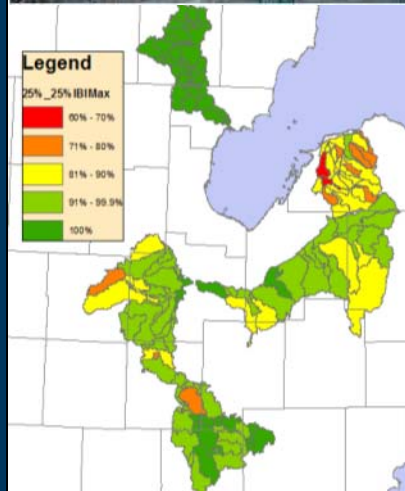
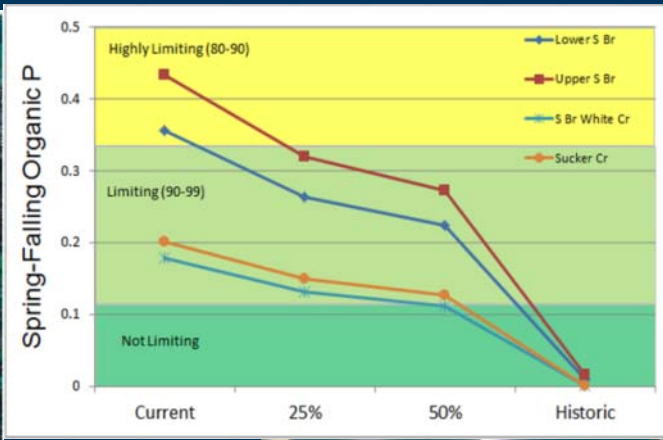


Overview of the Great Lakes and Western Lake Erie CEAP Projects

Informing Strategic Conservation of Streams in Ag Landscapes of the Great Lakes



Copyright Eric Engbretson

Doug Pearsall
 Lake Erie
 Millennium Network

October 29, 2013

A True Collaborative Effort



Scott Sowa, Matthew E. Herbert, Mary Fales, Anthony Sasson, August Froehlich, Gust Annis, Carrie Vollmer-Sanders, Bill Stanley, Kim Hall, Patrick Doran, and Douglas Pearsall,



Stuart Ludsin, Conor Keitzer, and Jeff Reuter



A. Pouyan Nejadhashemi



Lizhu Wang (now with IJC)



Jeff Arnold, Mike White, Charles Rewa, Lee Norfleet, and Mari-Vaughn Johnson



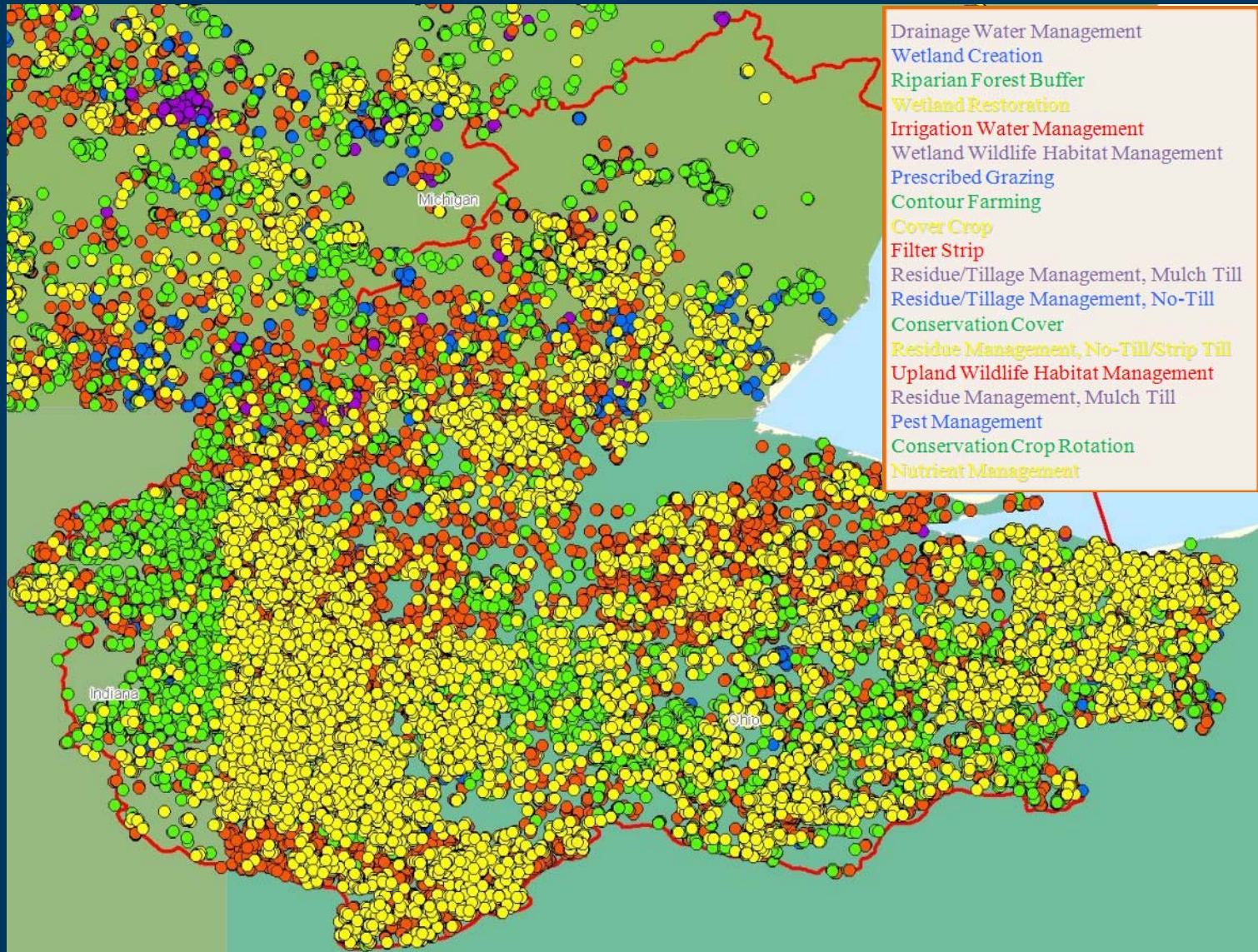
Raghavan Srinivasan, Prasad Daggupati, and Haw Yen

Strategic Conservation

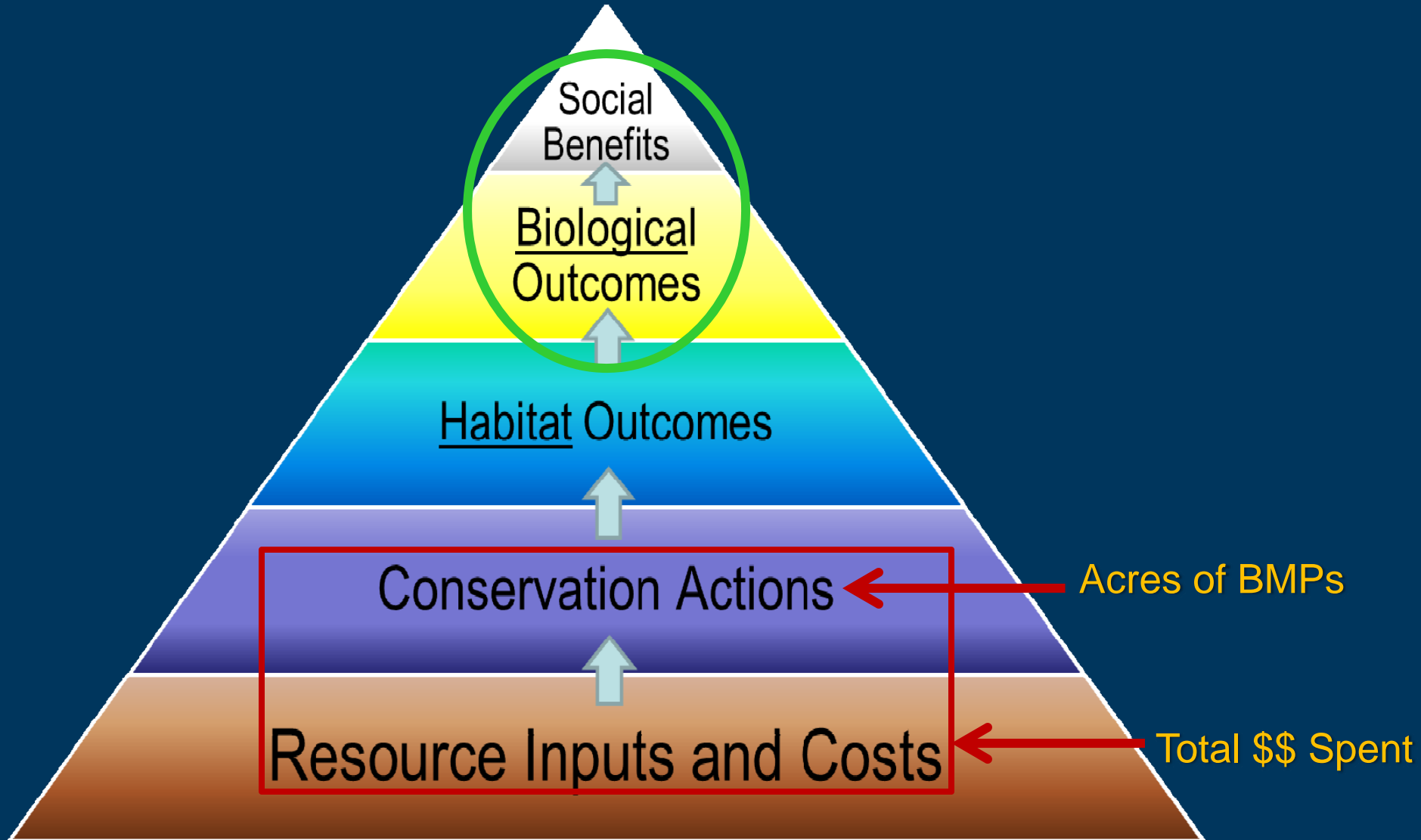
Getting the right conservation practices to the right places, in the **right amount**, at the right time, as efficiently as possible, to address the right problem and achieve realistic goals



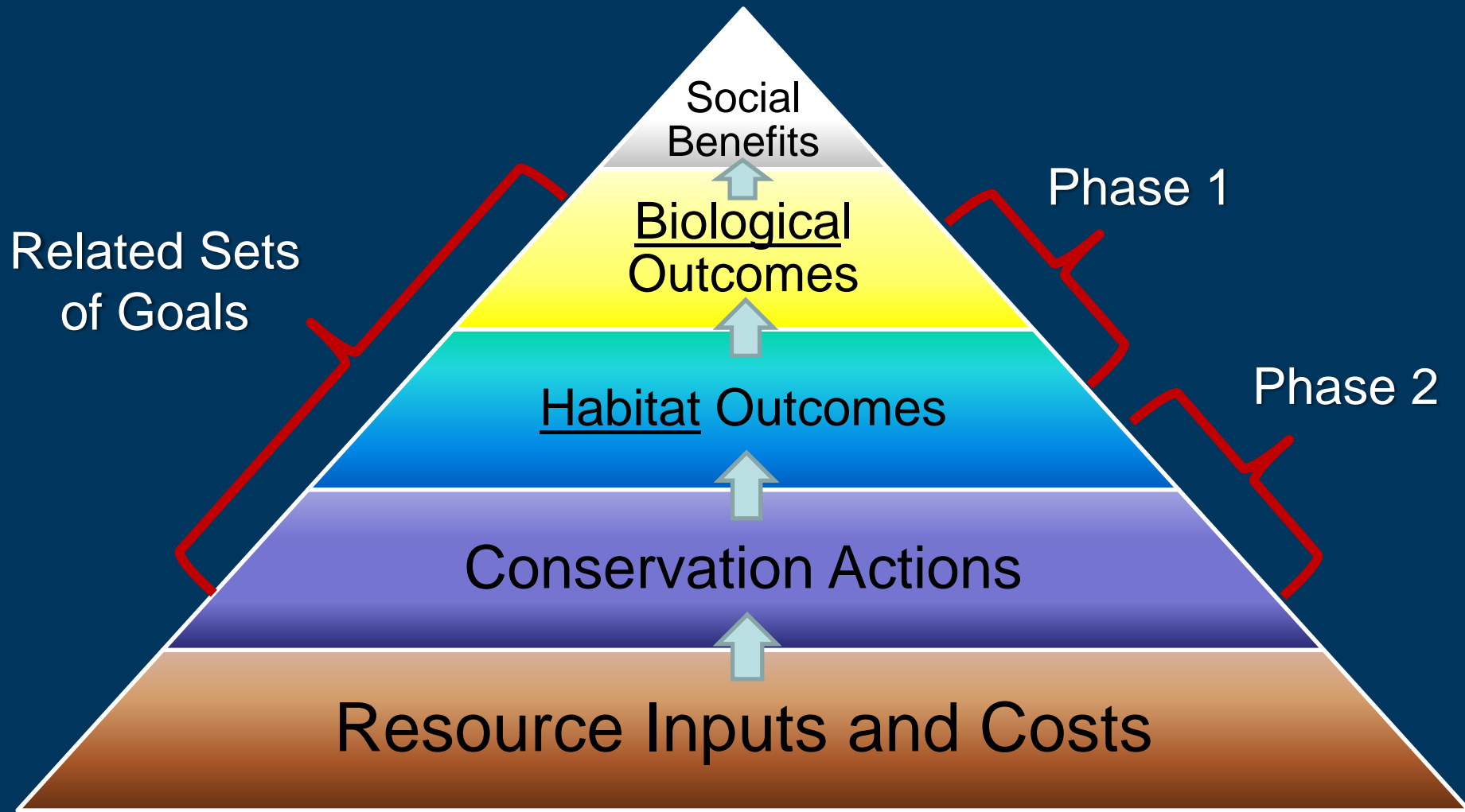
How Much Is Enough?



It Depends on Your Goal



Linking Conservation Actions to Biological Outcomes



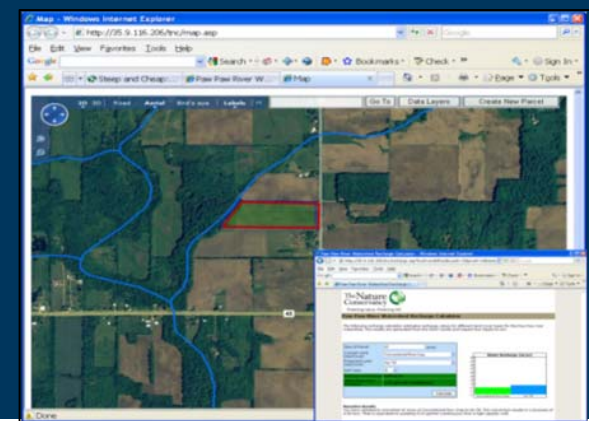
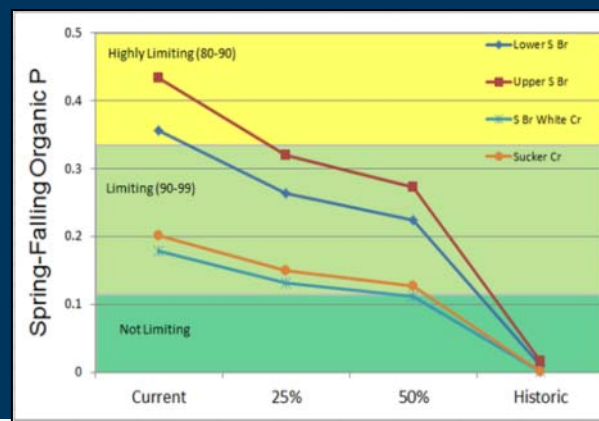
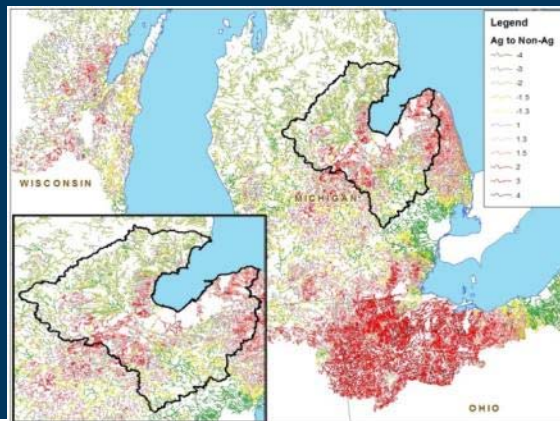
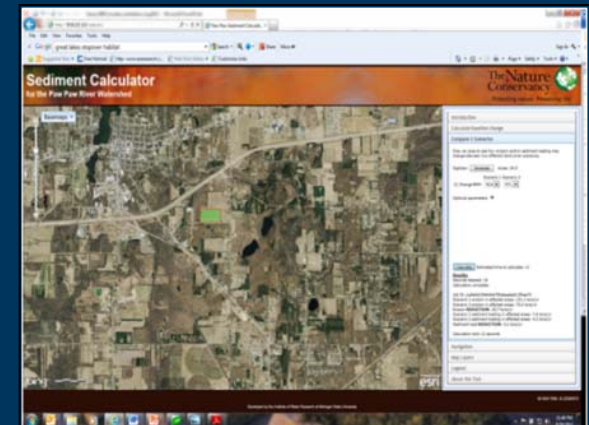
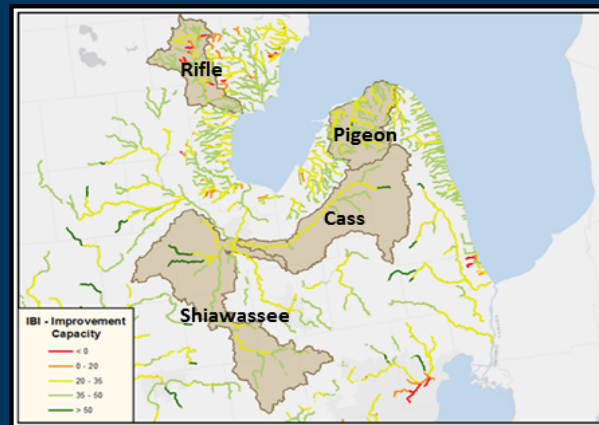
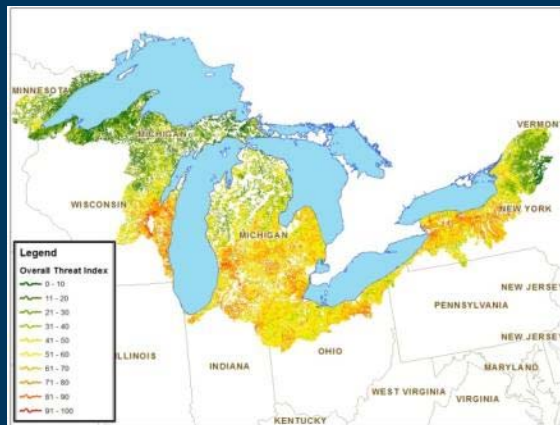
Strategic Conservation

Getting the right conservation practices to the **right places**, in the **right amount**, at the right time, as efficiently as possible, to address the right problem and achieve **realistic goals**



A Body of Work That Supports Logistics of Many Strategies

- Getting the **right information** to the **right people** in the **right format** to support setting realistic goals, strategically implement practices, & track progress

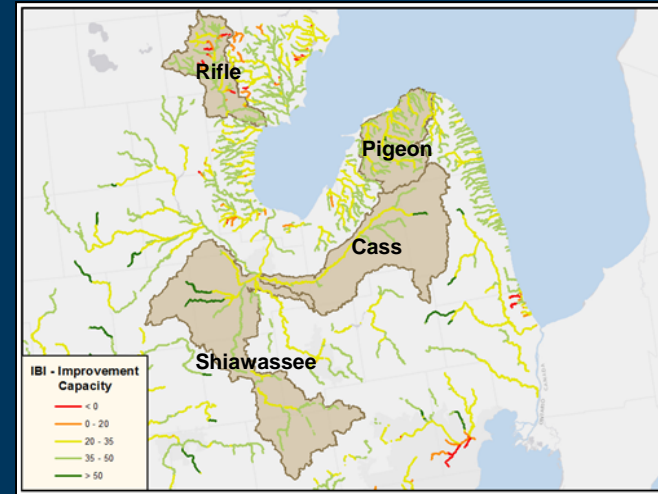


Project Areas

Phase 1

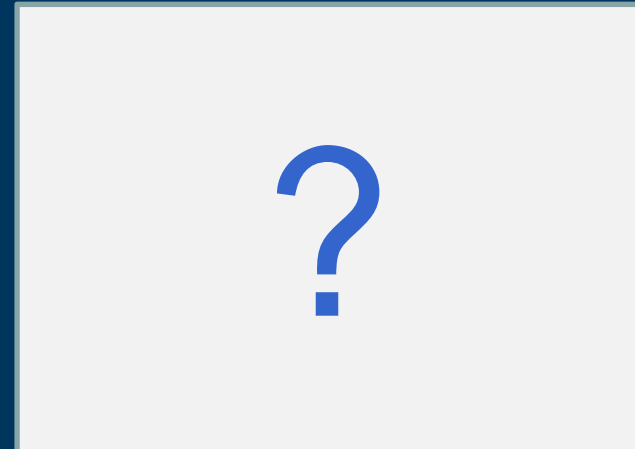


Phase 2



Great Lakes

Western Lake
Erie Basin



Phases of Work

Phase 1 – linking biological communities to water quality

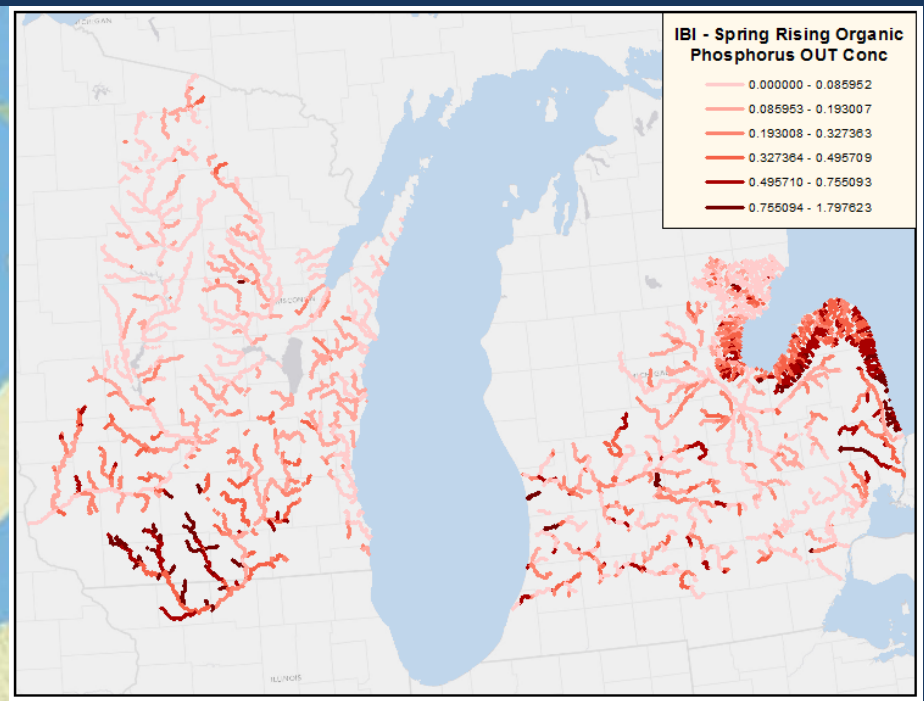
Phase 2 – linking conservation actions to water quality and biological endpoints

Phase 3 – decision tools to target and track

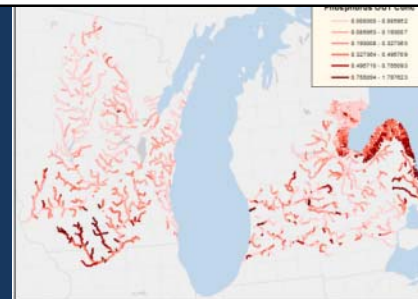
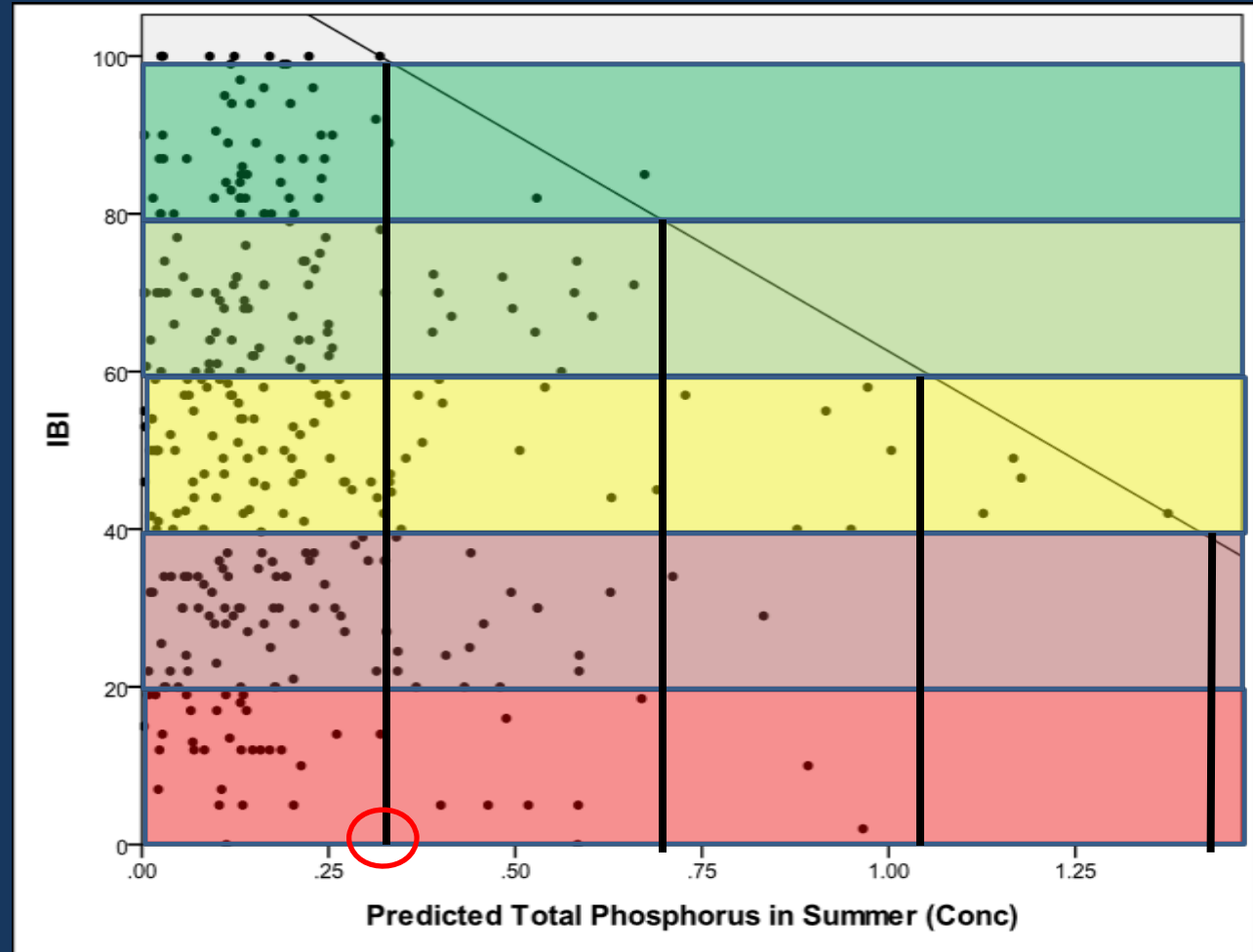
Phase 4 – partnering to set goals and test innovative strategies to achieve them

Phase 1 – Models Linking Fish Communities to Water Quality

- Actual Fish community health data vs. Predicted water quality (SWAT modeling)



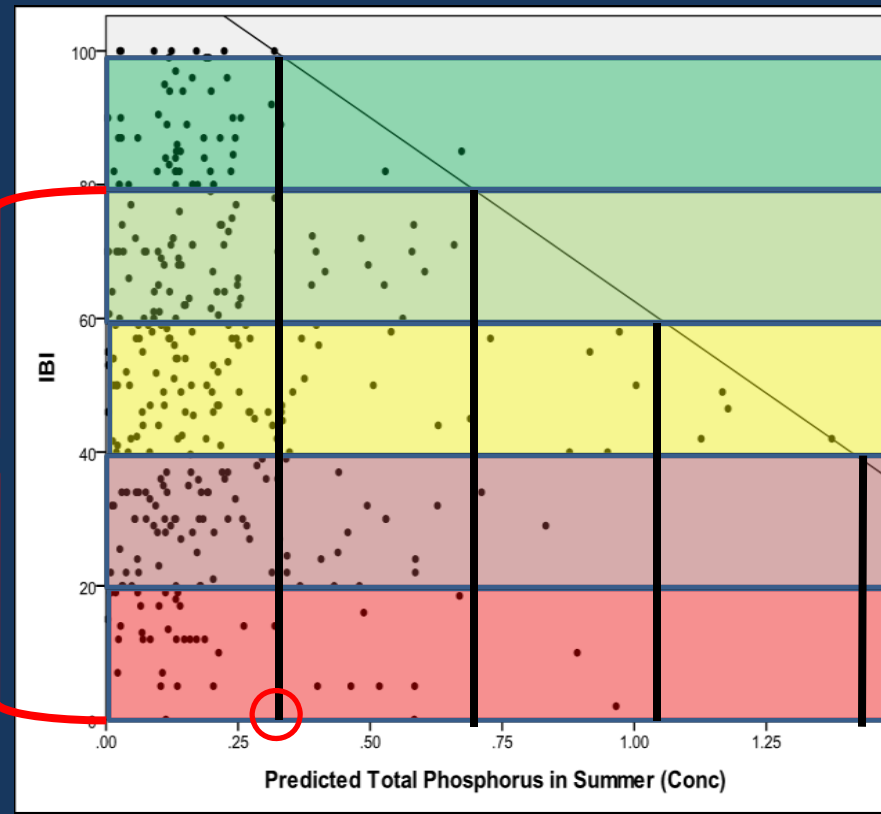
Phase 1 – Identify “ceilings” to set goals



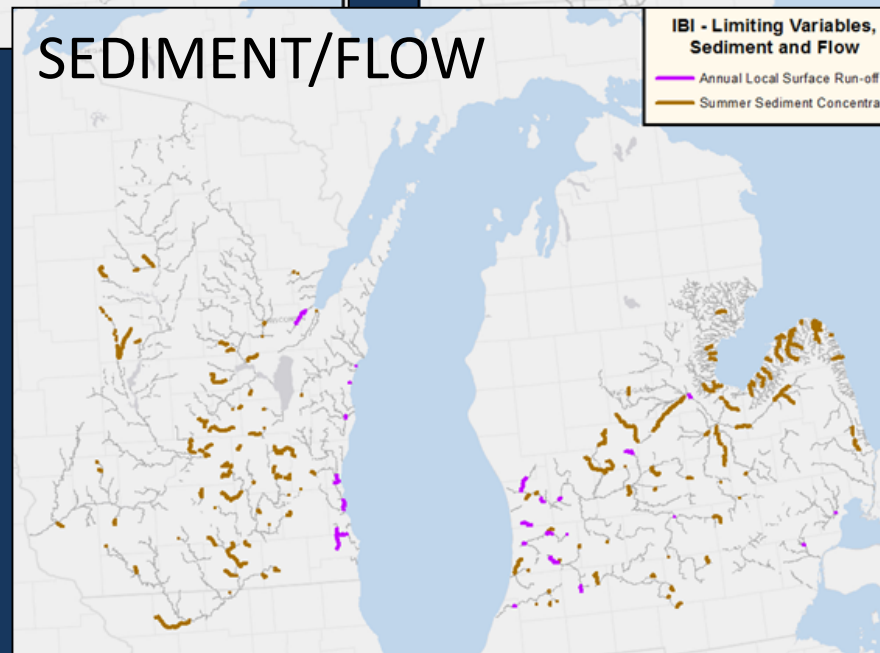
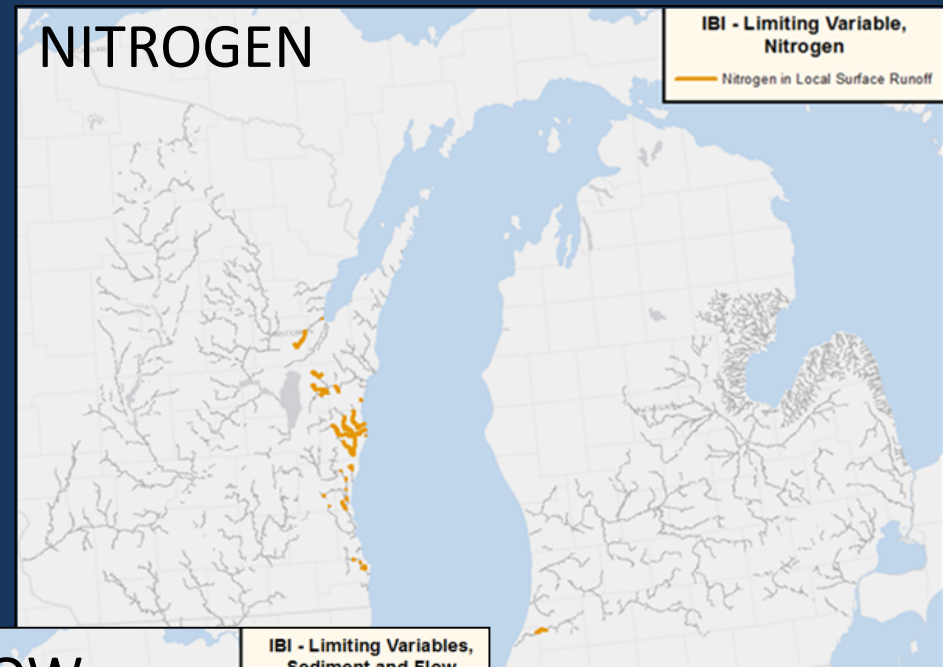
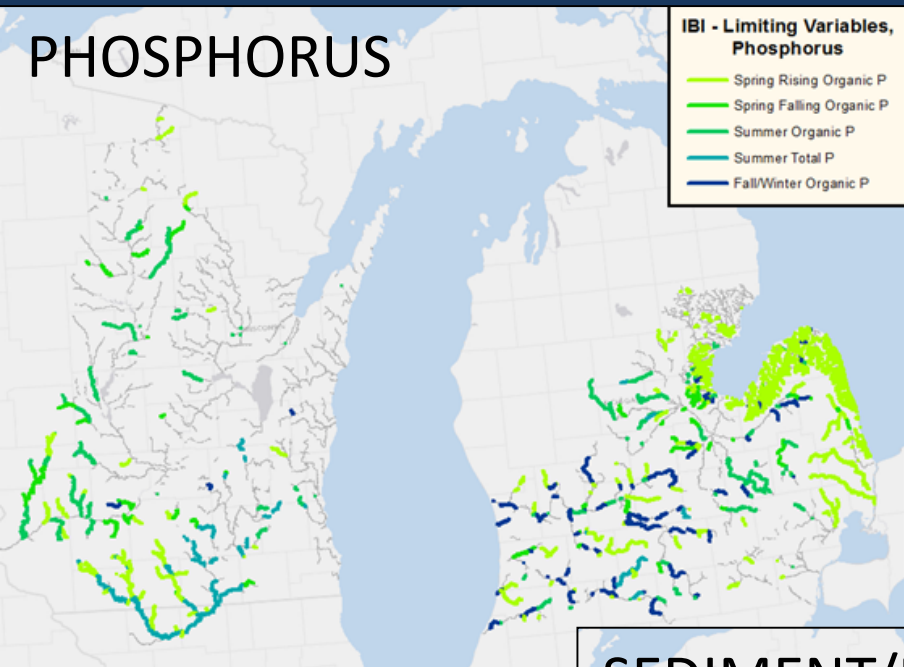
Phase 1: Identify Ceilings to Set Goals

Deciphering Wedge Plots/Envelopes

- At what point are **water quality** variables no longer limiting?
- Other factors are still often limiting



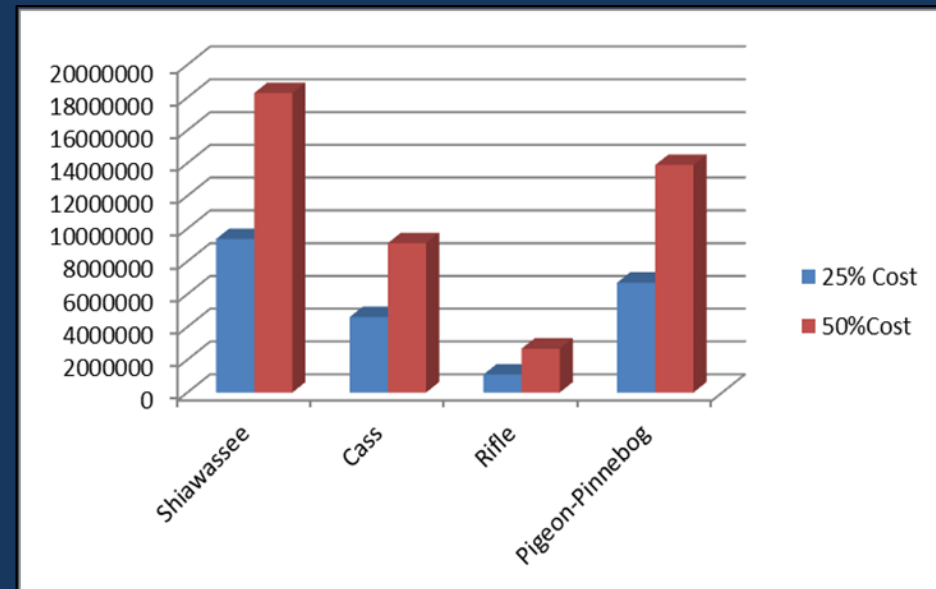
Which Variables Are Limiting and Where?



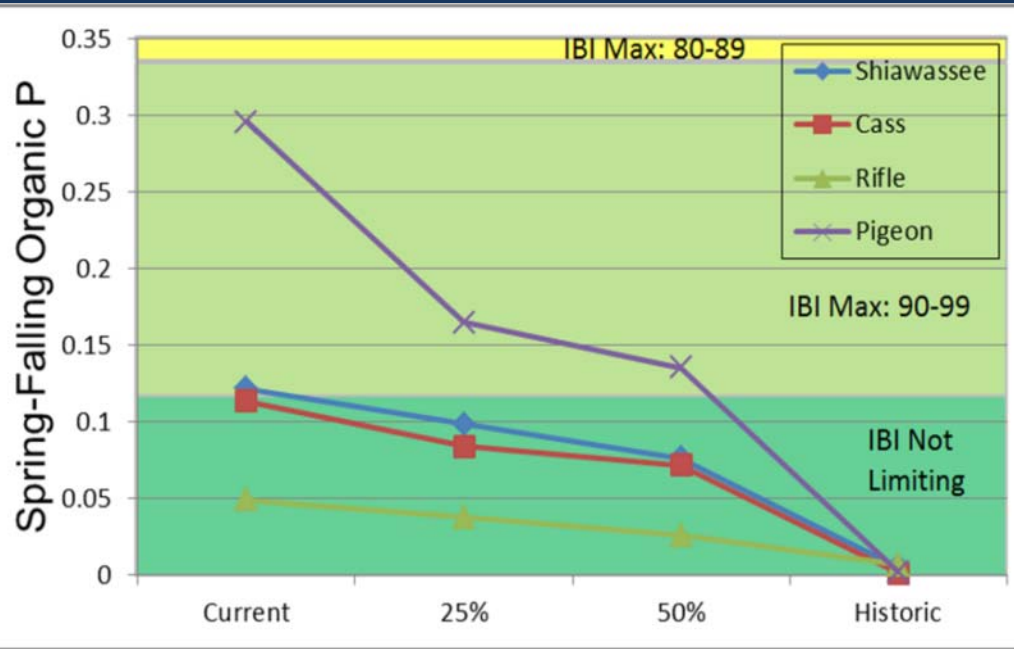
Phase 2:

Linking Practices to Water Quality and Fish

- Within 4 watersheds of Saginaw Bay
- Used SWAT to model changes in water quality under different scenarios (12 BMPs)
 - Current condition
 - Medium (25%)
 - High (50%)
 - Historic Condition
- Assess costs and benefits
 - 25% scenario costs **\$22 M**
 - 50% scenario costs **\$44 M**



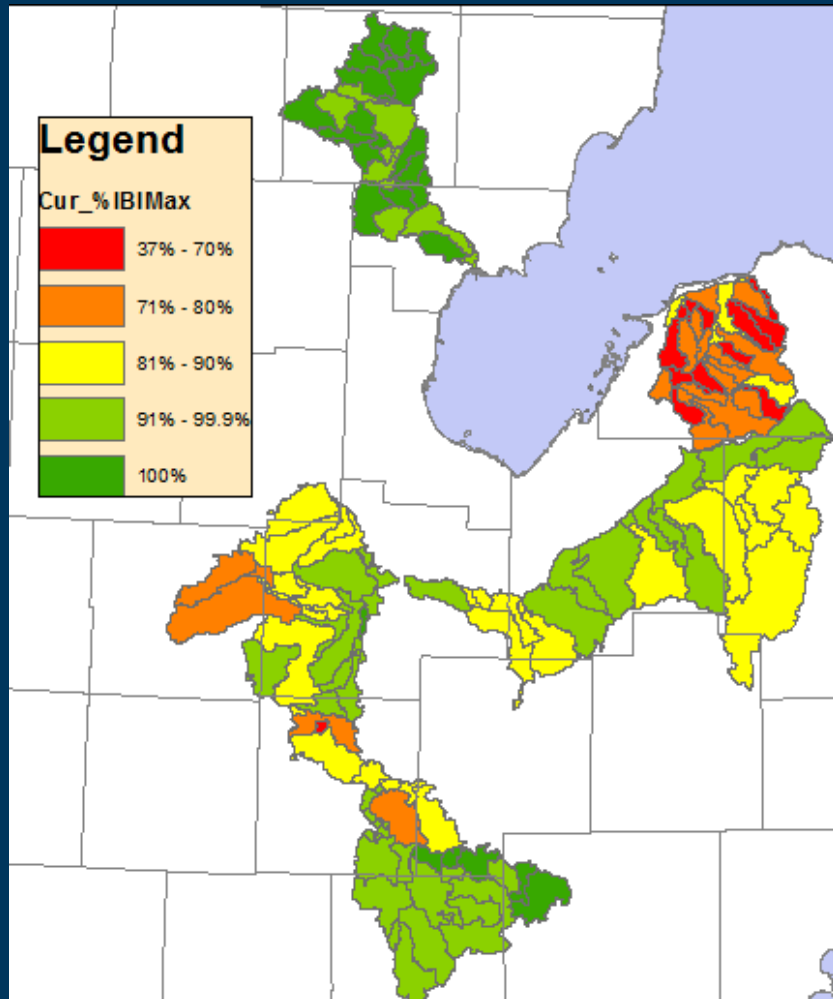
Phase 2: Assessing Costs and Benefits



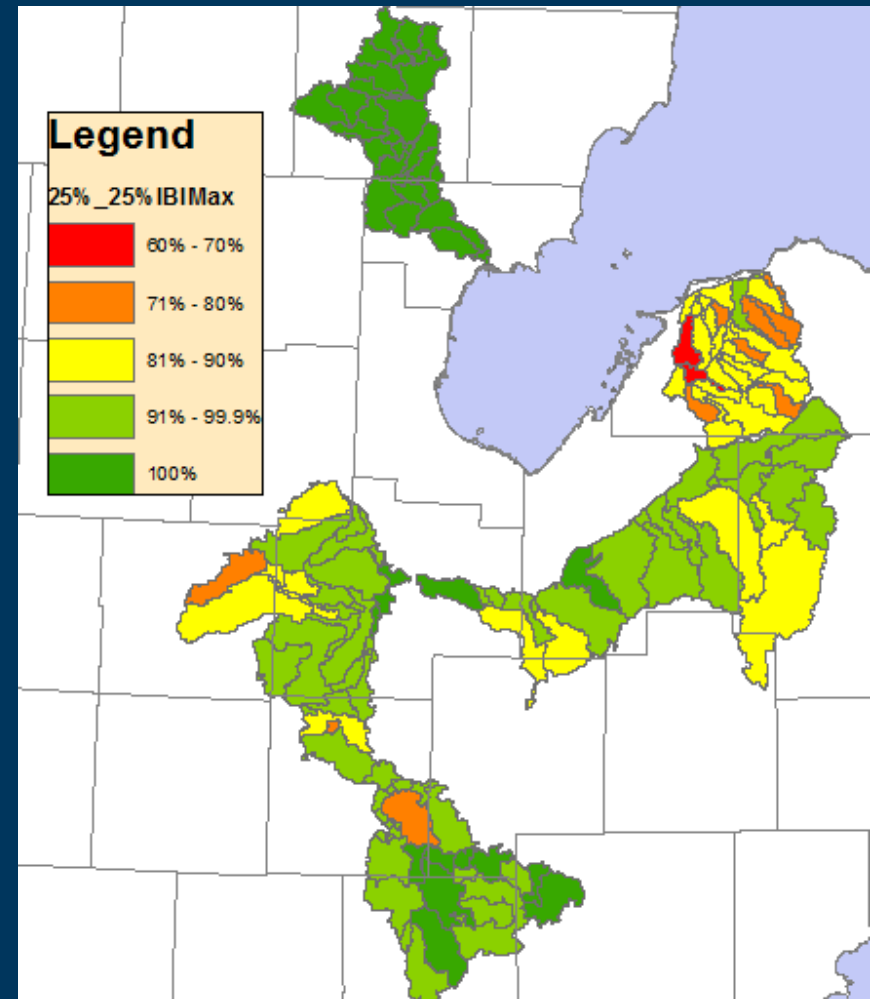
- Can never achieve non-limiting conditions in the Pigeon
- ~\$7.7 M to achieve non-limiting conditions for all 8 variables at the **OUTLET** of the other 3 sub-watersheds

Sub-watershed Comparison: Fish Community Health

Current Condition

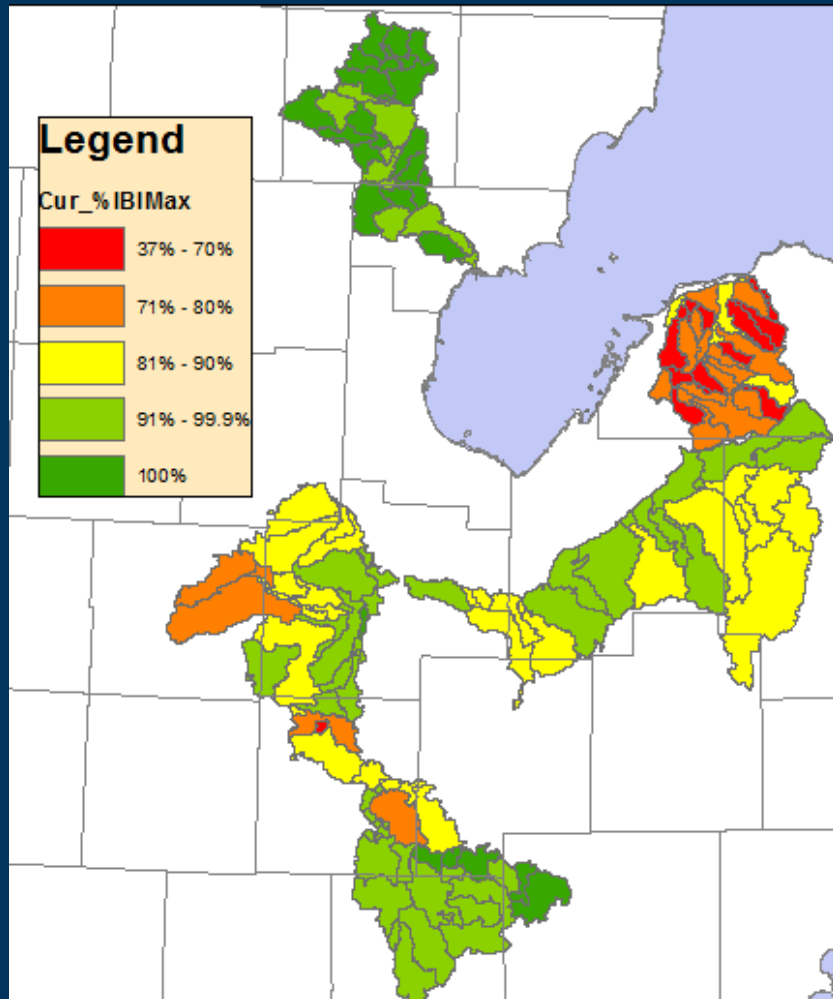


25% BMP

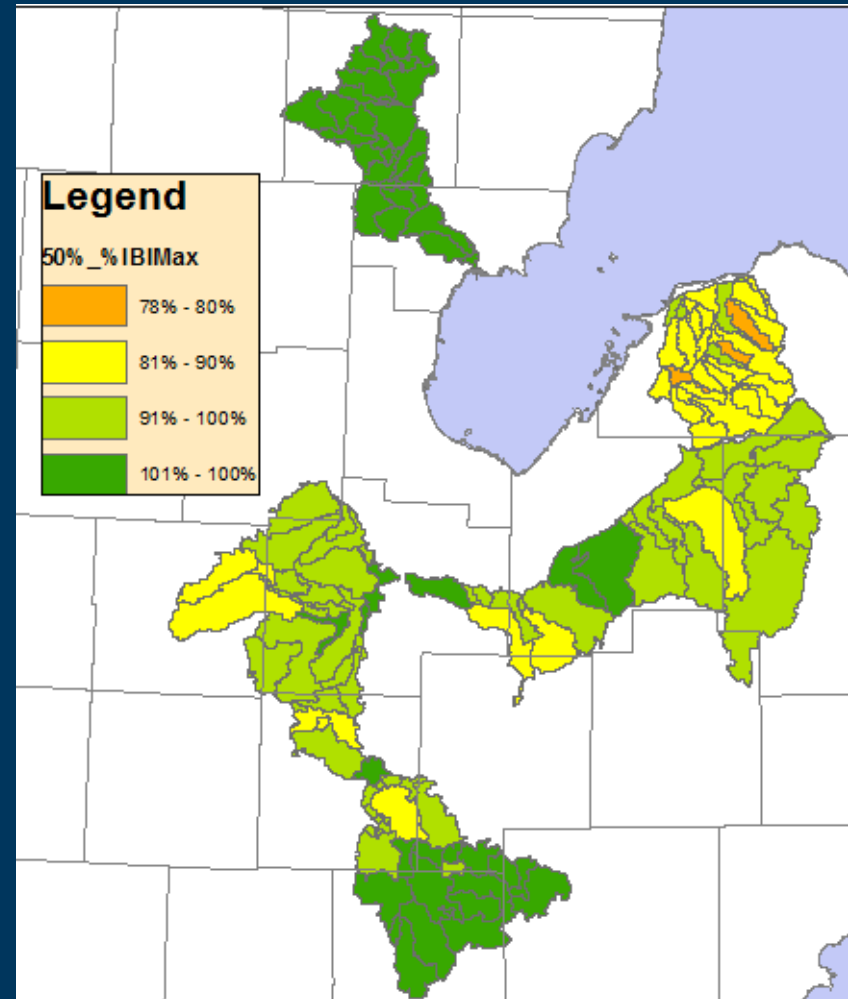


Sub-watershed Comparison: Fish Community Health

Current Condition

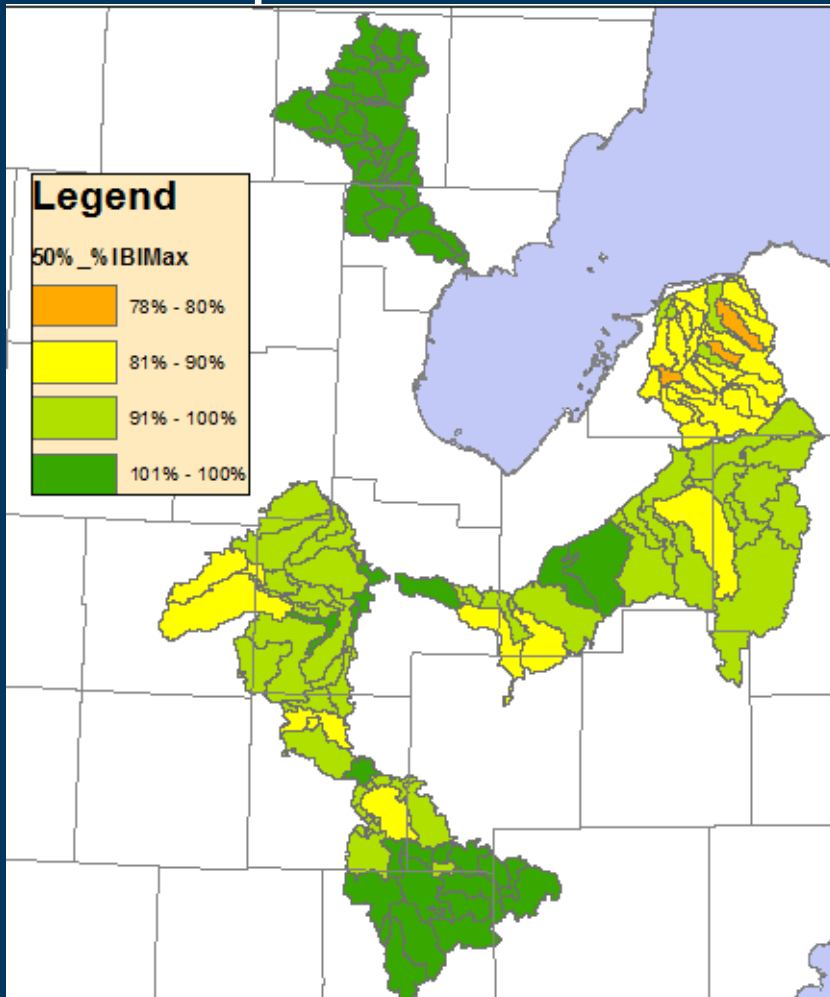


50% BMP



Sub-watershed Comparison: Fish Community Health

50% BMP Implementation

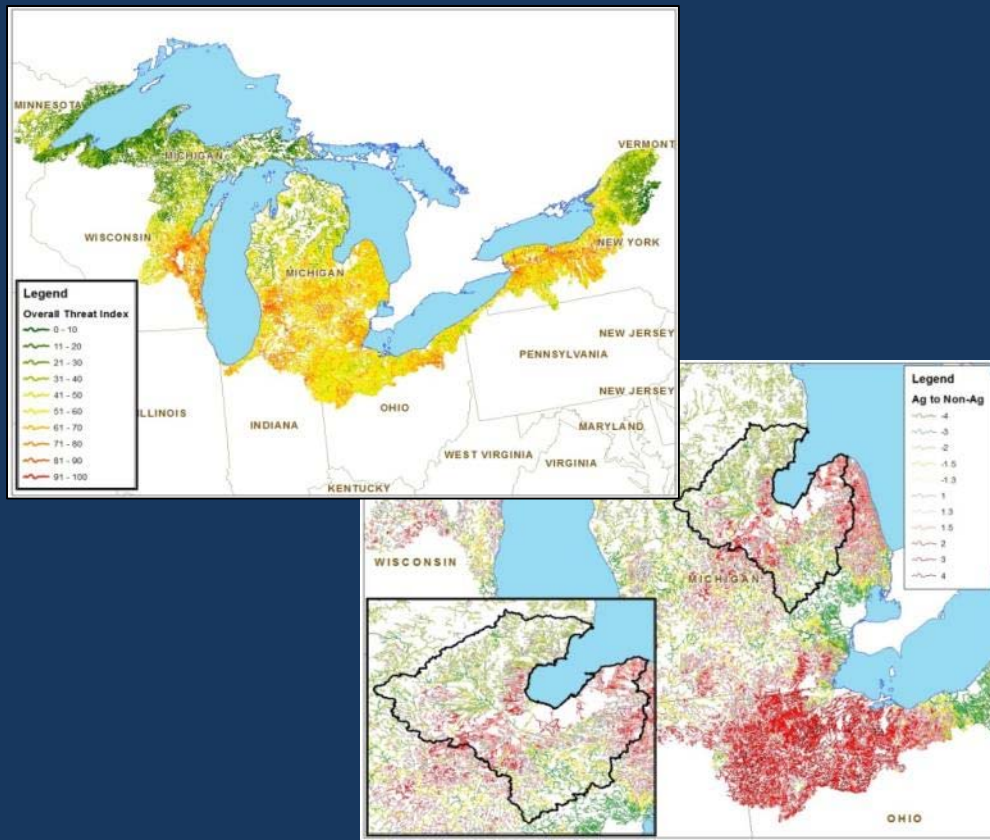


- More than **\$44 million** to achieve non-limiting conditions in all streams of four focal watersheds
- What is a realistic goal?
 - Lower expectations?
 - Conservation innovation?

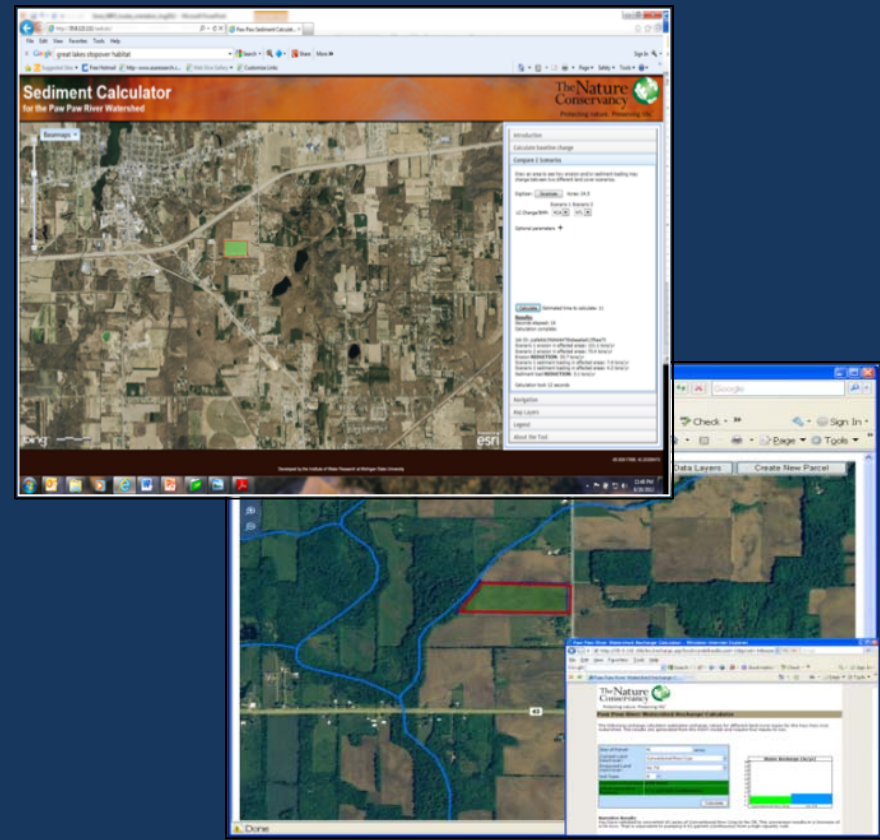
Phase 3: Decision Tools

- Getting the right information to the right people in the right format at the right time to **support the logistics** of strategic conservation

Context



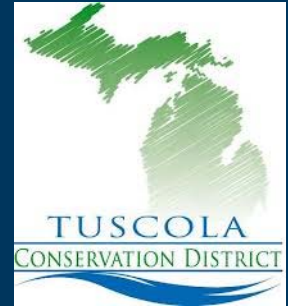
Target and Track



Phase 4: Partner and Test Innovative Strategies

Cass River Watershed Pilot (Tuscola CD)

- Test if information and decision tools can foster changes via traditional Farm Bill to meet conservation action goals



Saginaw Bay (Kellogg's and Star of the West)

- Set watershed scale sustainability goals and related conservation action goals to drive changes in behavior through supply chain demand



Paw Paw River Watershed (Van Buren DC)

- Set ecologically meaningful sediment reduction goals and use models and decision tools to support Drain Fee/Tax Reduction



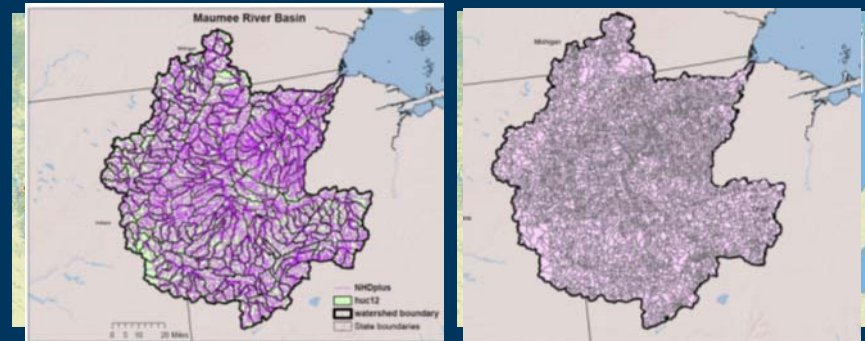
Major Improvements For Western Lake Erie CEAP

- Use multiple biological endpoints (fish and inverts)

- Many Improvements to SWAT Model

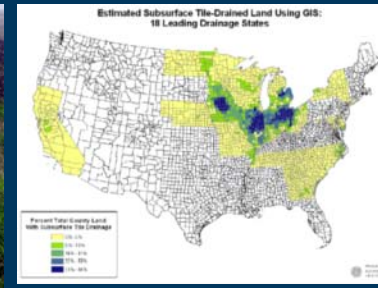
- Downscale Model (NHDPlus)

- 7-8digit; 395-12digit;
11,128-NHDPlus
- Lost 75% of biological data
in Great Lakes CEAP



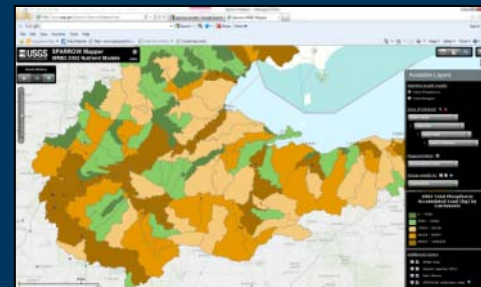
- Better Land Use & Management Data

- Downscaled NRI survey
- Drain tiles



- Spatially distributed WQ validation

- Improve predictions away from gaged sites



We are developing a suite of information and decision tools to:

- Set realistic *ecological* goals
- Set related *conservation action* goals
- Support *logistics* of strategic conservation
- Support *variety* of conservation strategies
- At *multiple scales* and *any location*

Acknowledgments

- USDA NRCS CEAP
- Mott Foundation, Herrick Foundation, and Americana Foundation
- Many, many, coauthors and collaborators

