



# Moving from Monitoring to Management

---

Jo Latimore - Michigan State University  
@JoLatimore













## Stream Monitoring

- Macroinvertebrates
- Habitat
- Road-Stream Crossing Inventories
- Stream Flow

## Lake Monitoring

- Transparency
- Phosphorus
- Invasive Plants
- Score the Shore
- Chlorophyll
- Dissolved Oxygen/Temperature
- Aquatic Plant Mapping



# For researchers, managers...

Challenges	How Met
Access to field sites	Volunteers have access to private and remote sites
Sufficient temporal scale	Emphasis on long-term monitoring
Sufficient spatial scale	Statewide scope
Resources (funding , personnel) to conduct large-scale monitoring	Hundreds of volunteers submit data
Connecting research to real-world needs	Monitoring programs, tools, and training developed in response to public interests and needs
Building public support for freshwater research and management	Public engagement in data collection, sharing of outcomes builds support





# MiCorps Volunteer Monitoring

Improved spatial and temporal coverage

	Streams	Lakes
State	Every 5 years	70 per year
Volunteers	2x per year	225 per year

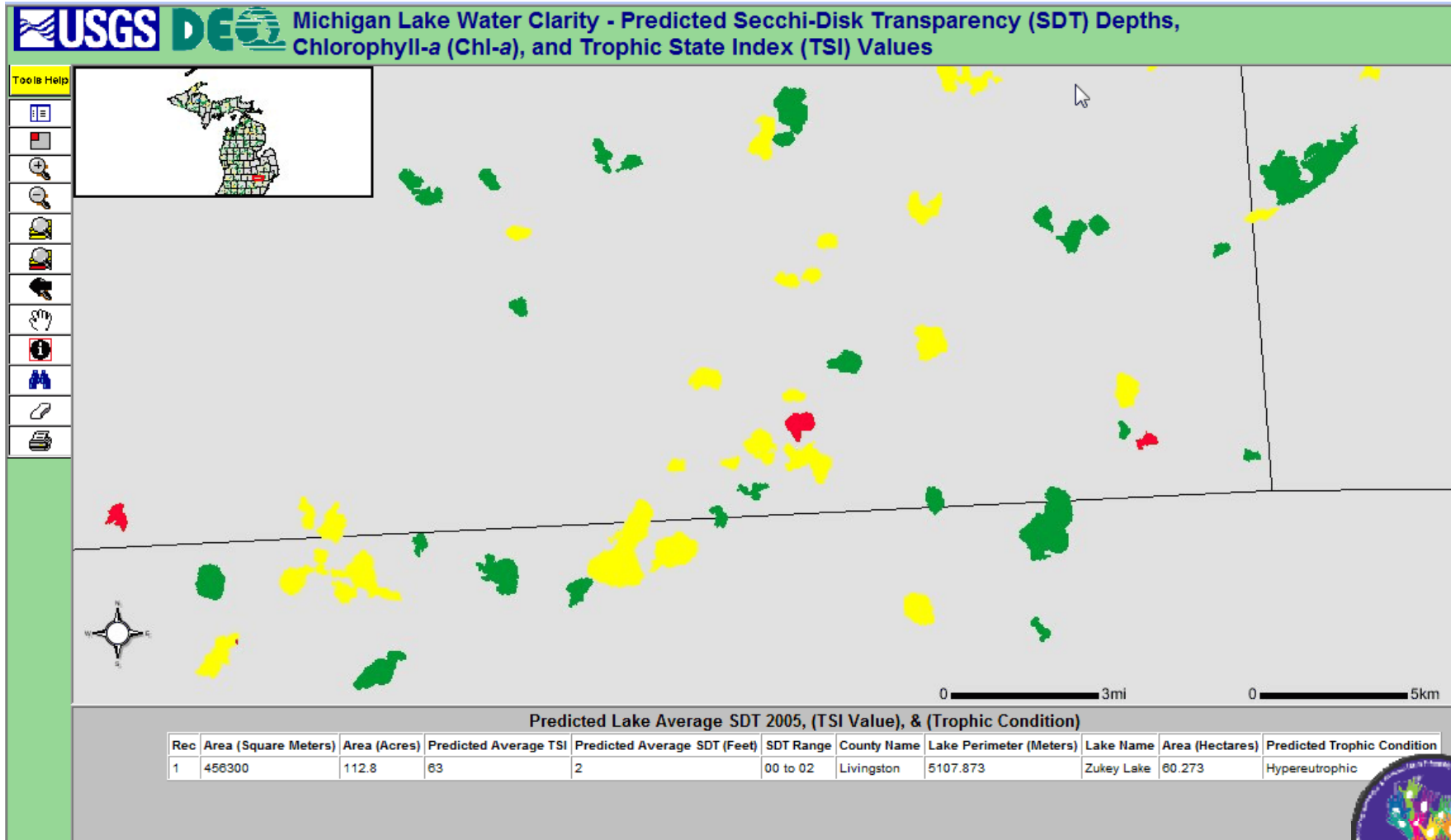
Large scale

Long-term

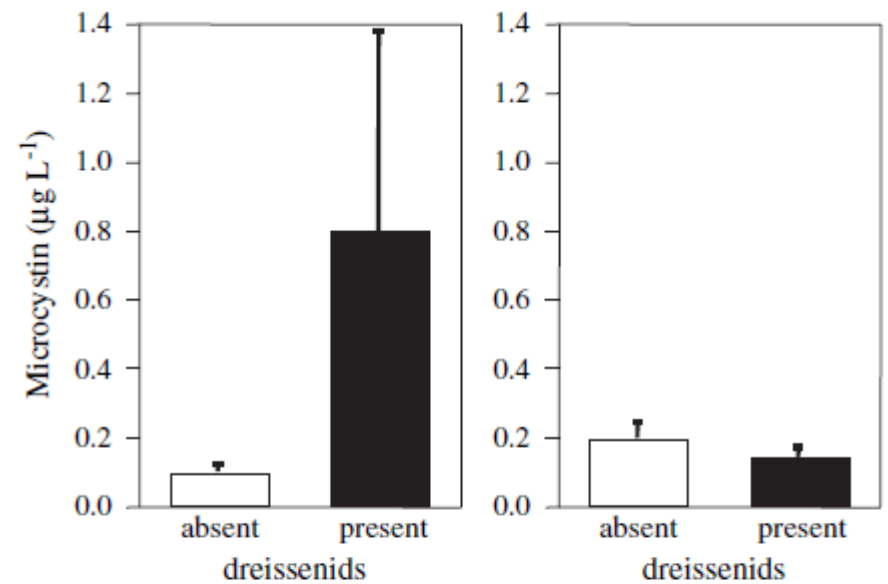
High-quality data



# Predicting Lake Trophic Status by Relating Field Measurements to Satellite Imagery



# Phosphorus, zebra mussels, and harmful algae blooms



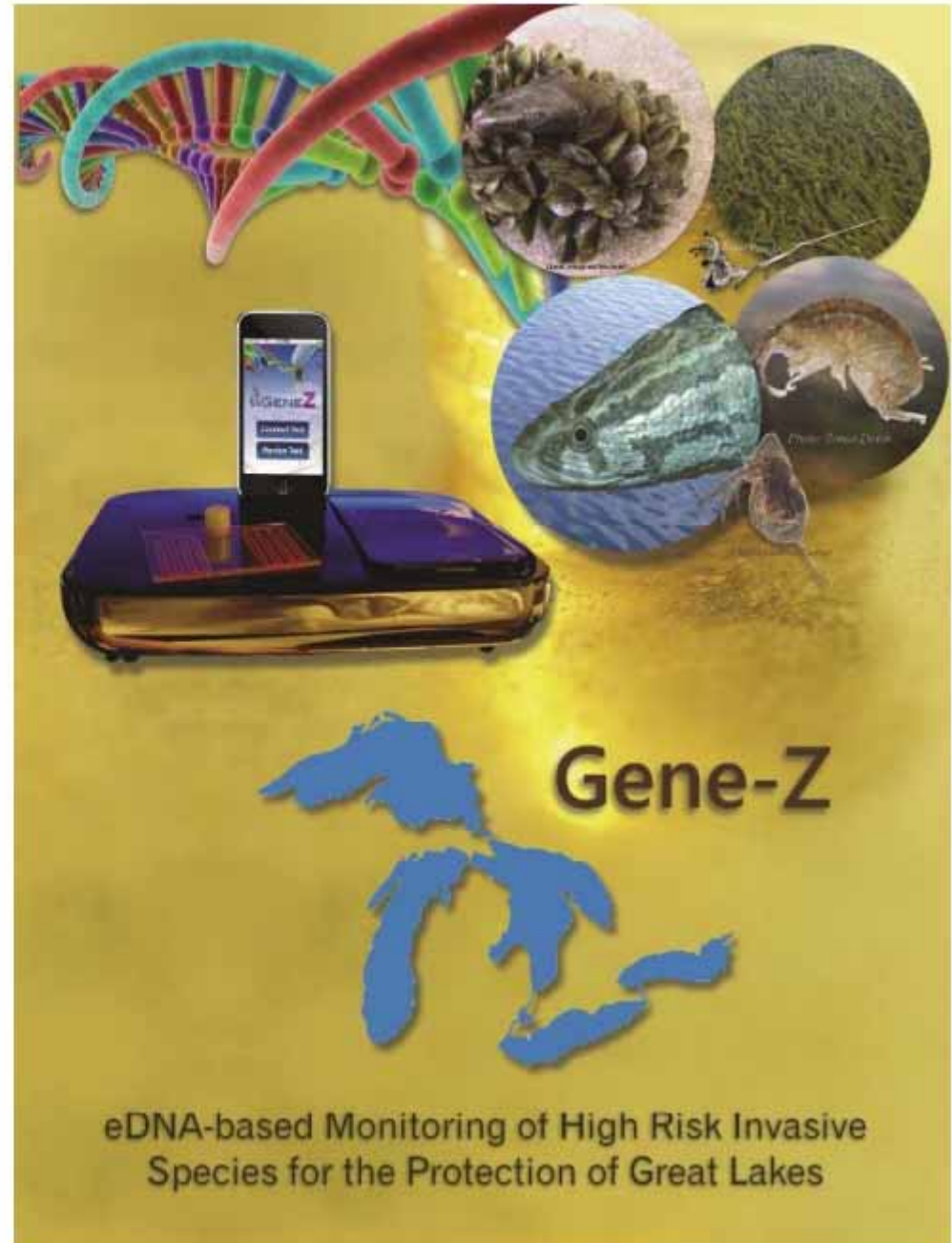
**Fig. 8 - Influence of dreissenid mussels on mean euphotic-zone microcystin concentration (+ 1 SE) for lakes with TP between 5 and 10  $\mu\text{g L}^{-1}$  (left panel) and lakes with TP between 10 and 26  $\mu\text{g L}^{-1}$  (right panel).**





## Project Overview

- eDNA-based monitoring
- Community-based sampling
- Smart phone-based reporting



# For volunteers...

Challenges	How Met
Knowledge of science-based monitoring methods	Standardized protocols and training
Data management	Web-based database with strict quality controls
Assuring validity of volunteer-collected data	Side-by-side field sampling with staff; single lab for all analysis; other quality assurance procedures
Data interpretation	Annual training and conference; annual reports; one-on-one guidance
Awareness of management options	Annual training and conference; individualized guidance



# Millers Creek Rainwater Project

---



Before

After



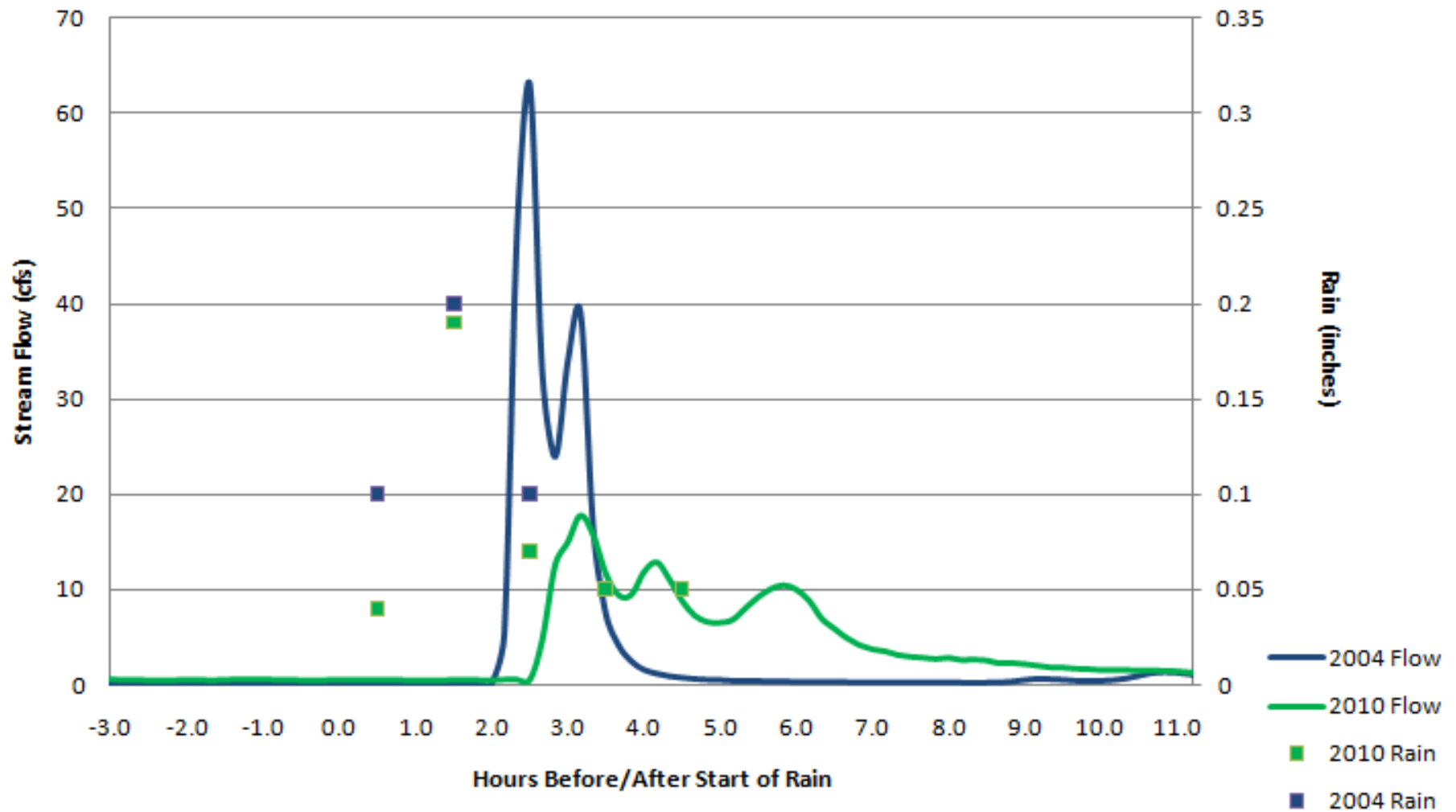


Before

After



# Storm #2 (0.4 inches) Millers Creek flow at Plymouth Road for Similar Storms in 2004 and 2010





# Invasive Species Surprise

---



# Starry Stonewort

## *Invasive Species*

---



Starry Stonewort multiplied to 13 acres within weeks.

Mapping done by consultant



# Timeline

---

- May 22, 2015 – Pre-treatment survey for invasive weeds to be treated, particularly Hybrid Eurasian Milfoil.
- June 9, 2015 – Herbicide treatment by consultant
- June 18, 2015 – Volunteers discover Starry Stonewort during Exotic Aquatic Plant Watch survey
- Sept. 21, 2015 - Treatment for Starry Stonewort (canals 9 acres & offshore 13 acres) and remaining Milfoil (6 acres)













- Indian Lake (Kalamazoo Co.): Lake data used to justify \$230k grant to develop a watershed management plan to reduce nutrient loading
- Eagle Lake (Cass Co.): Data informed the development of a Special Assessment District to fund aquatic plant management, and to influence the local zoning board to limit development along the lakeshore
- Stony Lake (Oceana Co.): Plant data educates property owners and developed a invasive species control plan



# Positive effects of volunteering

---

- Improved science literacy
- Social/community connections
- Access to technical and scientific expertise
- Increased confidence in ability to engage in freshwater issues
- And...



# Communicate and Coordinate

---

Agencies, researchers, and local volunteers



Needs, interests, and capabilities



Collaboration and science-based natural resource management



# For more information...

---



[www.MiCorps.net](http://www.MiCorps.net)

Dr. Jo Latimore  
Michigan State University  
[latimor1@msu.edu](mailto:latimor1@msu.edu)  
517-432-1491  
@JoLatimore