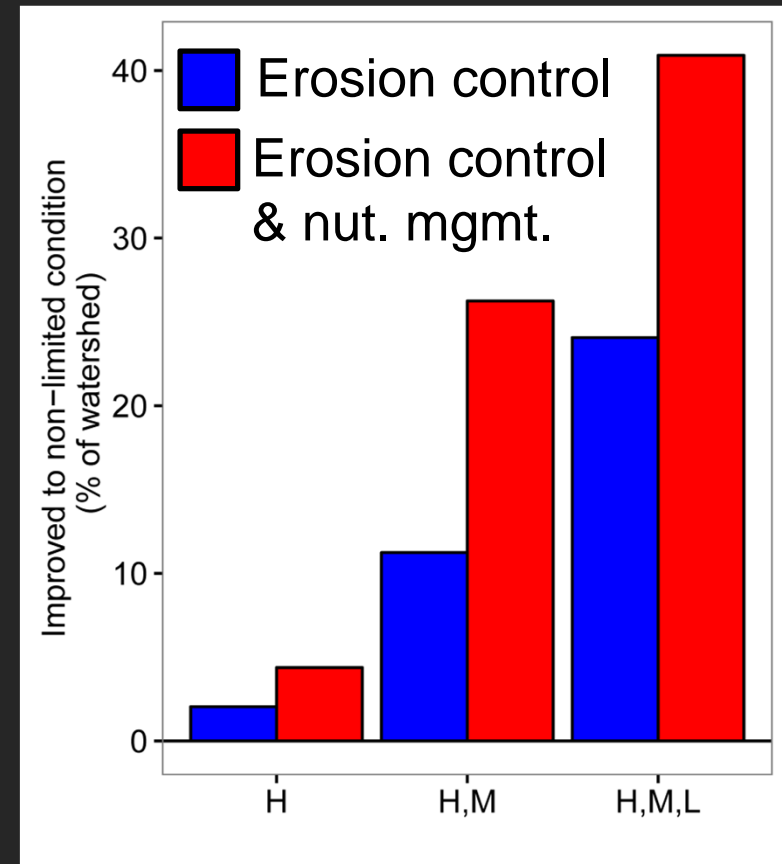


- Biological conditions may be improved substantially with *widespread* implementation
- Erosion control *and* nutrient management may be needed

Index of biotic integrity

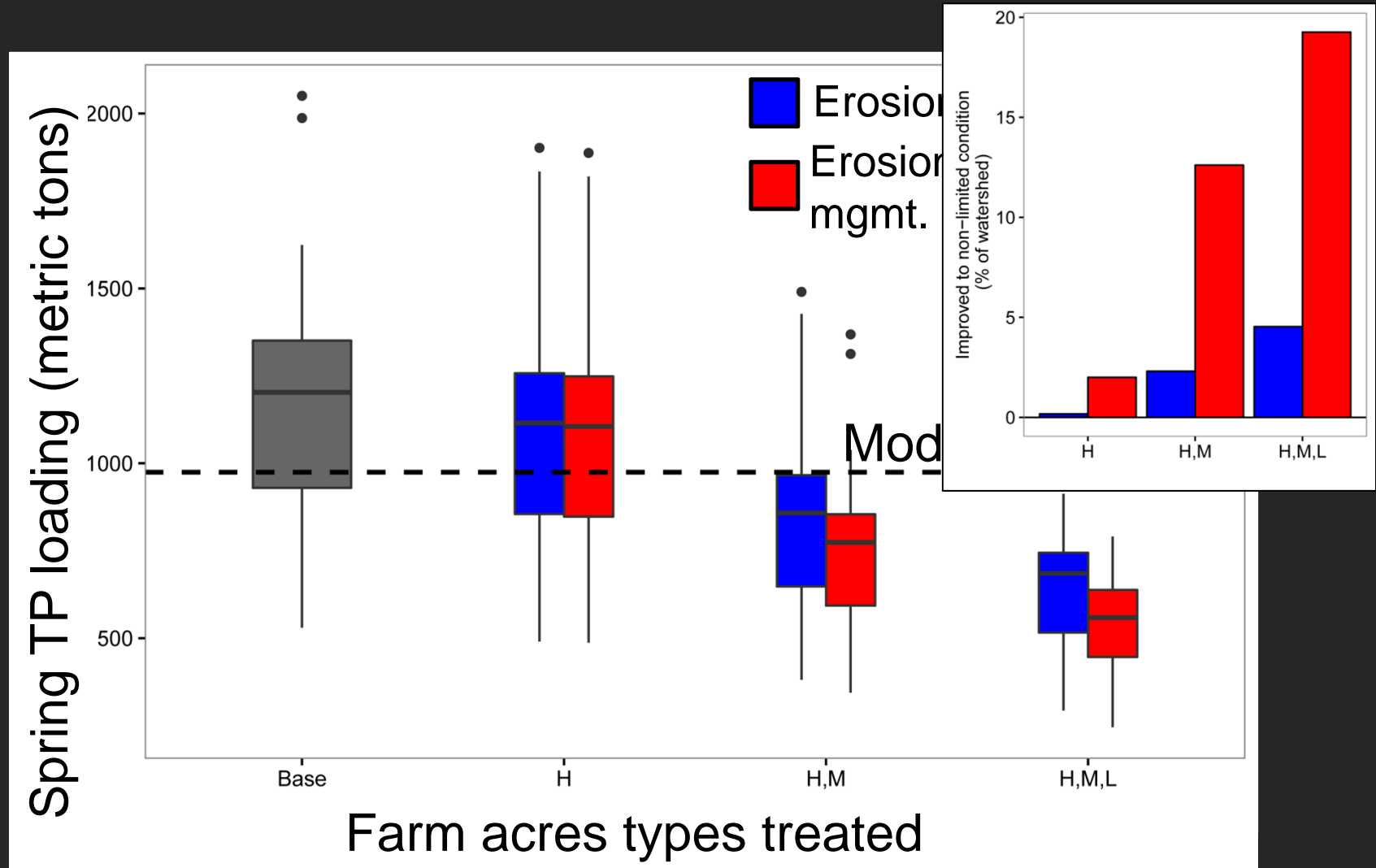


Piscivorous species



Farm acres types treated

- *Widespread* implementation can also help reduce TP loading from major WLE tributaries
- Some strategies were more effective than others for achieving “win-wins” for Lake Erie and its tributaries

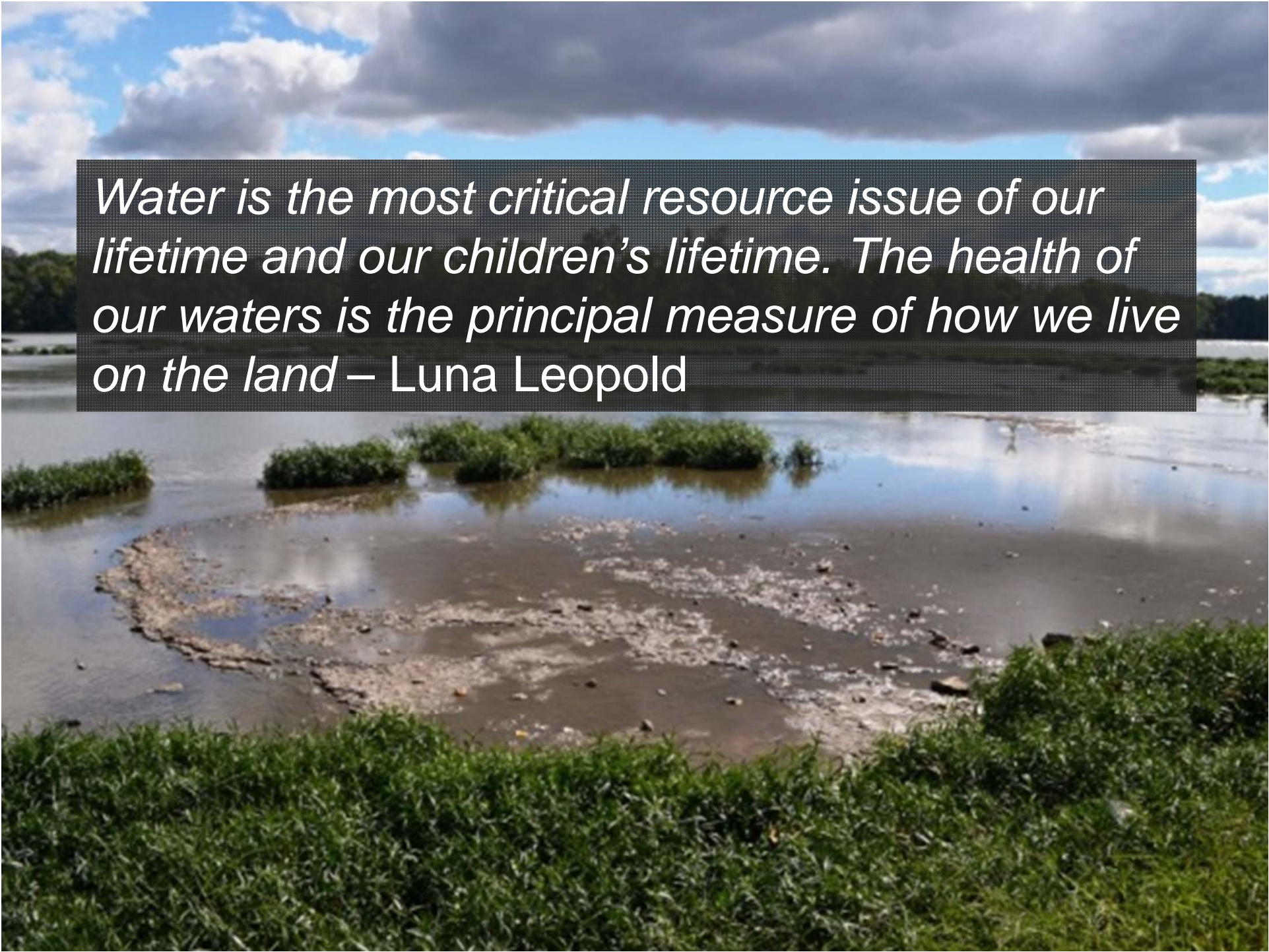


Summary

- Water quality is likely limiting stream health throughout a large portion of the WLE watershed
- Widespread implementation of conservation practices can help alleviate water quality issues
- Erosion control practices *and* nutrient management provide greater benefits for stream health
- We can achieve win-wins if we think strategically about stream conservation *and* Lake Erie water quality management

Thank You

- Final Report available on project website (<http://lakeerieceap.com/>) this summer (end of July)
- Manuscripts with more details of methods & results-
 - Daggupati et al. 2015. Hydrological Processes 29:5307-5230
 - Keitzer et al. 2016. Journal of Great Lakes Research. Available on-line or by request (keitzer.2@osu.edu)
 - Yen et al. 2016. Science of the Total Environment. Available by request (keitzer.2@osu.edu)



Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land – Luna Leopold